Discussion Paper

For

Revisions to the Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska

March 2017

Abstract: 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. Now, in response to a Ninth Circuit ruling, the Council is considering how to revise the FMP to manage the salmon fisheries that occur in the EEZ waters of Cook Inlet, Prince William Sound, and the Alaska Peninsula. These three areas had been removed from Federal management with the 2012 revisions to the FMP. The Council is considering new management measures in these three areas that comply with Magnuson-Stevens Act requirements, such as status determination criteria, annual catch limits, and accountability measures, for these three fisheries.

(blank page)

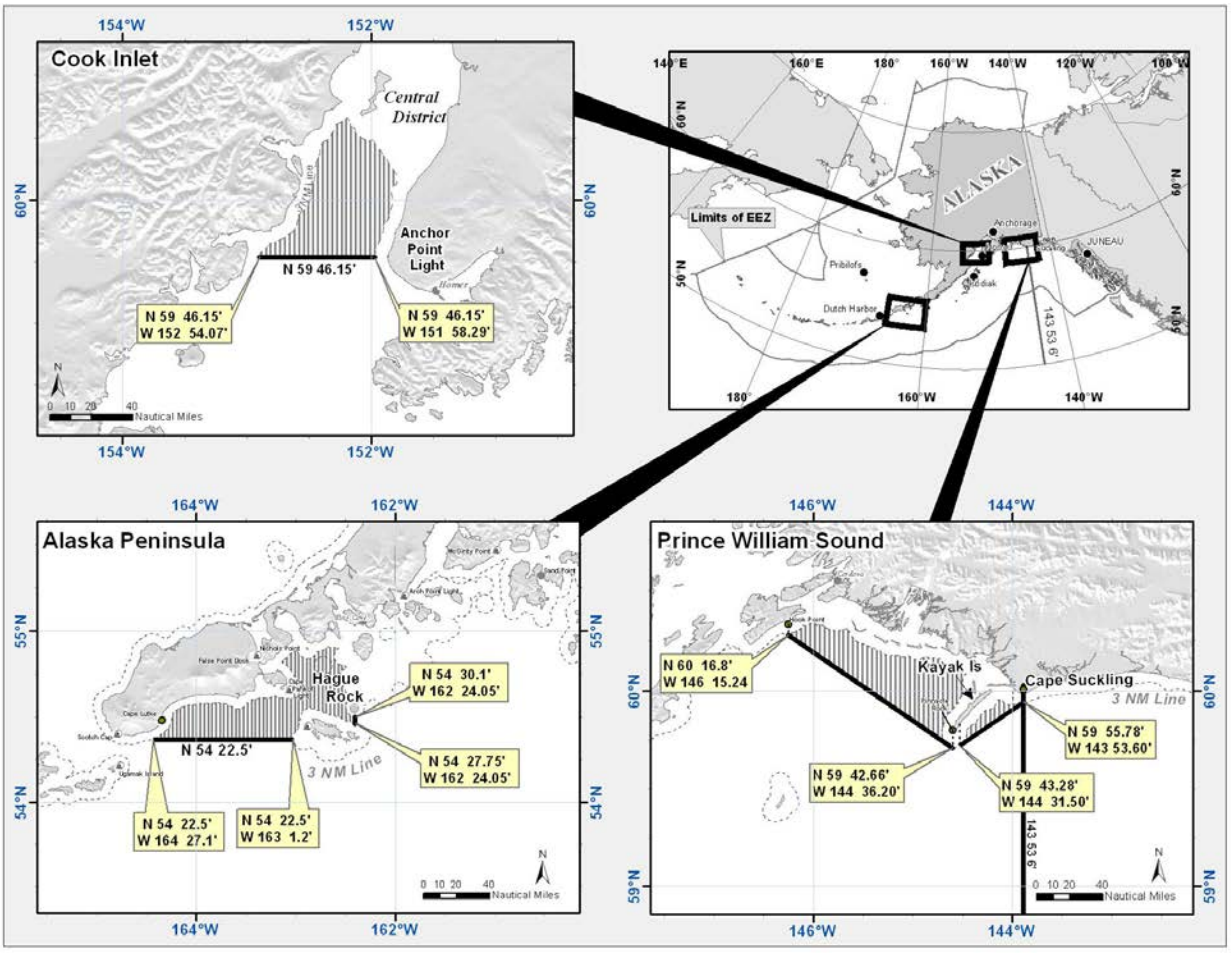
Executive Summary

The North Pacific Fishery Management Council (Council) is considering comprehensively revising and updating the *Fishery Management Plan for the Salmon Fisheries in the EEZ off Alaska* (FMP) to manage the salmon fisheries that occur in Federal waters of Cook Inlet, Alaska Peninsula, and Prince William Sound. The Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) directs each Regional 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; 3 nautical miles to 200 nautical miles offshore). 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 1990a) and 2012 (NMFS 2012). 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 a border at the longitude of Cape Suckling (Figure ES-1-1) and addresses commercial and sport salmon fisheries differently in each area. In the East Area, the 2012 FMP includes all EEZ waters and 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 2012 FMP includes most of the EEZ waters and prohibits commercial salmon fishing in the West Area. Three defined traditional net areas – Cook Inlet, the Alaska Peninsula, and Prince William Sound – were removed from the West Area by the 2012 FMP and the State manages the fisheries in the areas.

The 2012 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. Salmon from individual brood years can return as adults to spawn over a 2 to 6 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. Most salmon stocks are vulnerable to harvest by numerous commercial and sport fisheries in marine areas. Many are also taken in rivers and streams during their spawning migration by subsistence, sport, commercial, and personal use fishermen.

Figure ES-1-1 The FMP's management area, showing the East and West Areas and the three traditional net fishing areas.



The 2012 FMP's unique functions also recognize that the State is the appropriate authority for managing Alaska salmon fisheries given the State's existing infrastructure and expertise. The State manages Alaska salmon stocks throughout their range using a management approach that is designed to specifically 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.

Prior to the 2012 Salmon 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 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 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 to reflect both 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 NMFS implemented, the 2012 FMP that maintained the management structure in the East Area and, in the West Area, modified the FMP to specifically exclude three traditional net commercial salmon fishing areas and the sport fishery from the FMP, and updated the FMP.

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 Salmon FMP. 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's decision is now final, the FMP must be amended to bring it into compliance with the Ninth Circuit's decision, the provisions of the Magnuson-Stevens Act, and other applicable law. Under the Ninth Circuit's decision, the Council and NMFS must amend the 2012 FMP to include the three traditional net fishing areas in the fishery management unit for the West Area and to manage the commercial salmon fisheries that occur in the EEZ waters of these three areas.

Next Steps

The Council will need to amend the 2012 FMP to manage the salmon fisheries in the West Area. For this next FMP revision, which will bring the three traditional net commercial fishing areas back into the West Area and under FMP management, the analysis will focus on ways to apply Federal management to the three traditional net commercial salmon fishing areas in the West Area. Federal management in an FMP must meet the Magnuson-Stevens Act required provisions for an FMP.

The first step for the Council is to develop alternatives for FMP management in the three traditional net fishing areas. Possible alternatives the Council may want to consider could include an alternative that would directly federally manage the fisheries occurring within the EEZ portion of these areas, or an alternative that delegates specific management measures to the State to use existing State salmon management to the extent possible. A summary overview of existing State salmon management in the three traditional net fishing areas is in Chapter 4.

The Council will then need to develop options to address the Magnuson-Stevens Act requirements for the three traditional net areas that are not addressed in the current FMP – namely, management policy and objectives, status determination criteria, annual catch limits and accountability measures, methods to

report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch, and a Fishery Impact Statement, the salmon plan team, and the process for review and appeal of State management measures applicable under the FMP. These requirements are summarized in Table ES-1 and discussed in further detail in Chapter 3. If the Council decides to delegate specific management measures to the State to use existing State salmon management to the extent possible, the Council would need to identify those management functions that would be delegated and how the delegation process would operate. To develop options, the Council may consider forming a committee.

To assist the Council in developing measures to prevent overfishing as required under NS1 of the Magnuson-Stevens Act, this discussion paper also provides a summary description of the process the Pacific Fishery Management Council and NMFS West Coast Region in Chapter 5. Pacific Fishery Management Council and NMFS West Coast Region have a complex process for establishing optimum yield, maximum sustainable yield, allowable biological catch, overfishing levels, minimum stock size thresholds, annual catch limits for the salmon stocks caught in West Coast salmon fisheries. The Pacific Coast Salmon Fishery Management Plan specifies preseason or post-season accountability measures.

This discussion paper also provides information on additional issues that will be analyzed in the Environmental Assessment prepared for the proposed action and its alternatives in Chapter 6.

Table ES-1 Magnuson-Stevens Act § 303 Contents of Fishery Management Plans and next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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 salmon fisheries 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?
(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.
(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	How will the Council assess and specify the MSY and OY in the FMP following the *NS 1 guidelines at 50 CFR 600.310*? 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* 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. Present and probable future condition of the fishery could be addressed in the fishery impact statement.

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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	Address in the FMP.
(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.
(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 for inseason management could be delegated to the State.
(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.

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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?
(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	Work with the ADF&G to compile this information for the FMP. The fishery impact statement can also addressed the *MSA § 303(a)*'s related requirements for fishery information: (1) a description of the fishery, including the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved 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, 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 (16 U.S.C. 1853(a)). *NS Guidelines* provide direction on the types of information to include in a Fishery Impact Statement. For example, the NS8 Guidelines state that FMPs must examine the social and economic importance of fisheries to communities potentially affected by management measures.

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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 level and overfished level) that comply with the *NS 1 guidelines (50 CFR 600.310), NS 2, and the review process at 302(g) and (h) of the MSA*. *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
(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 fisheries? What are the conservation and management measures necessary to minimize bycatch that comply with *50 CFR Subpart R—Standardized Bycatch Reporting Methodology*?
(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.
(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.

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	**Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula**
(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.
(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).

Contents

AAC	Alaska Administrative Code
ABC	acceptable biological catch
ACL	annual catch limit
ADF&G	Alaska Department of Fish and Game
ADOL	Alaska Department of Labor
ADOR	Alaska Department of Revenue
AFSC	Alaska Fisheries Science Center
AM	accountability measure
ANILCA	Alaska National Interest Lands Conservation Act
AS	Alaska Statute
BEG	biological escapement goal
BiOp	biological opinion
Board	Alaska Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
CEQ	Council on Environmental Quality
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
Council	North Pacific Fishery Management Council
CPBD	catch per boat day
CTC	Chinook Technical Committee
CWT	coded-wire tag
DPS	distinct population segment
DSR	demersal shelf rockfish
EDPS	Eastern Distinct Population Segment
E.O.	Executive Order
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EFH	essential fish habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FMP	fishery management plan
FMU	fishery management unit
FONSI	Finding of No Significant Impact
FPEIS	Final Programmatic Environmental Impact Statement
FR	*Federal Register*
ft	foot or feet
GHL	guideline harvest level
GOA	Gulf of Alaska
IFQ	individual fishing quota
IRFA	Initial Regulatory Flexibility Analysis
ITS	incidental take statement
m	meters
MFMT	maximum fishing mortality threshold
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MMPA	Marine Mammal Protection Act
MSST	minimum stock size threshold
MSY	maximum sustainable yield
MTA	Mark, Tag and Age Laboratory
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NMFS	National Marine Fisher\ies Service
NOAA	National Oceanographic and Atmospheric Administration
NPAFC	North Pacific Anadromous Fish Commission
NPFMC	North Pacific Fishery Management Council
NS	National Standard
OEG	optimal escapement goal
OY	optimum yield

PBR	potential biological removal
PSC	prohibited species catch
PSEIS	Programmatic Supplemental Environmental Impact Statement
PWS	Prince William Sound
RFA	Regulatory Flexibility Act
RFFA	reasonably foreseeable future action
RIR	Regulatory Impact Review
RPA	reasonable and prudent alternative
SAFE	Stock Assessment and Fishery Evaluation
SAR	stock assessment report
SBA	Small Business Act
Secretary	Secretary of Commerce
SEIS	Supplemental Environmental Impact Statement
SEG	sustainable escapement goal
SET	sustainable escapement threshold
SPLASH	Structure of Populations, Levels of Abundance, and Status of Humpbacks
SSFP	Sustainable Salmon Fisheries Policy
State	State of Alaska
SWHS	Statewide Harvest Survey
TAC	total allowable catch
UCI	Upper Cook Inlet
U.S.	United States
USCG	United States Coast Guard
USFWS	United States Fish and Wildlife Service
VMS	vessel monitoring system
WDPS	Western Distinct Population Segment
WASSIP	Western Alaska Salmon Stock Identification Project

1 History of the Salmon FMP

The North Pacific Fishery Management Council's (Council'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; 3 nautical miles to 200 nautical miles offshore) off Alaska. The Council developed this fishery management plan (FMP) under the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). 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 1990a) and in 2012 (2012 FMP, NMFS 2012)[1]

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 the salmon fisheries in the EEZ, then known as the U.S. Fishery Conservation Zone. 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 at Cape Suckling, at 143°53'36" 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)), and authorized commercial troll fishing in the East Area. The prohibition on commercial fishing in the West Area 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 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 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.[2]

With time, the 1979 FMP became outdated and some of Alaska's management measures 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 Magnuson-Stevens Act 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

[1] The 2012 Salmon FMP is available at https://www.npfmc.org/wp-content/PDFdocuments/fmp/Salmon/SalmonFMP114.pdf
[2] 35 FR 7070, May 5, 1970. 50 CFR 210.1.

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. The FMP has been amended twelve times since 1979, as detailed in Table 1-1.

On October 29, 1992, Congress repealed the 1954 Act and implemented the *North Pacific Anadromous Stocks Act of 1992* (1992 Stocks Act).[3] 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. 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.[4] 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act and the National Standard 1 (NS1) Guidelines requirements for annual catch limits and accountability measures for stocks managed under an FMP. In December 2010, the Council unanimously 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.

[3] The *North Pacific Anadromous Stocks Act of 1992*, Public Law 102-567, is codified at 16 USC. §§ 5001-5012.
[4] 60 FR 39272, August 2, 1995.

Table 1-1. Amendments to the Salmon FMP.

Amendment	Year Approved	Pertinent Function(s)	Federal Register document
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 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
Amendment 4 (modified by Amend 6)		• Provides a definition of overfishing, as required by NOAA regulations at 50 CFR 602.	56 FR 12385
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.	65 FR 20216
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 an maximum sustainable yield control rule, maximum fishing mortality rate, and minimum stock size threshold for the Southeast Alaska troll fishery	67 FR 1163
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
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
Amendment 10 Permit Fees	2012	• Establish a system to collect fees for permits	77 FR 75570
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
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.	77 FR 75570

In April 2011, the Council reviewed a preliminary document that, along with a draft of the FMP that combines the 1990 FMP with all of the subsequent amendments, provides a thorough review of the amended 1990 FMP and a basic discussion of how and to what degree federal requirements are 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.

NMFS published a notice of availability for Amendment 12 on April 2, 2012 (77 FR 19605) and a proposed rule on April 20, 2012. 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). The Salmon FMP, as amended through Amendment 12, titled *Fishery Management Plan for the Salmon Fisheries in the EEZ Off Alaska,* is referred to as the 2012 FMP in this discussion paper.

1.1 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 Magnuson-Stevens Act. 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act, including National Standards 3 and 7, the Administrative Procedure Act, and 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act was reasonable. The district court also determined that NMFS had not violated other provisions of the Magnuson-Stevens Act, 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 Magnuson-Stevens Act 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 Magnuson-Stevens Act, 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 Magnuson-Stevens Act. 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 Magnuson-Stevens Act, 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. The State of Alaska's petition to the Supreme Court does not stay the decision of the Ninth Circuit.

Because the Ninth Circuit's decision is now final, the FMP must be amended to bring it into compliance with the Ninth Circuit's decision, the provisions of the Magnuson-Stevens Act, 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 have to be amended to address all three traditional net fishing areas.

1.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Act contains three primary sections that govern fishery management plans; plans that apply to the salmon fisheries in the FMP; the requirement that a Council prepare and submit a fishery management plan for fisheries requiring conservation and management in section 302, the ten national standards in section 301 and required contents of fishery management plans in section 303. These

sections are excerpted below.[5] Additionally, NMFS published National Standard Guidelines (NS Guidelines; 50 CFR 600.310-600.355) to provide comprehensive guidance for the development of FMPs and FMP amendments that comply with the Magnuson-Stevens Act national standards.

SEC. 301. NATIONAL STANDARDS FOR FISHERY CONSERVATION AND MANAGEMENT

(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.

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

(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).

2 Comparison of 1990 Salmon FMP and the 2012 Salmon FMP

The 1990 FMP contained only a few of the necessary amendments for the requirements of the Magnuson-Stevens Act or NS Guidelines. Importantly, the 1990 FMP's function in the three traditional net areas in the West was vague and did not reflect the Council's policy with respect to these areas. As a result, the 1990 FMP was no longer a viable FMP and it required substantive revisions. The Council developed the 2012 FMP to address these issues.

The EA prepared for Amendment 12 provides a detailed comparison of the changes from the 1990 FMP to the 2012 FMP. This section focuses on a comparison for the three traditional net fishing areas.

2.1 The Fishery Management Unit in the 1990 FMP

The fishery management unit of the 1990 FMP was composed of all waters of the EEZ off Alaska and the salmon fisheries that occur there (Figure 2-1).[6] The 1979 FMP established federal authority over salmon fisheries in the EEZ but excluded that portion of the EEZ west of 175° E. longitude. Amendment 3 (1990) to the FMP extended jurisdiction to the area of the EEZ west of 175° E. longitude and expressly deferred regulation of the sport fishery and the Southeast Alaska commercial troll salmon fishery to the State. Commercial and sport salmon fisheries occurring in the EEZ are governed by State regulations.[7] Although the Council and NMFS are removed from routine management of salmon fisheries in the EEZ, the FMP asserts and reserves federal authority and general NMFS and Council participation in and oversight of salmon management in the EEZ.

The FMP includes all five species of Pacific salmon in the EEZ:

Chinook salmon (king), *Oncorhynchus tshawytscha*;

Coho salmon (silver), *Oncorhynchus kisutch*;

Pink salmon (humpy), *Oncorhynchus gorbuscha*;

Sockeye salmon (red), *Oncorhynchus nerka*; and

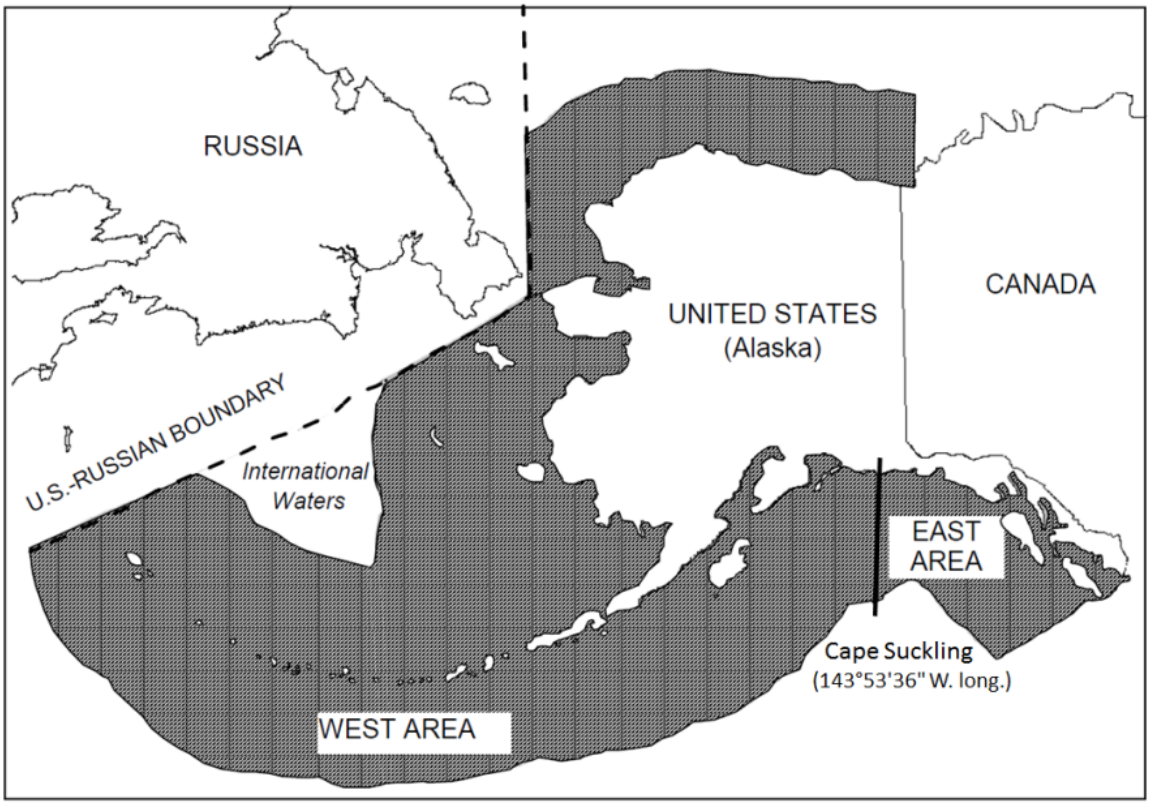
Chum salmon (dog), *Oncorhynchus keta*.

The 1990 FMP established two management areas within its fishery management unit, the East Area and the West Area. The border between the two areas is at the longitude of Cape Suckling, at 143°53'36" W. longitude. The 1990 FMP addresses commercial salmon fisheries differently in the East and the West Areas, as described below.

The intended effect of the 1990 FMP was to conserve and manage the salmon resources in the North Pacific Ocean and to allow the fisheries that occur in State and EEZ waters to be managed as one fishery. The 1990 FMP explicitly delegated management of the commercial troll and sport fisheries to the State, to manage consistent with State and federal laws, including the Pacific Salmon Treaty between the United States and Canada.

[6] Salmon FMP, Section 2.1.
[7] Salmon FMP, Section 2.2.

Figure 2-1 The 1990 FMP's management area, showing the East and West Areas.



East Area

The East Area is that portion of the EEZ off Alaska east of Cape Suckling.[8] Under the 1990 FMP, the Council delegates the regulation of the commercial troll and sport salmon fisheries in the East Area to the State of Alaska, pursuant to the Magnuson-Stevens Act. The Southeast Alaska commercial salmon troll fishery is 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 sets forth the Council's management goals and objectives for the salmon fisheries in the East Area, which accordingly focus on the Southeast Alaska commercial troll fishery.[9] 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 one percent of the total harvest of pink, chum, and sockeye salmon occurring in southeast waters. The troll

[8] 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).
[9] 1990 FMP, Section 4.2, including subsections.

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.

West Area

The West Area is 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 describes 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. More information on these fisheries is provided in Chapter 4.

The 1990 FMP was vague on the function of the FMP in these areas. Although 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 1990 FMP did not explicitly delegate management of these salmon fisheries to the State.[10] 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).[11] However, in 1992, Congress repealed the 1954 Act and implemented the *North Pacific Anadromous Stocks Act of 1992* (1992 Stocks Act).[12] 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*. 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* and do not extend into the U.S. EEZ as did the 1954 Act. Therefore, the other federal law that authorized state management of the net fisheries, in lieu of the 1990 FMP, no longer exists.

2.2 The Fishery Management Unit in the 2012 Salmon FMP

The 2012 FMP 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 Magnuson-Stevens Act. The 2012 FMP also retained all five species of Pacific salmon in the EEZ in the FMU.

The 2012 FMP 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

[10] 1990 FMP, Section 2.2.2.
[11] 1990 FMP, Section 2.2.2.
[12] The *North Pacific Anadromous Stocks Act of 1992*, Public Law 102-567, is codified at 16 USC. §§ 5001-5012.

traditional net areas in the FMU, imposing federal management on the salmon fisheries in these three traditional areas, and delegating management to the State, the 2012 FMP 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.

West Area

Amendment 12 modified the FMP's management area to remove the three traditional net areas (Figure 2-2, Figure 2-3, and Figure 2-4) from the West Area. Removing these three areas from the 2012 FMP's management area excludes 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 2012 FMP continues to prohibit commercial salmon fishing in the redefine 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 2012 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 2012 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 the 2012 FMP, the Council considered federal management of the three traditional net fishing areas and the salmon fisheries that occur within them, but determined that the State was managing the salmon fisheries within these three area consistent with the policies and standards of the Magnuson-Stevens Act, the Council and NMFS do not have the expertise or infrastructure to manage Alaska salmon fisheries, and 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 2012 FMP maintained the Council's policy for salmon management established with the original FMP in 1979.

Figure 2-2 Cook Inlet Area – The EEZ waters that are excluded from the management area are those waters north of the line from Anchor Point.

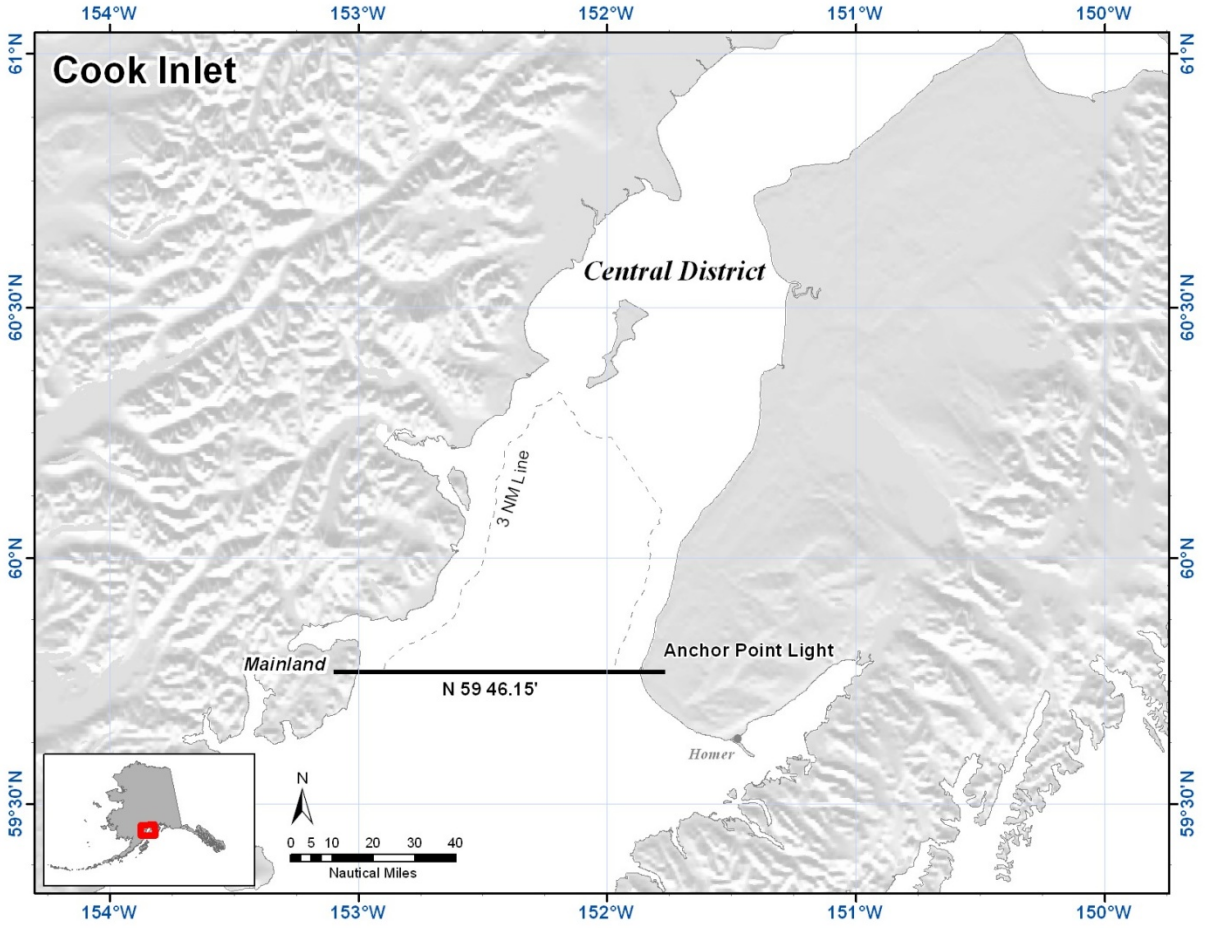


Figure 2-3 Prince William Sound Area– The EEZ waters that are excluded from the management area are shoreward of the line from 3 miles south of Hook Point to 3 miles south of Pinnacle Rock and from a line at state waters at Pinnacle Rock to 3 miles south of Cape Suckling.

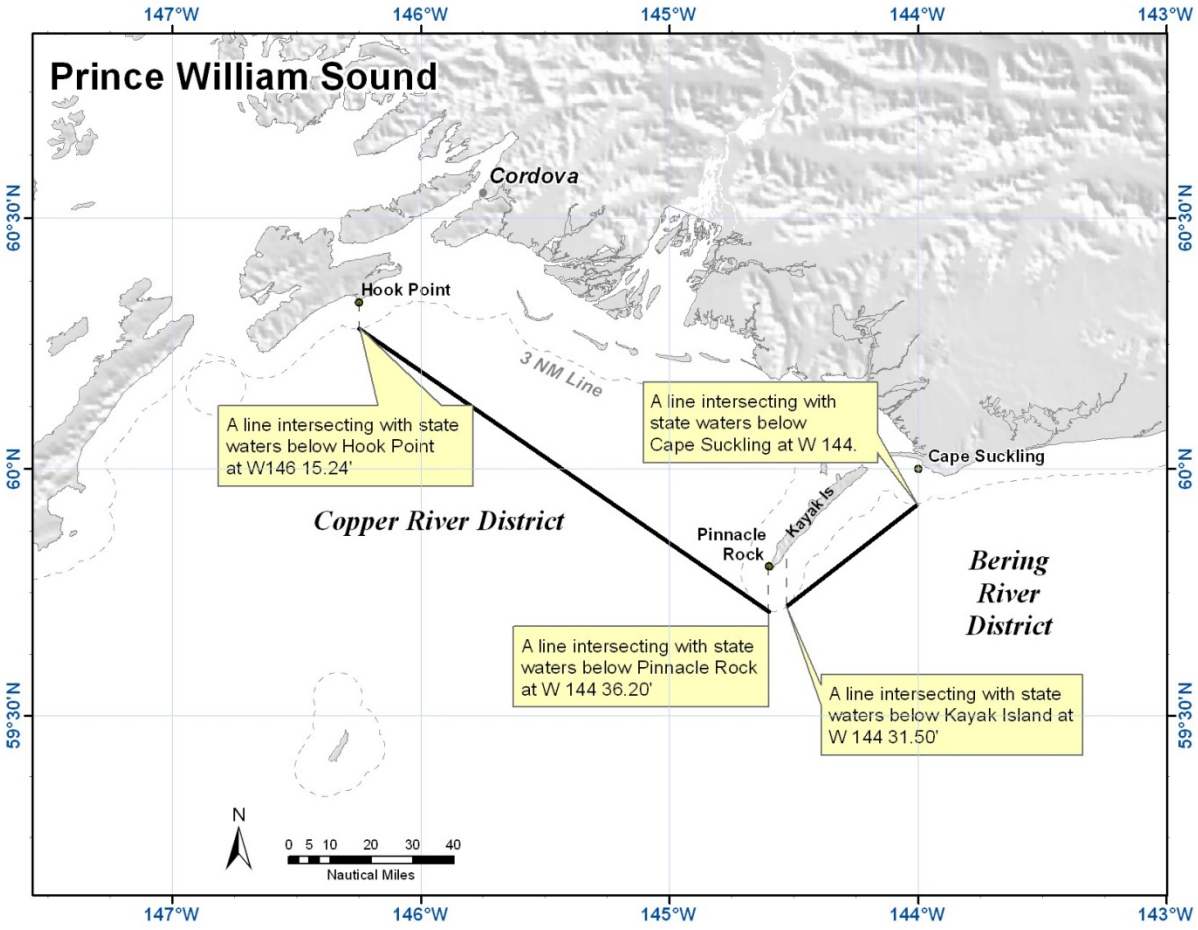
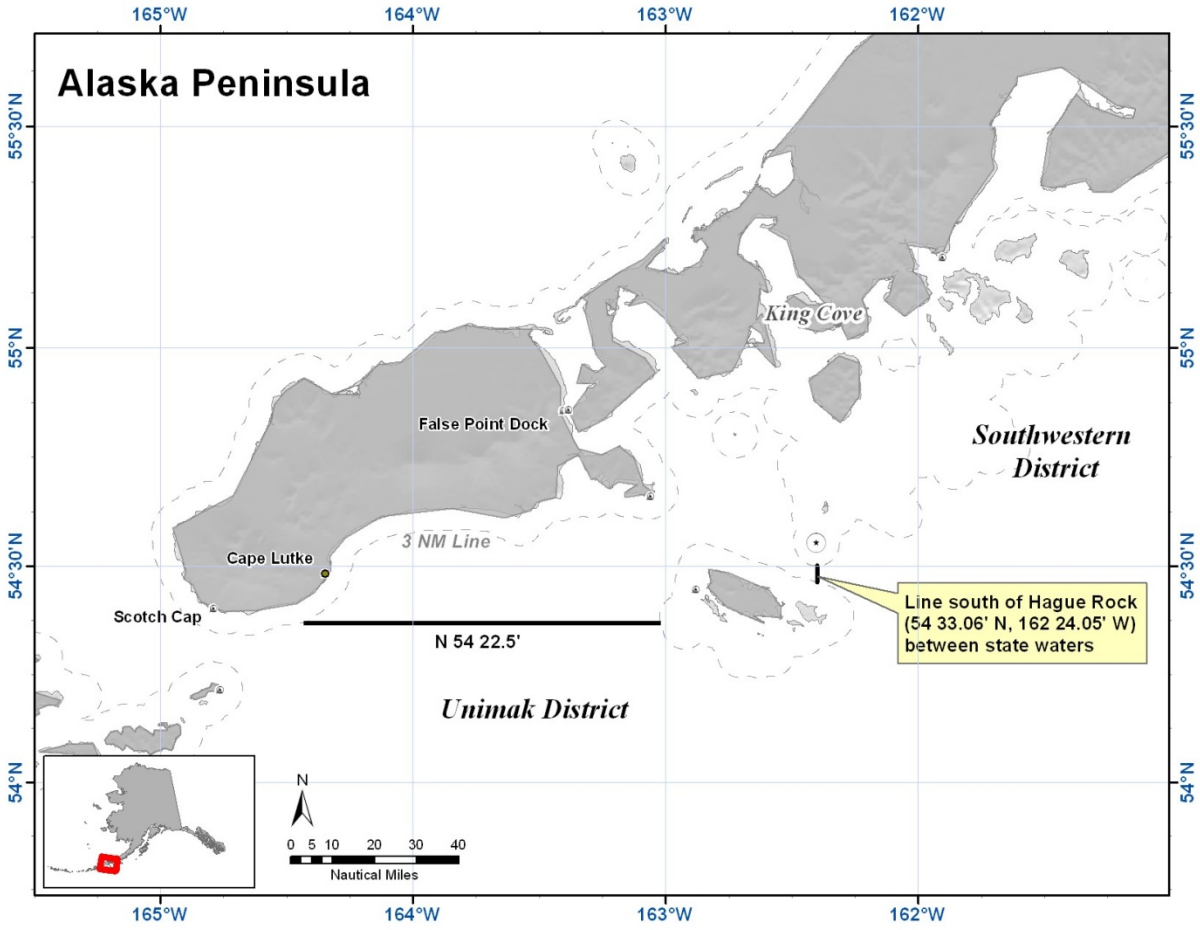


Figure 2-4 Alaska Peninsula Area – The EEZ waters that are excluded from the management area are shoreward starting from the line at 54°22.5' and a line south of Hague Rock between state waters.



3 Amending the 2012 FMP to manage the commercial salmon fisheries in EEZ waters in Cook Inlet, Prince William Sound, and the Alaska Peninsula in the Salmon FMP

Under the Ninth Circuit's decision, the Council and NMFS must amend the 2012 FMP to include the three traditional net fishing areas in the FMU for the West Area and to manage the commercial salmon fisheries that occur in the EEZ waters of these three areas. [13] Possible alternatives the Council may want to consider could include direct Federal management of the fisheries occurring within the EEZ portion of these areas, or alternatives that divide management authority between the Council and NMFS and the State by delegating to the State varying levels of management authority.

The Magnuson-Stevens Act is the primary domestic legislation governing management of the nation's marine fisheries. The Magnuson-Stevens Act 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 Magnuson-Stevens Act requires a fishery management plan contain specific conservation and management measures. Section 301(a) of the Magnuson-Stevens Act requires a fishery management plan be consistent with ten National Standards. Additionally, NMFS published National Standard Guidelines (NS Guidelines; 50 CFR 600.310-600.355) to provide comprehensive guidance for the development of FMPs and FMP amendments that comply with the Magnuson-Stevens Act national standards, and should be closely considered when developing options for meeting the Magnuson-Stevens Act requirements. The 2012 FMP does not address any of these requirements for the fisheries in the three traditional net fishing areas, except for EFH.

Because the Salmon FMP must be amended to include the three traditional net fishing areas and manage the commercial salmon fisheries occurring within them, this discussion paper preliminarily identifies the Magnuson-Stevens Act requirements that are not addressed for the three areas. The FMP does not contain, among other things, status determination criteria for determining when a stock is overfished or experiencing overfishing, annual catch limits (ACLs) and accountability measures (AMs), methods to report bycatch and measures to minimize bycatch and the mortality of unavoidable bycatch, or a Fishery Impact Statement. This discussion paper also identifies next steps and decision points for Council consideration that use existing State salmon management to the extent possible.

A new Federal/State management regime would need to be created and implemented for the salmon fisheries in the three traditional net fishing areas in the West Area.[14] Specific objectives and management measures would be required in the FMP to provide sufficient framework to define state and federal roles under a delegated management program in the West Area. Specific objectives and management measures for the three traditional net fishing areas would need to be established in order to comply with the

[13] The Council and NMFS may also need to reconsider whether the sport fishery in the West Area requires conservation and management in light of the Ninth Circuit's decision. NMFS will provide the Council with more information on this when the Council next considers the new Salmon FMP amendment.

[14] For the remainder of this discussion paper and unless otherwise noted, "West Area" refers to the salmon fisheries occurring in the EEZ potions of the three traditional net fishing areas.

Magnuson-Stevens Act, define roles, and address concerns that may arise under delegated management in the West Area.

Updating the 2012 FMP will require extensive exchanges of information and continued coordination among Alaska Department of Fish and Game (ADF&G), NMFS, and Council staff, as well as coordination with the Alaska Board of Fisheries (Board). The 2012 FMP would need to be updated and revised to establish management measures that meet Magnuson-Stevens Act requirements and NS Guidelines for the three traditional net fishing areas. This chapter initially identifies for Council consideration the following provisions as necessary to manage the three traditional net fishing areas under the Magnuson-Stevens Act.

The Council will need to clarify the FMP's management policy and objectives for the commercial salmon fisheries in the West Area. To address Magnuson-Stevens Act provisions, new management measures that do not currently exist would need to be developed for the fisheries in the West Area, such as including status determination criteria, a mechanism for specifying annual catch limits, a mechanism for standardized bycatch reporting, and measures to minimize bycatch to the extent practicable. Additionally, the Council or NMFS may decide that it is necessary to apply additional federal requirements to salmon vessels fishing in the West Area, such as or electronic monitoring, recordkeeping and reporting requirements, or vessel monitoring systems.

Defining the FMP's role in the three traditional net fishing areas 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 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.

Per the Magnuson-Stevens Act, FMP management in the West Area would only apply to the EEZ and that portion of the salmon fisheries that occur in the EEZ in each traditional net fishing area. Under the Magnuson-Stevens Act, an FMP only has authority to manage the fisheries that occur in the EEZ. The Magnuson-Stevens Act is clear that nothing in the Magnuson-Stevens Act shall be construed as extending or diminishing the jurisdiction or authority of any state within its boundaries.[15] Absent formal preemption in accordance with Magnuson-Stevens Act § 306(b), the Magnuson-Stevens Act does not provide authority for the Council to manage fisheries in state waters, which would be required for the Council to change escapement goals or to allocate more salmon to a specific gear group, or to direct the State to make these types of changes.

The Magnuson-Stevens Act does provide the Secretary the ability to preempt state management and assume responsibility for the regulation of a fishery in state waters under two conditions. First, the

[15] 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.

fishery must occur predominantly within the EEZ. Second, 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 fisheries regulations require data, analysis, and an extensive process. NMFS does not have the information, expertise, or infrastructure necessary to manage Alaska salmon fisheries in federal or State waters, at present.

FMP management would not be able to control harvests in State waters and would have to be responsive to harvests in state waters. In other words, the EEZ portion of the fishery would only occur if there was harvestable surplus after accounting for 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 a fishery occurs in both state and federal waters, federal management of the federal portion of the fishery is responsive to state management of the portion of the fishery that occurs in state waters. An example of this occurs in the Pacific cod fisheries in the Gulf of Alaska and Aleutian Islands. The federal Pacific cod total allowable catch is set taking 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.

3.1 Management Policy and Objectives

For Amendment 12, the Council developed a new management policy and six objectives. The 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 developing the management policy and objectives, the Council recognized that these objectives cannot be accomplished by an FMP alone. To that end, the 2012 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 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 three net fishing areas in the West Area, the Council will need to consider whether to develop a new management policy and objectives for, or revise the current management policy and/or the objectives to apply to the salmon fisheries in Cook Inlet, Prince William Sound, and the South Alaska Peninsula.

The following are the Council's management policy as stated in section 3.1 and the Council's management objectives as stated in section 3.2 of the 2012 FMP:

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.

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.

3.2 Roles of agencies in implementing the FMP

To amend the 2012 FMP to manage the commercial salmon fisheries in the three traditional net fishing areas, the new FMP amendment would need to establish the roles of the appropriate State and Federal agencies in implementing FMP management in those areas. The Council could choose to delegate certain management responsibilities to the State. This would entail establishing which specific types of management measures should be delegated to the State and requirements associated with delegated authority.

Under § 306(a)(3)(B)(3) of the Magnuson-Stevens Act, 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 1990 FMP was in place on August 1, 1996 and the 1990 FMP did not delegate management of the commercial salmon fisheries in the three traditional net fishing areas the State as of that date, the Council would need to approve a delegation of management of the fishery to the State by a three-quarters majority vote of the voting members of the Council.

The 2012 FMP delegates regulation of the commercial troll and 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 are consistent with this FMP, the Magnuson-Stevens Act, and other applicable federal law. Chapter 9 describes the ways in which the Council and NMFS will monitor 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 Magnuson-Stevens Act, or other applicable federal law. In addition to this delegation, the 2012 FMP contains the required FMP measures under section 303(a) of the Magnuson-Stevens Act for the East Area.

The Council has two other FMPs that delegate much of the day-to-day management of those fisheries to the State, with federal oversight – the Fishery Management Plan for the Bering Sea/Aleutian Islands King and Tanner Crabs (crab FMP) and the Fishery Management Plan for the Scallop Fisheries off Alaska (scallop FMP). These fishery management plans implement federal management measures and delegate specific categories of management measures to the State. These fishery management plans have provisions, either implemented by NMFS or the State, that address each requirement in Magnuson-Stevens Act § 303(a), and many other federal requirements, such as a federal limited access program, up to 100% observer coverage, and mandatory vessel monitoring system. **Table 3-1** provides a list of the management measures in the crab FMP that are under either Federal or State jurisdiction.

Table 3-1. Management measures in the Crab FMP implemented for the BSAI king and Tanner crab fisheries, by category.

Category 1 (Federal)	Category 2 (State with criteria frameworked in FMP)	Category 3 (State's discretion)
Legal Gear	Minimum Size Limits	Reporting Requirements
Permit Requirements	Guideline Harvest Levels/ Total Allowable Catch	Gear Placement and Removal
Federal Observer Requirements	Inseason Adjustments	Gear Storage
Limited Access Norton Sound Superexclusive Registration Area	Districts, Subdistricts and Sections	Gear Modifications
Essential Fish Habitat	Fishing Seasons	Vessel Tank Inspections
Habitat Areas of Particular Concern	Sex Restrictions	State Observer Requirements
Status determination Criteria (optimum yield, overfishing and overfished)	Closed Waters	Bycatch Limits (in crab fisheries)
Annual Catch Limits and Accountability Measures	Pot Limits	Other (requires consultation with the Council)
Quota Share and Individual Fishing Quota	Registration Areas	
Processor Quota Share and Individual Processing Quota		
Vessel Monitoring Systems		
Reporting Requirements for Crab Rationalization Program		

3.3 Status Determination Criteria (overfishing and overfished)

To achieve NS1 – prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery – the Magnuson-Stevens Act 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 status determination criteria, and contain conservation and management measures to prevent overfishing or end overfishing and rebuild the fishery (Magnuson-Stevens Act § 303(a)(10)) and (2) establish mechanisms for specifying ACLs to prevent overfishing and include AMs to prevent ACLs from being exceeded and to correct overages of the ACL if they do occur (Magnuson-Stevens Act § 303(a)(15)).[16] The NS 1 Guidelines provide guidance on how to meet these Magnuson-Stevens Act requirements and describe fishery management approaches to meet the objectives of NS 1.[17]

[16] MSA §303(a)(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."

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

This section discusses the requirement for status determination criteria under Magnuson-Stevens Act § 303(a)(10). Under Magnuson-Stevens Act § 304(e)(1), NMFS reports annually to Congress and the Council on the status of the FMP managed fisheries relative to the status determination criteria in the FMP.

Amendment 6 to the FMP specified status determination criteria for the East Area but did not specify status determination criteria 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 three net fishing areas in the West Area, the Council would need to develop status determination criteria for the salmon stocks caught in the fisheries in these three areas. The purpose of status determination criteria 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.

A key part of status determination criteria is establishing an annual process for specifying the status determination criteria and assessing the status of managed stocks relative to that criteria. The FMP's process for specifying status determination criteria must comply with § 302(g)(1)(B) of the Magnuson-Stevens Act 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. The Council has established plan teams for other FMPs to assist in this process. The Council may be able to also consider establishing an alternative peer review process for status of the stocks and fishery information § 302(g)(1)(E) of the Magnuson-Stevens Act.

Whether there is a salmon plan team is directly related to the preparation of a Stock Assessment and Fishery Evaluation (SAFE) Report and related requirements for reviewing and providing fishery and scientific information to the Council. 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 salmon fisheries in the EEZ. 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, would work together with the Council to implement the provisions of the Magnuson-Stevens Act. This could enable the escapement goal recommendations from the State's peer review process to serve as a functional substitute for SSC recommendations on acceptable biological catch under Magnuson-Stevens Act § 302(h)(6).

The standard approaches to specification of reference points set forth in the NS1 Guidelines are difficult to reconcile with the existing escapement-based management structure and associated in-season monitoring and management measures for the salmon fisheries that occur in the three traditional areas. The State salmon stock assessment and management program is dependent on biological reference points for salmon populations that are estimated based on long-term, stock specific assessment of recruits from parent escapement or from long-term assessment of escapement. Estimating biological reference points

for salmon populations requires direct assessment of the spawning stock. NS1 Guidelines and status determination criteria are catch and exploitation rate based, using information available pre-season. Reference points as defined in NS1 Guidelines do not directly correspond to the biological reference points underlying the state's escapement-based management program. Escapement goals are fixed and escapement levels are monitored in-season. The allowable catch to maintain escapements within the escapement goal range or above the threshold is variable and not known pre-season.

Another complicating factor with status determination criteria is that they are assessed at the stock or stock complex level and take into consideration total catch from all fisheries. Generally, if the overfishing limit (OFL) was exceeded, then NMFS would take measures to prevent overfishing the next year. NMFS would only be able to take those measures on the fishery that occurs in the EEZ. So, overfishing would be addressed by restrictive measures on the part of the fishery NMFS has authority over. In setting the allowable harvest in the EEZ, NMFS would have to consider all sources of harvest and adjust the EEZ harvest accordingly to prevent overfishing.

The NMFS Alaska Fisheries Science Center reviews and certifies the overfishing definitions in the FMP amendment for compliance with guidelines provided for National Standards 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.

The status determination criteria in the 2012 FMP for the East Area are separated into three tiers for the purposes of status determination criteria. An MSY control rule, a maximum fishery mortality threshold (MFMT), and a minimum stock size threshold (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.

Chapter 5 provides an overview of the process the Pacific Fishery Management Council (Pacific Council) uses to specify status determination criteria and to prevent overfishing as required under NS1 of the Magnuson-Stevens Act. Salmon management in the Pacific region is complex, involving a large number of stocks, three States, Pacific Salmon Treaty obligations with Canada, tribes, hatchery fish, and Endangered Species Act (ESA) requirements, however, it may provide some useful information for the Council as it moves forward in establishing status determination criteria and an annual process for the three traditional net fishing areas.

3.4 Annual Catch Limits and Accountability Measures

Magnuson-Stevens Act § 303(a)(15) requires that each FMP establish mechanisms for specifying ACLs to prevent overfishing and include AMs to prevent ACLs from being exceeded and to correct overages of the ACL if they do occur. Magnuson-Stevens Act § 302(h)(6) requires each Council to develop annual catch limits for each of its managed fisheries, and the annual catch limits cannot exceed the fishing level recommendation of its SSC or the Council's peer review process. The NS1 Guidelines provide guidance on how to meet this requirement and describe fishery management approaches to meet the objectives of NS1.

The annual catch limit system is not as flexible as the State's system and could inhibit the State's current ability to respond in-season to the best available information in managing salmon stocks. For example, if the EEZ harvest level was set by NMFS preseason, and could not be adjusted based on inseason abundance information, the EEZ harvest would be constrained when salmon returns are greater that the preseason forecast. Including these areas in the FMP would not improve the condition of the salmon stocks since the FMP could not control harvests in state waters or ensure escapement goals are met.

The NS1 Guidelines contemplate limited circumstances where the standard approaches to specification of reference points, including ACLs, and management measures detailed in the guidelines may not be appropriate. The NS1 Guidelines specifically cite Pacific salmon as an example of stocks that may require an alternative approach.[18] Under this flexibility within the guidelines, the Council may propose an alternative approach for satisfying the ACL requirements, other than those set forth in the guidelines. The guidelines require that the Council document its rationale for proposing an alternative approach in an FMP amendment and document its consistency with the Magnuson-Stevens Act.

For the East Area, the 2012 FMP does not establish a mechanism for specifying ACLs for Chinook salmon in the East Area because of the Magnuson-Stevens Act exception from the ACL requirement for stocks managed under an international fisheries agreement in which the United States participates (§ 303 note). The 2012 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 National Standard 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.

[18] 50 CFR 600.310(h)(2), 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 … stocks with unusual life history characteristics (*e.g., Pacific salmon, where the spawning potential for a stock is spread over a multi-year period*). In these circumstances, Councils may propose alternative approaches for satisfying the NS1 requirements of the Magnuson-Stevens Act other than those set forth in these guidelines. Councils must document their rationale for any alternative approaches for these limited circumstances in an FMP or FMP amendment, which will be reviewed for consistency with the Magnuson-Stevens Act") (emphasis added).

The alternative approach could apply to the Prince William Sound drift gillnet fishery, the Cook Inlet drift gillnet fishery, and the South Alaska Peninsula drift gillnet and purse seine fisheries. Additionally, Magnuson-Stevens Act §302(h)(6) requires each Council to 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). As part of the alternative approach, the Council could consider either review by the SSC or establishing a peer review process in the FMP that utilizes the State's existing salmon expertise and processes for developing escapement goals as fishing level recommendations.

The primary function of status determination criteria, ACLs, and related requirements is to ensure that a scientifically-based approach is used for controlling catch to maintain stock abundance at the level necessary to produce MSY by ensuring that overfishing does not occur in the fishery. Therefore, an alternative approach that is consistent with the Magnuson-Stevens Act should document how the management measures used to determine stock status and control catch are scientifically-based and how they achieve the biomass level necessary to produce MSY. If the Council and NMFS determine that the State's management represents an alternative approach that satisfies the ACL requirements, then implementing ACLs, in the manner described within the NS1 Guidelines would be unnecessary.

The State's salmon escapement goal management may be an appropriate alternative approach for satisfying the ACL requirements of the Magnuson-Stevens Act. Escapement goals are specified annually, in terms of numbers of fish. The biology of salmon is such that escapement is the point in the species life history best suited to routine assessment and long-term monitoring. The Pacific Fishery Management Council also recommended ACLs specified on the basis of spawning escapement, which is the metric most commonly used for assessing the status of salmon stocks (Pacific Fishery Management Council 2011). The Pacific Council recognized that using spawning escapement, which is more consistent with the FMP conservation objectives, the biology of the species, and the current structure of the salmon management system requires invoking the flexibility provisions of the NS1 Guidelines. Basing ACLs on escapement goals is consistent with the long-standing practice of using spawning escapement to assess the status of salmon stocks. Note that the Pacific Council's recommended approach recognizes that Council's active role in managing salmon and its existing management process, such as its Salmon Technical Team. Chapter 5 provides more information on the Pacific Council's process.

3.5 Optimum Yield

Magnuson-Stevens Act § 303(a)(3) requires that an FMP assess and specify the optimum yield (OY) from the fishery, and include a summary of the information utilized in making such specification. Consistent with 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 provide guidance on how to meet the OY requirement. The Magnuson-Stevens Act § 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 Council will need to determine how to assess and specify OY for salmon stocks harvested in the three traditional net fishing areas. MSY could be 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 fishery could be 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 stock or stock complex. The portion of the annual catch harvested by the fishery reflects the biological, economic, and social factors considered by the Board and ADF&G in determining when to open and close salmon fisheries in the three traditional net fishing areas.

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.

3.6 Bycatch Management

The Magnuson-Stevens Act 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 the three traditional net fishing areas, the 2012 FMP does not address Magnuson-Stevens Act § 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 NS9. According to the NS9 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.[19]

On January 19, 2017, NMFS published new requirements to comply with Magnuson-Stevens Act § 303(a)(11) and 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).[20] Section 600.1610(a)(1) requires every FMP to identify the required procedure or procedures that constitute the SBRM for the fishery. Such procedures may include, but are not limited to, observer programs, electronic monitoring and reporting technologies, and self-reported mechanisms. Section 600.1610(a)(1) also requires Councils to explain in an FMP how the SBRM meets the purpose described in § 600.1600, based on an analysis of requirements set forth in § 600.1610(a)(2). Finally, § 600.1610(a)(1) explains that, in addition to proposing regulations necessary to implement the

[19] 50 CFR 600.350(d).
[20] The final rule implementing SBRM is available at *https://www.federalregister.gov/documents/2017/01/19/2017-00405/standardized-bycatch-reporting-methodology*.

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, Magnuson-Stevens Act § 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 2012 FMP does not assess economic discards in the three traditional net fishing areas or contain measures to lower economic discards.

3.7 Monitoring, Recordkeeping, Reporting Requirements

The 2012 FMP does not contain management measures to monitor the salmon fisheries in each of the three traditional net fishing areas or to measure total catch from EEZ waters. Magnuson-Stevens Act § 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 Magnuson-Stevens Act. NMFS and the Council monitor Federally managed fisheries with a number of tools, including eLandings, certified scales, observers, and electronic monitoring,

3.8 Process for Review and Appeal

Delegation of salmon fishery management authority to the State of Alaska requires the Council and NMFS to stay apprised of state management measures governing commercial and sport salmon fishing and, if necessary, to review those measures for consistency with the FMP, the Magnuson-Stevens Act, and other applicable federal law. FMPs that delegate management to the State include a process to address Magnuson-Stevens Act § 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.

The 2012 FMP also includes a process for the public to request that the Secretary review State salmon management actions. Secretarial review is limited to whether the State statute or regulation is consistent with the FMP, Magnuson-Stevens Act, or other applicable federal law. In 2008, NMFS received the first appeal under the FMP appeals process. State management measures include measures adopted by the Pacific Salmon Commission and the Alaska Board of Fisheries as well as other state laws, regulations, and inseason actions.

Under the 2012 FMP, the review and appeals processes only apply to the East Area. The 2012 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 Magnuson-Stevens Act, 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 Magnuson-Stevens Act, 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 Magnuson-Stevens Act, or other applicable federal laws.

To revise the FMP to include the three net fishing areas, the Council may consider revising FMP chapter 9 to expand the appeals process to include the West Area fisheries.

3.9 Fishery Impact Statement

A fishery impact statement is required by the Magnuson-Stevens Act, § 303(a)(9). The fishery impact statement must assess, specify, and analyze any likely effects (including cumulative conservation, economic, and social impacts) of the conservation and management measures on the following:

(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.

Additionally, the fishery impact statement must consider possible measures for mitigating any adverse impacts. This fishery impact statement also addresses the Magnuson-Stevens Act's related requirements for fishery information: (1) 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, actual and potential revenues from the fishery, any recreational interest in the fishery; (2) a specification of the present and probable future condition of the fishery and 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, including their economic impact, and, to the extent practicable, quantify trends in landings of the managed fishery resource by the commercial, recreational, and charter fishing sectors.

The NS Guidelines provide direction on the types of information to include in a Fishery Impact Statement. For example, the NS8 Guidelines state that FMPs must examine the social and economic importance of fisheries to communities potentially affected by management measures.[21]

[21] 50 CFR 600.345(c)(1).

Table 3-2 Magnuson-Stevens Act § 303 Contents of Fishery Management Plans and next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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 salmon fisheries 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?
(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.
(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	How will the Council assess and specify the MSY and OY in the FMP following the *NS 1 guidelines at 50 CFR 600.310*? 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* 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. Present and probable future condition of the fishery could be addressed in the fishery impact statement.

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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	Address in the FMP.
(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.
(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 for inseason management could be delegated to the State.
(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.
(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?

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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	Work with the ADF&G to compile this information for the FMP. The fishery impact statement can also addressed the *MSA § 303(a)*'s related requirements for fishery information: (1) a description of the fishery, including the number of vessels involved, the type and quantity of fishing gear used, the species of fish involved 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, 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. *NS Guidelines* provide direction on the types of information to include in a Fishery Impact Statement. For example, the NS8 Guidelines state that FMPs must examine the social and economic importance of fisheries to communities potentially affected by management measures.
(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 level and overfished level) that comply with the *NS 1 guidelines (50 CFR 600.310), NS 2, and the review process at 302(g) and (h) of the MSA*. *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

MSA § 303 Contents of Fishery Management Plans (a) REQUIRED PROVISIONS	Next steps and considerations to include required provisions in FMP for Cook Inlet, Prince William Sound, and South Alaska Peninsula
(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 fisheries? What are the conservation and management measures necessary to minimize bycatch that comply with *50 CFR Subpart R—Standardized Bycatch Reporting Methodology*?
(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.
(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.
(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.
(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).

4 Alaska Salmon

This chapter summarizes information from the State on salmon management, the salmon fisheries in EEZ waters in the Cook Inlet, Prince William Sound, and South Alaska Peninsula, and the condition of the salmon stocks in those three areas.

4.1 State of Alaska salmon management

The State's first priority for management is to meet spawning escapement goals in order to sustain salmon resources for future generations. The highest priority use is for subsistence, under both state and federal law. Salmon, surplus to escapement needs and subsistence uses, are made available for other uses. Salmon throughout the entire State are a fully allocated resource; multi-use salmon fisheries (commercial, sport, subsistence, and personal use) compete for a finite resource. To this end, management plans adopted by the State work to minimize and maximize allocations of specific salmon stocks, depending upon the conservation need identified. As such, management plans incorporate conservation burden and allocation of harvest opportunity that affects all users of the resource in Alaska. State management plan provisions such as net mesh size restrictions, weekly fishing periods, and size limits work to reduce the incidental catch of non-target salmon species in the salmon fishery so that stocks are able to achieve their established escapement goals.

The State uses an adaptive management process to achieve these priorities that starts with development of management strategies based on pre-season forecasts, then transitions into evaluation of run strength in season and adjusting management strategy implementation based on in-season performance of annual salmon runs. Pre-season forecasts and management strategies are developed based on guidelines and directives as outlined in state and federal management plans and regulations and in cooperation with federal subsistence managers, fishermen, tribal council representatives, and other stakeholders. Managers use test fisheries, sonar projects, weir counts, aerial surveys, genetic stock identification and age-sex-length composition, and in-season harvest reports to assess and project salmon run timing and run strength in-season to inform management decisions.

The State has many decades of sustainable salmon management, utilizing escapement goals and in-season management decisions by local managers. Alaska salmon fisheries are conservatively managed by allowing fishing with specific gears, in specific areas, at specific times. Alaska salmon fisheries generally occur in areas terminal or near-terminal to natal spawning systems, where the fish are highly concentrated and stock of origin is discernible. Generally, run times are consistent and predictable from one year to the next; salmon run sizes, however, are highly variable.

Under State management, salmon fishery openings are set pre-season through regulations adopted by the Board or in-season through management authority that has been delegated to ADF&G area managers. Salmon fishery openings are managed and adjusted in-season through emergency orders in response to escapement goal level and run size. State escapement enumeration programs are in place, with direct or indicator stock escapement monitoring for most salmon stocks. Fishing is allowed to continue only if in-season assessment of run strength indicates a harvestable surplus; the level of fishing depends on the strength of the in-season run. Local area managers, under authority delegated by the ADF&G Commissioner, open and close the fisheries in response to in-season assessments of the strength and

timing of runs. In-season, emergency order management strives to avoid the principle overfishing threat: intense fishing activity during weak runs.

State management of the salmon fishery is based, by direction from the State constitution, on the sustained yield principle (Alaska Constitution Article VIII, section 4). In the State's Policy for the Management of Mixed Stock Salmon Fisheries (5AAC 39.220), conservation of wild salmon stocks, consistent with sustained yield, is given the highest priority. In the absence of a regulatory management plan that allocates or restricts harvest, and when it is necessary to restrict fisheries on stocks where there are known conservation problems, the burden of conservation shall be shared among all fisheries in close proportion to their respective harvest. Assigning conservation burdens in mixed stock fisheries is accomplished through the application of specific fishery management plans set out in regulation. To this end, management plans are adopted by the State that work to both minimize and maximize allocations of specific salmon stocks, depending upon the conservation need identified. As such, management plans incorporate conservation burden and allocation of harvest opportunity that affects all users of the resource in Alaska. Management plan provisions such as net mesh size restrictions, weekly fishing periods, and size limits work to reduce the incidental catch of non-target salmon species in the salmon fishery so that stocks are able to achieve their established escapement goals.

The State manages salmon through the Board, ADF&G, and the Alaska Commercial Fisheries Entry Commission (CFEC).

- The Board is responsible for considering and adopting regulations through a public process to conserve and allocate fisheries resources to various user groups; establishing fish reserves and conservation areas, fishing seasons, quotas, bag limits and size restrictions; methods and means; habitat protection; stock enhancement; and developing commercial, subsistence, sport and personal use fisheries.
- ADF&G is responsible for the protection, management, conservation, and restoration of Alaska's fish and game resources.
- CFEC helps to conserve and maintain the economic health of Alaska's commercial fisheries. Its primary duties are limiting the number of participating fishermen; 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.

Management priorities are to first ensure adequate escapement to sustain future runs; second, provide reasonable opportunity for subsistence fishermen to meet their needs; and third, provide opportunity to commercial, sport, and personal use fishermen, to harvest fish in excess of escapement and subsistence needs. Regulations for the Alaska salmon fishery are made by the Board and the Board has the authority to allocate salmon available for harvest among different user groups (AS 16.05.251). ADF&G manages the fishery in-season and issues emergency orders to achieve conservation objectives and to implement allocation policies established by the Board (AS 16.05.060). ADF&G reviews salmon escapement goals and stock status for each salmon management area on a three-year cycle, consistent with the Board's regulatory review cycle (5 AAC 39.223(b)(6)). Escapement goal and stock status reviews are prepared prior to Board review. Through its public process, the Board strives to manage for the potential conflicts

that arise from the nature of competing interests in such a diverse fishery. The Board has adopted regulations that control the time, area of operation, and efficiency of salmon fisheries to address the unique challenges of managing mixed-stock resources.

ADF&G uses an adaptive management process to achieve these priorities. The process starts with development of management strategies based on pre-season forecasts, then transitions into evaluation of run strength in season, and implements a management strategy that is adjusted based on in-season performance of annual salmon runs. Pre-season forecasts and management strategies are developed based on guidelines and directives as outlined in state and federal management plans and regulations, and in cooperation with federal subsistence managers, fishermen, tribal council representatives, and other stakeholders.

While forecasts and pre-season management strategies are made each year, these are frequently revised based on in-season run assessments. For example, the structure and implementation of fishing periods (time periods open to fishing in addition to regularly scheduled fishery openings) may be adjusted in-season by Emergency Order based on run strength and run timing estimates derived from in-season run assessment programs. Management decisions often need to be made before fish have reached the affected areas, districts, or communities. Managers use test fisheries, sonar projects, genetic stock identification and age-sex-length composition, and in-season harvest reports to assess and project salmon run timing and run strength in-season to inform management decisions.

The State manages subsistence, sport, commercial, and personal use harvests of salmon in waters throughout Alaska. The first priority for management is to meet spawning escapement goals in order to sustain salmon resources for future generations. The highest priority use is for subsistence, under both state and federal law. Salmon surplus above escapement needs and subsistence uses are made available for other uses. Salmon throughout the entire State is a fully allocated resource; multi-use salmon fisheries (commercial, sport, subsistence, and personal use) are competing for a finite resource. Commercial salmon fisheries occurring in EEZ waters are only one component of this multi-use scenario for which competing goals and interests must be managed. While commercial and sport salmon fisheries occur in both state and federal waters, personal use and subsistence salmon fisheries occur entirely in the waters of the State (within three nautical miles).

Subsistence

Subsistence fisheries are managed by the State and are not included in the FMP. Subsistence salmon fisheries do not occur in the EEZ. The State defines subsistence uses of wild resources as noncommercial, customary, and traditional uses for a variety of purposes. Under Alaska's subsistence statute, the Board 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. Whenever it is necessary to restrict harvest, subsistence fisheries have a preference over other uses of the stock (AS 16.05.258). Subsistence fisheries management includes coordination with the Federal Subsistence Board and Office of Subsistence Management, which also manages subsistence uses by rural residents on federal lands and applicable waters, under Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA). Management of subsistence salmon fisheries in the Yukon River

includes obligations under an international treaty with Canada. Management of subsistence salmon fisheries in southeast Alaska also includes international obligations under the Pacific Salmon Treaty.

Commercial Management

Commercial fishing is defined by the State as the taking of fish with the intent of disposing of them for profit, or by sale, barter, trade, or in commercial channels (AS 16.05.940 (5)). The State manages a large number of commercial salmon fisheries in waters from Southeast Alaska to the Bering Strait. Management of the commercial salmon fisheries is the responsibility of the ADF&G Division of Commercial Fisheries, under the direction of the Board. The fisheries are managed under a limited entry system; participants need to hold a limited entry permit for a fishery in order to fish and the number of permits for each fishery is limited. The state originally issued permits to persons with histories of participation in the various salmon fisheries. Permits can be bought and sold; thus, since the original limitation program was implemented, new persons have entered into the commercial fishery by buying permits on the open market.

Alaska's commercial salmon fisheries are administered through the use of management areas throughout the State. The value of the commercial salmon harvest varies with the size of the runs, market conditions, and with foreign currency exchange rates. Because of the complexity of commercial fisheries for salmon, State biologists collect extensive information and statistics to support management decisions.

Commercial salmon fisheries are defined by gear type; troll, drift gillnet, purse seine, and set gillnet. In any given area, ADF&G manages different commercial fisheries that target mixed salmon stocks. In the West Area, the only commercial fisheries in the EEZ are the drift gillnet and purse seine fisheries.

Personal Use Fisheries

Personal use fisheries are managed by the State and are not included in the Salmon FMP. Personal use salmon fisheries do not occur in the EEZ. The State 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 Board (AS 16.05.940(25)). Personal use fisheries are different from subsistence fisheries, because they either do not meet the criteria identifying customary and traditional fisheries or because they occur within nonsubsistence areas. Personal use fisheries provide opportunities for harvesting fish with gear other than rod and reel in nonsubsistence areas. The 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 subsistence purposes within nonsubsistence use areas, but subsistence use does 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, outside of Southeast Alaska, is primarily managed by ADF&G Division of Sport Fish, but some other regional or area fisheries for various species of fish are managed by the Division of Commercial Fisheries. Further information on state management of personal use fisheries can be found on the ADF&G website.[22]

[22] www.adfg.alaska.gov/index.cfm?adfg=fishingPersonalUse.main

Sport Fisheries

The ADF&G Division of Sport Fish manages the state's sport fisheries. Sport fisheries are not included in the FMP. 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 which is held in the hand or closely attended, or by other means defined by the Board (AS 16.05.940(30)). By law, the division's mission is to protect and improve the state's recreational fisheries resources.

Per Alaska regulation (5 AAC 75.075), the ADF&G oversees the annual licensing of salt water and registration of fresh water sport fish businesses and guides. This duty has been relegated to the Division of Sport Fish. 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(a)(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 (5 AAC 75.995(a)(42)). Salmon are the primary species targeted in the states' recreational fisheries.

State of Alaska Policy for the Management of Sustainable Salmon Fisheries

The Board's Policy for the Management of Sustainable Salmon Fisheries (5 AAC 39.222) is an integral part of its tri-yearly review of State salmon fisheries. The policy contains five fundamental principles for sustainable salmon management, each with criteria used to evaluate salmon fisheries and to address conservation issues. The five fundamental principles of the policy are as follows:

- Wild salmon stocks and their habitats should be maintained at levels of resource productivity that assure sustained yields.
- Fisheries shall be managed to allow escapements within ranges necessary to conserve and sustain potential salmon production and maintain normal ecosystem functioning.
- Effective salmon management systems should be established and applied to regulate human activities that affect salmon.
- Public support and involvement for sustained use and protection of salmon resources should be sought and encouraged.
- In the face of uncertainty, salmon stocks, fisheries, artificial propagation, and essential habitats shall be managed conservatively.

The Sustainable Salmon Fisheries Policy requires that ADF&G describe the extent to which salmon fisheries and habitats conform to the policy's explicit principles and criteria. In response, the Board must review fishery management plans or draft new plans. If a concern with a particular salmon stock is identified in the course of this review, an action plan with measures that include needed research, habitat improvements, or new regulations, must be developed to address the concern. The Sustainable Salmon Fisheries Policy is implemented by the Board and ADF&G in the course of the Board's normal regulatory cycle.

The key definitions contained in the Policy for the Management of Sustainable Salmon Fisheries with regard to scientifically defensible escapement goals and resulting management actions are: biological escapement goal, optimal escapement goal, sustainable escapement goal, and sustained escapement threshold. Biological escapement goal (BEG) means the escapement that provides the greatest potential for maximum sustained yield. BEG will be the primary management objective for the escapement unless an optimal escapement or in-river run goal has been adopted. BEG will be developed from the best available biological information and should be scientifically defensible on the basis of available biological information. BEG will be determined by ADF&G and will be expressed as a range based on factors such as salmon stock productivity and data uncertainty. ADF&G will seek to maintain evenly distributed salmon escapements within the bounds of the BEG (5 AAC 39.222(f)(3)).

Sustainable escapement goal (SEG) means a level of escapement, indicated by an index or an escapement estimate, that is known to provide for sustained yield over a five to ten year period, used in situations where a BEG cannot be estimated or managed for; the SEG is the primary management objective for the escapement, unless an optimal escapement or in-river run goal has been adopted by the Board; the SEG will be developed from the best available biological information and should be scientifically defensible on the basis of that information; the SEG will be determined by ADF&G and will take into account data uncertainty and be stated as either a "SEG range" or "lower bound SEG"; ADF&G will seek to maintain escapements within the bounds of the SEG range or above the level of a lower bound SEG (5 AAC 39.222(f)(36)).

Sustained escapement threshold (SET) means a threshold level of escapement, below which the ability of the salmon stock to sustain itself is jeopardized. In practice, SET can be estimated based on lower ranges of traditional escapement levels, for which the salmon stock has consistently demonstrated the ability to sustain itself. The SET is lower than the lower bound of the BEG and also lower than the lower bound of the SEG. The SET is established by ADF&G, in consultation with the Board, for salmon stocks of management or conservation concern (5 AAC 39.222(f)(39)).

Optimal escapement goal (OEG) means a specific management objective for salmon escapement that considers biological and allocative factors and may differ from the SEG or BEG. An OEG will be sustainable and may be expressed as a range with the lower bound above the level of SET (5 AAC 39.222(f)(25)). The Policy for Statewide Salmon Escapement Goals (5 AAC 39.223) allows the Board, during its regulatory process and in consultation with ADF&G, to review a BEG, SEG, or SET determined by ADF&G, and with the assistance of ADF&G, determine the appropriateness of establishing an OEG. The Board would provide an explanation of the reasons for establishing an OEG and provide, to the extent practicable, and with assistance from ADF&G, an estimate of expected differences in yield of any salmon stock, relative to MSY, resulting from implementation of an OEG. Biological factors must be considered in establishing an OEG; the Board could not establish an OEG without ADF&G finding it consistent with the sustained yield principle.

In certain fisheries, where it is not cost effective to manage for escapement goal ranges, because the magnitude of the resource is low, the rate of fishing is low, or it is difficult or impossible to enumerate escapement, fishing is limited to weekly fishing periods. These fishing periods are set to provide ample periods of time for salmon to move through the fishery, and reflect the level of fishing that has provided a sustainable level of harvest based on the historical performance of the fishery. For these fisheries, fishing

periods may be shortened or lengthened depending on qualitative indicators of run strength, such as catch-per-unit-of-effort in directed or test fisheries. The fishing-period strategy is reviewed annually on the basis of postseason evaluations of escapement levels and fishery performance. The fishing-period strategy may result in lower sustained yields than the escapement goal harvest strategy.

4.2 West Area Commercial Salmon Fisheries in the EEZ

The West Area under the Salmon FMP comprises the area of the EEZ off Alaska, west of Cape Suckling. The FMP prohibits commercial salmon fishing in the West Area, except in three traditional net areas (Cook Inlet, Prince William Sound, and the South Alaska Peninsula). Under Amendment 12, these three fisheries were removed from the FMP. The Council is now considering how to apply Federal management to these three areas. This section provides information on the commercial salmon fisheries subject to the FMP and does not address the fisheries that only occur in State waters.

The State-Federal boundary has not been relevant to active salmon management in the three traditional net fisheries in the West Area. Fisheries in these areas are managed by district and subdistricts, which are comprised of salmon statistical areas that span both State and federal waters. Historical analysis of only the federal waters portion of the fisheries is not possible. Collection of harvest data in these net fisheries has, to date, included no provision for spatial segregation within the salmon statistical areas and the larger units by which the fisheries are managed. As a result, harvest and participation data in tables throughout this section, for districts that include EEZ waters and the gear groups that participate in those waters, represent the maximum level of activity that may have occurred in the EEZ. In each area, the available data overestimate EEZ waters activity.

The harvest and participation data presented in this section are taken from ADF&G fish ticket data and participation and earnings data compiled by the CFEC. To show the relative contribution of salmon harvests in the EEZ compared to total harvests within management districts, the harvest and participation data for the gear group(s) in the district(s) where the fishing area extends into EEZ waters are compared to harvest and participation data for all salmon taken by directed salmon fisheries in the full management area. The districts that include EEZ waters are the Central Upper Cook Inlet district, the Bering River and Copper River districts in Prince William Sound, and the Southwestern and Unimak Districts in the Alaska Peninsula management area. In the Upper Cook Inlet and in Prince William Sound, only drift gillnet permit holders may harvest salmon in the EEZ, whereas in the Alaska Peninsula management area drift gillnet and purse seine permit holders may fish for salmon in the EEZ. One table for each management area is included to show total annual salmon removals associated with commercial fishing in districts that include EEZ waters and with the gear group(s) that participate in EEZ waters of those districts compared to removals associated with the entire management area and all gear groups.

Drift gillnet is the primary gear used in the EEZ in the West Area. Drift gillnet gear works by entangling the fish as they attempt to swim through the net. The drift gillnet fleet utilizes a mix of stern and bow pickers; driftnet vessels deploy and retrieve a gillnet from either the stern or bow of the vessel. The net is usually 150 fathoms long, although sometimes shorter than this. Primarily stern picking is used although there are bow pickers in the fleet. The net stays attached to the vessel and is suspended from 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.

Additionally, purse seine gear is used in EEZ waters in the South Alaska Peninsula. Purse seines work by encircling schools of fish with nets that are drawn up to create giant "purses" that hold the school until the fish can be brought aboard.

4.2.1 Upper Cook Inlet (Central District)

The Upper Cook Inlet (UCI) commercial fisheries management area consists of that portion of Cook Inlet north of the latitude of the Anchor Point Light, and is divided into the Central and Northern districts. The Central District is approximately 75 miles long, averages 32 miles in width, and is divided into six subdistricts. The Northern District is 50 miles long, averages 20 miles in width, and is divided into two subdistricts. The UCI traditional EEZ net fishing area occurs within the Central district. Currently, set gillnets are the only gear permitted in the Northern District; both set and drift gillnets are permitted in the Central District. While both set and drift gillnets are permitted in Central District, it is only the drift gillnet fleet that commercially operates in the EEZ. In the UCI area, ADF&G managers estimate that in recent years approximately half of the drift gillnet fleet's salmon harvest comes from waters of the EEZ. The drift gillnet fleet primarily harvests sockeye, but also catches coho and chum and, to a lesser degree, pink and Chinook salmon.

Salmon fisheries in Upper Cook Inlet are complex, mixed stock, mixed species, with many divergent users. Run-timing and migration routes utilized by all salmon species overlap to such a degree that the commercial fishery is largely mixed-stock and mixed-species in nature. Following the "Mixed Stock Salmon Fisheries Policy", the State will restrict new or expansion of mixed stock fisheries unless otherwise provided for by management plans or application of the allocation criteria (5 AAC 39.220(d)). It is difficult to manage mixed stock, mixed species, salmon fisheries for MSY on all stocks and all salmon species in circumstances where the composition, abundance and productivity of the salmon stocks and species in those fisheries varies substantially from salmon stock to salmon stock. Management of the sockeye salmon fishery integrates information received from a variety of programs, including: offshore test fishing; escapement enumeration by sonar, weir, remote camera, and mark-recapture studies; comparative analyses of historical commercial harvest and effort levels; genetic stock identification; and age composition studies. Analyses of the age composition of sockeye salmon escapement into the principal watersheds of UCI provides information necessary for in-season estimates of the stock contribution in various commercial fisheries by comparing age and size data in the escapement with that in the commercial harvest.

Major sockeye salmon fisheries in the Central District occur in the Big River, Western Subdistrict, Upper Subdistrict, and Kalgin Island Subdistrict areas. The Big River fishery is a small set gillnet fishery in the northwest corner of the Central District that opens on June 1. Permit holders are limited to a single 35-fathom set gillnet and the minimum distance between nets is 1,800 feet, which is three times the normal separation of gear. While targeting sockeye salmon, this fishery is limited to a harvest of no more than 1,000 Chinook salmon per year. The Western Subdistrict fishery opens on the first Monday or Thursday on or after June 16. The regular fishing schedule consists of two 12-hour weekly fishing periods throughout the season, unless modified by an emergency order. Fishing in the Kasilof Section of the Upper Subdistrict opens between June 20 and June 25, depending upon escapement levels in the Kasilof River; the Kenai and East Forelands Sections of the Upper Subdistrict open on or after July 8. For

management of the set gillnet fisheries in the Upper Subdistrict, there are two principal restrictions: 1) a limit on the number of additional hours that may be fished each week beyond the two regular 12-hour fishing periods and 2) implementation of closed fishing times (windows) each week. By regulation, a week is defined as a period of time beginning at 12:01 a.m. Sunday and ending at 12:00 midnight the following Saturday. Weekly limitations vary according to the time of year and the size of the sockeye salmon run returning to the Kenai River. For the drift gillnet fishery throughout the Central District, the regular fishing season begins with the first regular period on or after June 19.

In 2008, Susitna River sockeye salmon were found to be a stock of yield concern and the Board implemented commercial fishing restrictions to the Northern District set gillnet fishery and the Central District drift gillnet fishery for conservation of Susitna River sockeye salmon stocks. In 2011, after reviewing the most recent data available, the Board took action to reduce harvest levels on Susitna River sockeye salmon even further. Conservation of Susitna River sockeye salmon requires ADF&G to restrict the drift gillnet fishing fleet for the first regular period from July 9-15 to the Expanded Kenai and Expanded Kasilof Sections (the corridor) and during the second regular period from July 9-15, the drift gillnet fleet is restricted to Area 1 and the Kenai and Kasilof Sections. From July 16-31, the restrictions to the drift gillnet fleet are dependent upon the size of the sockeye salmon run to the Kenai River. For runs less than 2.3 million sockeye salmon, fishing during one regular 12-hour fishing period will be restricted to the Expanded corridor; at run strengths of 2.3-4.6 million sockeye salmon, fishing during one regular 12-hour fishing period per week will be restricted to either or both the Expanded Kenai and Expanded Kasilof Sections of the Upper Subdistrict, or Drift Gillnet Area 11 with an option that one of the two potential Drift Gillnet Area 1 12-hour fishing periods available from July 16 – 31 may be replaced with a 12-hour fishing period in the entire Central District; for sockeye salmon runs greater than 4.6 million fish, there are no mandatory restrictions.

Coho salmon are fully utilized and an increase in commercial opportunity for pink, chum, or coho salmon could result in unsustainable harvest rates on coho salmon in UCI. Some have asserted that pink and chum may not be fully utilized in Upper Cook Inlet, in part, due to the conservation of coho salmon and to provide opportunity for sport fisheries, however pink and chum salmon populations in Cook Inlet are not actively monitored so it is difficult to determine the magnitude of available surplus pink and chum salmon in any given year and there is no marked trend in decreasing pink and chum salmon commercial harvests since the early 1990s to support the assertion that commercial harvest opportunity has decreased. Coho salmon harvest rates in Cook Inlet are at or near the maximum considered sustainable and coho salmon stock abundance is only assessed in a few drainages. Increasing harvest opportunity on pink and chum salmon would increase harvest rates on coho salmon and could represent a conservation concern for these stocks..

The two commercial fisheries in which Chinook salmon are harvested in appreciable numbers are the set gillnet fisheries in the Upper Subdistrict of the Central District and the Northern District. Kenai River late-run Chinook salmon (as well as other salmon species) passage is estimated in-season by Adaptive Resolution Imaging Sonar (ARIS) sonar as well as through a test netting project and creel survey. The drift gillnet fleet in the Central District is the primary harvester of coho, chum, and even-year pink salmon.

The 2016 total Cook Inlet commercial salmon harvest was just over 3.5 million fish, of which almost 50 percent was harvested by drift gillnet gear in the Central District of Upper Cook Inlet. The total Cook Inlet commercial salmon harvest was composed of 10,847 Chinook, 2.7 million sockeye, 149,557 coho, 507,982 pink, and 198,317 chum salmon (**Table 4-1**).

Incidental catch

In Upper Cook Inlet, 94 percent of the salmon species harvested are commercially targeted; however, all salmon species are retained, sold, and recorded on ADF&G fish tickets (5 AAC 39.130(c)).

In Cook Inlet, groundfish taken by drift gillnet gear being operated for salmon are legally taken and possessed (5 AAC 28.330(b)). Groundfish sold, or retained but not sold, are required to be recorded on ADF&G fish tickets (5 AAC 39.130(c)(10)). However, bycatch of non-salmon species in the directed salmon fisheries in Cook Inlet is *de minimus* because drift gillnet vessels utilize water features (i.e., tidal currents and rips) that concentrate salmon, thereby minimizing interactions with groundfish species in the EEZ.

4.2.2 Prince William Sound (Copper River and Bering River Districts)

The Prince William Sound (PWS) management area encompasses all coastal waters and inland drainages entering the north central Gulf of Alaska between Cape Suckling and Cape Fairfield. In addition to Prince William Sound, the management area includes the Bering River and the Copper River.

The PWS management area is divided into 11 districts that correspond to the local geography, and to the distribution of the five species of salmon harvested by the commercial fishery. The management objective for all districts is to assure sustained yield through the achievement of spawning escapement goals for the major stocks while allowing for the orderly harvest of all fish surplus to spawning requirements. In addition, ADF&G follows regulatory plans to manage fisheries and allows private non-profit hatcheries to achieve cost recovery and brood stock objectives.

The PWS traditional net fishing area includes waters in the Copper River and Bering River districts. While purse seine, drift gillnet, and set gillnet gear are utilized in the PWS management area, only drift gillnets are permitted to fish in the Copper River and Bering River districts, and this is therefore the only gear type to commercially operate in the EEZ. Only the drift gillnet fishery occurs within the EEZ, which is limited to the outer portions of the Copper River and Bering River districts. These estimates are based on apportionment of harvest by area; this area method of apportionment may significantly overestimate harvests in waters further from land, where fishing effort is reduced. Fishing vessels do not disperse evenly in Prince William Sound fisheries. Instead, their densities are highest closer to shore where the water is less rough, tide rips are more common, and fishing nets are closer to the bottom thereby making the nets more efficient. In addition, salmon tend to congregate in nearshore waters before heading upstream, resulting in generally higher fish densities and harvest rates in nearshore waters than in waters farther from shore.

The Copper River District commercial fishing season has historically opened in mid-May. Sockeye and coho salmon are the two main species targeted in the EEZ. In general, fishing time has steadily been reduced over the years in response to increased efficiency of the commercial fleet, changing patterns in

the fishery, and reallocations authorized by the Board. During the current sockeye salmon season for the Copper River District (mid-May to mid-August) there are two evenly spaced fishing periods per week, with periods generally occurring on Mondays and Thursdays, with duration of periods announced by emergency order. Generally, coho salmon management begins during the second week of August. Precedent is to provide an initial single 24-hour opening per week; as numbers warrant, the duration of this fishing period may be increased to 48 hours or a second fishing period may be added during the week. Management tools, such as in-river sonar, aerial survey observations, and harvest data, provide indices of abundance that are used to regulate Copper River fisheries. ADF&G relies on the escapement index provided by the sonar at Miles Lake to aid in managing commercial harvests and provide for upriver escapement and allocations.

Opening in early June, the Bering River District is managed concurrently with the Copper River District. The Bering River drainage is the largest sockeye salmon spawning system in the Bering River District.

The 2016 total PWS management area commercial salmon harvest was 18.7 million fish. This harvest was composed of 13,459 Chinook, 486,635 coho, 2 million sockeye, 3 million chum, and 13 million pink salmon. In 2016, commercial harvests of salmon by drift gillnet vessels fishing in the Copper River and Bering River districts was nine percent of the total Prince William Sound commercial salmon harvest (**Table 4-2**).

Incidental catch

In Prince William Sound, 98 percent of the salmon species harvested are commercially targeted; however, all salmon species are retained, sold, and recorded on ADF&G fish tickets (5 AAC 39.130(c)).

In Prince William Sound, groundfish taken by drift gillnet gear being operated for salmon are legally taken and possessed (5 AAC 28.230(b)). Groundfish sold, or retained but not sold, are required to be recorded on ADF&G fish tickets (5 AAC 39.130(c)(10)). However, bycatch of non-salmon species in the directed salmon fisheries in Prince William Sound is *de minimus*, because drift gillnet vessels utilize water features (i.e., tidal currents and rips) that concentrate salmon, thereby minimizing interactions with groundfish species in the EEZ.

4.2.3 South Alaska Peninsula (Unimak and Southwestern Districts)

The South Alaska Peninsula Salmon Management Area includes waters from Kupreanof Point, west to Scotch Cap on Unimak Island. This area is divided into four districts: the Southeastern District, consisting of waters between Kupreanof Point and McGinty Point; the South Central District, consisting of waters between McGinty Point and Arch Point Light; the Southwestern District, consisting of waters between Arch Point Light, False Pass, and Cape Pankof Light; and Unimak District, consisting of waters between Cape Pankof Light and Scotch Cap, including Sanak Island.

Legal gear types in South Peninsula waters include purse seine, drift gillnet, and set gillnet. The Alaska Peninsula traditional net fishing area only includes a portion of the waters in the Southwestern and Unimak districts. Only drift gillnet and purse seine gear are utilized in these EEZ waters. Most purse seine and set gillnet permit holders fish South Alaska Peninsula waters throughout the season, whereas most drift gillnet permit holders fish South Unimak waters during the month of June and North Alaska

Peninsula waters from July into September. The North Alaska Peninsula Salmon Management Area falls within the same fishery permit area as the South Alaska Peninsula, but does not include EEZ waters.

It is anecdotally estimated by participants in both the drift gillnet and purse seine fisheries that no more than 25 percent of the total Unimak June fishery salmon harvest is taken from waters of the EEZ, outside of the 3 nm boundary. In practice, both gear groups utilize water features (i.e., tidal rips and capes) that help to naturally concentrate the salmon for harvest. These types of water features are not often found outside of three nautical miles; therefore, fishing within the EEZ generally only takes place when fishing within State waters is poor.

The South Alaska Peninsula June fishery takes place in the Unimak District and the Shumagin Islands area. At the February 2004 Board meeting, the Unimak fishery was expanded to include the entire Southwestern District and the West and East Pavlof Bay sections of the South Central District. The South Alaska Peninsula June fishery takes place June 7 through June 29; fishing periods are 88 hours in duration interspersed by 32-hour closures, except for the final fishing period of 64 hours. The primary target species of the June fishery is sockeye salmon, although all five salmon species are harvested.

The South Alaska Peninsula post-June salmon fishery takes place in all four districts listed above (excluding the Southeastern District Mainland prior to July 26). The post-June fishery takes place from July 1 through the end of the season and the three major components of this fishery are as follows:

- From July 6 through 21: six 24-hour fishing periods, each followed by a closure of at least 48 hours. Additional fishing time could be allowed in terminal fishing areas based on local salmon run strength.
- From July 22 through 31: fishing time is limited to three periods not to exceed 36 hours in duration and interspersed by closures of at least 48 hours outside of the Southeastern District Mainland (prior to July 26).
- From August 1 through 31: fishing periods are based on abundance of local sockeye, coho, pink, and chum salmon stocks. From September 1 through October 31 (changed from an ending date of September 30 as of the 2010 Board meeting), fishing periods are based on abundance of coho salmon stocks, although ADF&G could consider abundance of late pink and chum salmon stocks.

Historically, South Alaska Peninsula salmon harvest for all species has fluctuated dramatically, primarily in response to Board actions that significantly changed management plans and harvests. Pink and sockeye salmon are currently the most abundant salmon species harvested in the South Alaska Peninsula Management Area. There are approximately 224 salmon streams, with sockeye found in 37, pink salmon in at least 204, chum salmon in 136, and coho salmon in 81. Most salmon escapements are monitored by aerial observations. Pink and chum salmon escapements are estimated using an indexed total escapement method, while sockeye salmon systems are estimated using peak escapements (McCullough 2001, Keyse et al, 2016).

Salmon stocks targeted throughout the Alaska Peninsula vary through the season. Salmon harvested in the South Unimak and Shumagin Islands June fisheries include stocks migrating to a wide range of locations, including Bristol Bay and the Arctic-Yukon-Kuskokwim regions. The Southeastern District Mainland is managed primarily on the basis of the Chignik River sockeye salmon run prior to July 26.

The remaining fisheries are managed on the basis of local run strength and escapements, such as the sockeye fishery on the North Alaska Peninsula and the South Alaska Peninsula pink and chum fisheries.

The 2016 total Alaska Peninsula salmon (all species) harvest was 9.7 million fish. This harvest was composed of 17,669 Chinook, 6 million sockeye, 266,949 coho, 3 million pink, and 521,201 chum salmon. Drift gillnet and purse seine gear operating in the Unimak and Southwestern Districts of the South Alaska Peninsula accounted for 29.1 percent of the total Alaska Peninsula commercial salmon catch (**Table 4-3**).

Incidental catch

In order to reduce the incidental harvest of immature salmon in the South Alaska Peninsula, ADF&G conducts a purse seine test fishery in the Shumagin Islands Section in early July, before the post-June fishery begins, to assess abundance of immature salmon. Test fishery results from the Shumagin Islands are an indicator of the presence of immature salmon in the Southeastern, Southcentral, Southwestern, and Unimak districts of the South Alaska Peninsula Management Area. If 100 or more immature salmon, per set, are present, the commercial fishery will be closed to purse seine gear in an area to be determined by ADF&G. "Immature salmon, per set, are present" is defined as the number of Chinook, sockeye, coho, and chum salmon that are observed to be gilled in the seine web. Test fishing gear is standardized to purse seine gear, conducting two 20-minute sets at Popof Head, middle Set, and Red Bluff located on Popof Island. The fishery will reopen once the abundance of immature salmon harvested during the test fishery is determined to be below the threshold of 100 immature salmon per seine set. Gillnet gear is permitted to fish in these areas during the presence of immature salmon, because the larger mesh size permits immature salmon to pass through the nets.

In the South Alaska Peninsula salmon net fisheries, no regulation allows groundfish species harvested as bycatch to be legally retained. However, bycatch of non-salmon species in the directed salmon fisheries in the South Alaska Peninsula is *de minimus*, because the waters of the EEZ are relatively deep; therefore, groundfish species are not vulnerable to the drift gillnet and purse seine gear being utilized for directed salmon fishing.

Table 4-1 Central District (Upper Cook Inlet) drift gillnet salmon harvests compared to total Cook Inlet salmon harvests associated with directed commercial fisheries, 1991-2016 (in numbers of fish).

	Chinook Salmon			*Sockeye Salmon*			*Coho Salmon*			*Pink Salmon*			*Chum Salmon*			*Salmon Total*		
Year	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*	*Central District Drift Gillnet*	*Total Cook Inlet*	*% of Total*
1991	249	14,967	1.7%	1,121,171	2,507,887	44.7%	177,002	445,768	39.7%	5,815	843,426	0.7%	216,216	305,202	70.8%	1,520,453	4,117,250	36.9%
1992	618	20,188	3.1%	6,073,147	9,300,882	65.3%	267,751	474,808	56.4%	424,068	1,175,961	36.1%	233,561	297,694	78.5%	6,999,145	11,269,533	62.1%
1993	769	22,647	3.4%	2,561,451	5,003,817	51.2%	122,155	319,599	38.2%	46,510	967,748	4.8%	88,994	139,318	63.9%	2,819,879	6,453,129	43.7%
1994	465	21,195	2.2%	1,902,885	3,706,195	51.3%	310,878	597,943	52.0%	256,481	2,171,602	11.8%	250,272	333,986	74.9%	2,720,981	6,830,921	39.8%
1995	597	21,588	2.8%	1,776,115	3,242,594	54.8%	242,202	462,627	52.4%	64,742	2,982,154	2.2%	469,368	577,425	81.3%	2,553,024	7,286,388	35.0%
1996	392	15,496	2.5%	2,207,252	4,375,582	50.4%	171,965	333,341	51.6%	122,791	695,764	17.6%	141,302	167,168	84.5%	2,643,702	5,587,351	47.3%
1997	632	14,540	4.3%	2,199,933	4,449,536	49.4%	79,094	161,856	48.9%	30,100	2,885,557	1.0%	92,546	110,021	84.1%	2,402,305	7,621,510	31.5%
1998	338	9,198	3.7%	604,852	1,512,583	40.0%	84,301	175,754	48.0%	201,830	2,011,008	10.0%	89,158	101,535	87.8%	980,479	3,810,078	25.7%
1999	582	16,154	3.6%	1,425,750	3,194,605	44.6%	65,429	133,483	49.0%	3,588	1,156,700	0.3%	168,526	184,409	91.4%	1,663,875	4,685,351	35.5%
2000	274	8,542	3.2%	665,869	1,581,086	42.1%	134,226	246,148	54.5%	96,499	1,539,780	6.3%	121,981	204,230	59.7%	1,018,849	3,579,786	28.5%
2001	631	10,295	6.1%	849,656	2,047,600	41.5%	40,627	119,032	34.1%	31,730	666,002	4.8%	76,545	174,409	43.9%	999,189	3,017,338	33.1%
2002	422	14,278	3.0%	1,399,306	3,101,775	45.1%	129,600	255,717	50.7%	248,185	2,441,407	10.2%	229,825	286,451	80.2%	2,007,338	6,099,628	32.9%
2003	1,255	19,711	6.4%	1,604,682	4,134,388	38.8%	53,012	109,821	48.3%	30,679	906,563	3.4%	108,064	158,049	68.4%	1,797,692	5,328,532	33.7%
2004	1,138	28,616	4.0%	2,540,319	5,067,942	50.1%	200,682	320,189	62.7%	236,115	2,876,094	8.2%	137,661	353,468	38.9%	3,115,915	8,646,309	36.0%
2005	1,963	28,303	6.9%	2,526,824	5,483,530	46.1%	145,306	229,586	63.3%	31,509	2,355,670	1.3%	66,201	168,880	39.2%	2,771,803	8,265,969	33.5%
2006	2,791	18,781	14.9%	786,764	2,428,000	32.4%	99,831	209,259	47.7%	213,692	1,876,646	11.4%	60,712	136,754	44.4%	1,163,790	4,669,440	24.9%
2007	914	18,160	5.0%	1,827,332	3,693,857	49.5%	109,340	181,539	60.2%	67,729	434,778	15.6%	75,213	79,394	94.7%	2,080,528	4,407,728	47.2%
2008	654	13,626	4.8%	985,735	2,804,722	35.1%	90,447	174,638	51.8%	104,172	675,416	15.4%	46,405	226,446	20.5%	1,227,413	3,894,848	31.5%
2009	868	8,887	9.8%	971,375	2,340,382	41.5%	82,483	154,764	53.3%	140,304	1,204,388	11.6%	77,433	157,178	49.3%	1,272,463	3,865,599	32.9%
2010	539	9,990	5.4%	1,590,428	2,928,105	54.3%	110,695	208,785	53.0%	164,199	571,111	28.8%	217,787	324,431	67.1%	2,083,648	4,042,422	51.5%
2011	594	11,390	5.2%	3,206,695	5,677,071	56.5%	41,217	96,274	42.8%	15,422	396,605	3.9%	111,843	161,886	69.1%	3,375,771	6,343,226	53.2%
2012	219	2,665	8.2%	2,935,915	3,332,805	88.1%	75,098	107,796	69.7%	304,212	727,184	41.8%	266,422	327,108	81.4%	3,581,866	4,497,558	79.6%
2013	498	5,794	8.6%	1,667,844	2,859,927	58.3%	186,054	270,733	68.7%	30,812	2,147,167	1.4%	132,996	194,591	68.3%	2,018,204	5,478,212	36.8%
2014	382	5,028	7.6%	1,506,761	2,622,083	57.5%	78,035	139,984	55.7%	419,154	916,314	45.7%	109,378	190,675	57.4%	2,113,710	3,874,084	54.6%
2015	561	11,674	4.8%	1,015,035	2,899,591	35.0%	131,069	222,653	58.9%	21,748	6,436,882	0.3%	253,344	390,442	64.9%	1,421,757	9,961,242	14.3%
2016	607	10,947	5.5%	1,268,842	2,659,548	47.7%	90,672	149,557	60.6%	269,222	507,982	53.0%	113,621	198,317	57.3%	1,742,964	3,526,351	49.4%

Note: Central District drift gillnet harvest reflects harvest recorded in Central District ADF&G salmon statistical areas by vessels fishing with Cook Inlet salmon drift gillnet (S03H) permits. This represents the maximum amount of harvest that has been taken from EEZ waters. Total Cook Inlet harvest is associated with the following CFEC permit types: Cook Inlet salmon purse seine (S01H), Cook Inlet salmon drift gillnet (S03H), Cook Inlet salmon set gillnet (S04H), and Cook Inlet salmon special harvest area (S77H), a hatchery permit. All salmon associated with commercial activity are included, regardless of disposition, and including test fishing and hatchery cost recovery. With the exception of commercially sold sport fish derby harvest, no other harvest is excluded based on the disposition of the salmon.

Table 4-2 Copper River and Bering River District (Prince William Sound) salmon harvests compared to total Prince William Sound salmon harvests associated with directed commercial fisheries, 1991-2016 (numbers of fish).

	Chinook Salmon			*Sockeye Salmon*			*Coho Salmon*			*Pink Salmon*			*Chum Salmon*			*Salmon Total*		
Year	*Copper /Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*	*Copper/Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*	*Copper/Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*	*Copper/ Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*	*Copper /Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*	*Copper/Bering River drift gillnet*	*Total Prince William Sound*	*% of Total*
1991	34,815	35,354	98.48%	1,225,992	1,734,346	70.7%	496,037	641,853	77.3%	1,250	37,135,557	0	20,415	352,039	5.8%	1,778,509	39,899,149	4.5%
1992	39,831	41,306	96.43%	990,680	1,771,612	55.9%	417,261	619,572	67.3%	1,668	8,637,116	0	5,808	334,376	1.7%	1,455,248	11,403,982	12.8 %
1993	29,858	32,005	93.29%	1,432,273	1,851,133	77.4%	397,319	445,612	89.2%	9,661	5,761,097	.2%	13,025	1,186,365	1.1%	1,882,136	9,276,212	20.3 %
1994	47,945	49,326	97.20%	1,181,093	1,515,343	77.9%	936,657	1,058,242	88.5%	12,113	36,890,921	0	19,132	1,058,405	1.8%	2,196,940	40,572,237	5.4%
1995	67,418	68,783	98.02%	1,293,407	1,523,464	84.9%	824,703	967,333	85.3%	19,835	16,065,231	.1%	56,329	758,545	7.4%	2,261,692	19,383,356	11.7
1996	57,964	58,657	98.82%	2,394,692	3,000,602	79.8%	287,065	459,319	62.5%	6,372	26,048,812	0	25,564	2,103,559	1.2%	2,771,657	31,670,949	8.8%
1997	52,542	53,757	97.74%	2,965,833	4,184,045	70.9%	18,753	91,339	20.5%	8,485	26,131,953	0	2,465	2,252,255	0.1%	3,048,078	32,713,349	9.3%
1998	70,503	72,346	97.45%	1,351,750	1,717,275	78.7%	120,530	196,213	61.4%	20,838	28,694,697	.1%	5,026	1,271,950	0.4%	1,568,647	31,952,481	4.9%
1999	63,510	64,557	98.38%	1,698,601	2,036,707	83.4%	142,751	172,112	82.9%	10,410	45,031,400	0	25,485	2,960,822	0.9%	1,940,757	50,265,598	3.9%
2000	32,018	33,153	96.58%	882,699	1,431,540	61.7%	361,273	716,770	50.4%	9,804	38,885,528	0	5,366	5,163,769	0.1%	1,291,160	46,230,760	2.8%
2001	40,554	41,407	97.94%	1,331,154	2,263,274	58.8%	259,353	495,349	52.4%	9,387	35,246,524	0	2,789	3,099,796	0.1%	1,643,237	41,146,350	4.0%
2002	39,552	40,490	97.68%	1,250,271	2,263,328	55.2%	612,932	650,518	94.2%	3,677	18,950,931	0	31,657	6,373,517	0.5%	1,938,089	28,278,784	6.9%
2003	49,000	49,278	99.44%	1,210,578	2,730,160	44.3%	422,970	521,917	81.0%	12,967	51,975,683	0	10,123	3,804,895	0.3%	1,705,638	59,081,933	2.9%
2004	38,825	39,144	99.19%	1,061,768	1,892,525	56.1%	563,456	619,913	90.9%	5,177	23,531,483	0	3,407	2,001,949	0.2%	1,672,633	28,085,014	6.0%
2005	35,770	36,118	99.04%	1,411,090	1,988,771	71.0%	306,614	531,771	57.7%	44,335	59,944,654	.1%	3,536	2,099,493	0.2%	1,801,345	64,600,807	2.8%
2006	31,309	31,634	98.97%	1,535,291	2,524,501	60.8%	375,145	763,720	49.1%	30,901	21,722,036	.1%	17,245	2,181,580	0.8%	1,989,891	27,223,471	7.3%
2007	40,276	41,132	97.92%	1,920,508	3,231,202	59.4%	126,827	328,980	38.6%	80,757	63,469,830	.1%	9,765	3,579,068	0.3%	2,178,133	70,650,212	3.1%
2008	12,042	12,407	97.06%	324,248	1,301,040	24.9%	243,369	550,629	44.2%	1,498	42,353,653	0	1,345	5,076,135	0.0%	582,502	49,293,864	1.2%
2009	10,344	10,752	96.21%	907,099	1,919,185	47.3%	254,035	300,615	84.5%	16,821	19,001,363	.1%	8,686	3,222,176	0.3%	1,196,985	24,454,091	4.9%
2010	10,551	10,996	95.95%	643,329	2,045,144	31.5%	292,414	338,745	86.3%	21,167	71,309,596	0	15,776	4,323,309	0.4%	983,237	78,027,790	1.3%
2011	19,783	20,462	96.68%	2,061,508	3,542,017	58.2%	148,020	371,482	39.8%	24,072	33,403,424	.1%	13,394	1,914,525	0.7%	2,266,777	39,251,910	5.8%
2012	12,611	13,120	96.12%	1,874,436	3,700,809	50.6%	177,622	210,466	84.4%	6,063	27,237,360	0	27,376	3,819,046	0.7%	2,098,108	34,980,801	6.0%
2013	9,409	10,804	87.09%	1,620,307	2,334,229	69.4%	292,193	621,283	47.0%	65,497	92,473,442	.1%	10,238	4,070,523	0.3%	1,997,644	99,510,281	2.0%
2014	10,975	11,660	94.13%	2,062,214	3,305,481	62.4%	414,271	615,684	67.3%	11,878	44,659,329	0	43,592	1,516,962	2.9%	2,542,930	50,109,116	5.1%

	Chinook Salmon			***Sockeye Salmon***			***Coho Salmon***			***Pink Salmon***			***Chum Salmon***			***Salmon Total***		
Year	***Copper /Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***	***Copper/Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***	***Copper/Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***	***Copper/ Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***	***Copper /Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***	***Copper/Bering River drift gillnet***	***Total Prince William Sound***	***% of Total***
2015	23,664	24,546	96.41%	1,584,195	3,221,663	49.2%	150,520	224,990	66.9%	84,868	97,343,156	.1%	15,725	2,512,433	0.6%	1,858,972	103,326,788	1.8%
2016	13,133	13,459	97.58%	1,194,538	1,989,248	60.0%	449,362	486,635	92.3%	35,138	13,041,180	.3%	5,645	3,171,744	0.2%	1,697,816	18,702,266	9.1%

Note: Copper River and Bering River District drift gillnet harvest reflects harvest recorded in Copper River or Bering River District ADF&G statistical areas by vessels fishing with Prince William Sound salmon drift gillnet (S03E) permits. This represents the maximum amount of harvest that has been taken from EEZ waters. Total Prince William Sound harvest is associated with the following permit types: Prince William Sound salmon purse seine (S01E), Prince William Sound salmon drift gillnet (S03E), Prince William Sound salmon set gillnet (S04E), Prince William Sound salmon special harvest area (S77E), a hatchery permit. All salmon associated with commercial activity are included, regardless of disposition, and including test fishing and hatchery cost recovery. With the exception of commercially sold sport fish derby harvest, no other harvest is excluded based on the disposition of the salmon.

Table 4-3 Unimak and Southwestern District (South Alaska Peninsula) drift gillnet and purse seine salmon harvests compared to total Alaska Peninsula salmon harvests associated with directed commercial fisheries, 1991-2010 (numbers of fish).

	Chinook Salmon			*Sockeye Salmon*			*Coho Salmon*			*Pink Salmon*			*Chum Salmon*			*Salmon Total*		
Year	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*	*Unimak/SW District drift and purse seine*	*Total AK PEN*	*% of Total*
1991	3,302	16,880	19.6%	1,252,994	4,697,428	26.7%	79,149	530,597	14.9%	2,914,133	10,600,845	27.5%	885,010	1,765,052	50.1%	5,134,588	17,610,802	29.2%
1992	2,660	21,077	12.6%	2,130,252	7,017,468	30.4%	85,337	621,761	13.7%	4,719,844	10,266,124	46.0%	597,848	1,653,183	36.2%	7,535,941	19,579,613	38.5%
1993	4,639	37,668	12.3%	2,398,310	7,549,197	31.8%	36,692	279,632	13.1%	2,371,862	9,930,451	23.9%	549,055	1,181,367	46.5%	5,360,558	18,978,315	28.2%
1994	4,427	28,121	15.7%	1,001,088	4,874,336	20.5%	32,365	493,605	6.6%	5,145,309	10,228,805	50.3%	1,243,181	2,263,438	54.9%	7,426,370	17,888,305	41.5%
1995	7,551	24,649	30.6%	1,471,048	6,269,111	23.5%	38,452	396,325	9.7%	4,780,987	16,314,764	29.3%	826,222	1,814,361	45.5%	7,124,260	24,819,210	28.7%
1996	1,305	10,461	12.5%	567,646	3,454,260	16.4%	36,043	450,687	8.0%	416,760	2,261,345	18.4%	251,154	862,598	29.1%	1,272,908	7,039,351	18.1%
1997	3,100	18,164	17.1%	1,121,612	4,436,459	25.3%	22,662	210,920	10.7%	1,189,305	2,372,072	50.1%	369,660	725,374	51.0%	2,706,339	7,762,989	34.9%
1998	1,323	10,847	12.2%	1,042,585	3,271,328	31.9%	34,345	288,918	11.9%	2,027,268	8,082,808	25.1%	354,650	790,584	44.9%	3,460,171	12,444,485	27.8%
1999	2,310	9,960	23.2%	1,273,028	4,775,623	26.7%	22,095	246,410	9.0%	1,477,956	8,460,816	17.5%	339,022	890,150	38.1%	3,114,411	14,382,959	21.7%
2000	2,337	9,350	25.0%	900,073	3,976,851	22.6%	43,665	340,980	12.8%	1,024,836	3,853,291	26.6%	522,315	1,160,353	45.0%	2,493,226	9,340,825	26.7%
2001	136	7,048	1.9%	158,659	1,766,266	9.0%	34,067	236,416	14.4%	1,221,754	4,033,961	30.3%	455,724	1,108,276	41.1%	1,870,340	7,151,967	26.2%
2002	355	10,280	3.5%	403,361	2,454,963	16.4%	17,999	231,483	7.8%	647,003	2,192,277	29.5%	416,606	871,405	47.8%	1,485,324	5,760,408	25.8%
2003	311	7,419	4.2%	398,774	2,538,908	15.7%	13,913	185,628	7.5%	1,133,068	4,281,586	26.5%	338,346	678,634	49.9%	1,884,412	7,692,175	24.5%
2004	626	17,525	3.6%	576,027	4,644,306	12.4%	18,085	270,097	6.7%	1,280,225	6,697,275	19.1%	188,734	809,686	23.3%	2,063,697	12,438,889	16.6%
2005	629	13,868	4.5%	397,661	5,456,416	7.3%	7,353	216,988	3.4%	2,462,875	9,428,733	26.1%	219,648	785,009	28.0%	3,088,166	15,901,014	19.4%
2006	1,289	13,306	9.7%	368,693	4,231,436	8.7%	7,611	264,063	2.9%	733,557	5,320,037	13.8%	388,381	1,319,703	29.4%	1,499,531	11,148,545	13.5%
2007	843	12,933	6.5%	767,125	5,860,703	13.1%	27,373	220,824	12.4%	2,058,080	8,461,412	24.3%	277,129	862,143	32.1%	3,130,550	15,418,015	20.3%
2008	1,312	6,178	21.2%	1,065,517	4,255,334	25.0%	41,372	352,892	11.7%	4,390,429	13,530,667	32.4%	380,595	991,868	38.4%	5,879,225	19,136,939	30.7%
2009	1,321	9,064	14.6%	566,848	4,155,644	13.6%	44,398	316,566	14.0%	2,800,380	9,822,112	28.5%	708,324	1,792,971	39.5%	4,121,271	16,096,357	25.6%
2010	2,028	10,777	18.8%	509,238	3,521,357	14.5%	49,460	226,985	21.8%	232,055	872,303	26.6%	198,859	1,058,262	18.8%	991,640	5,689,684	17.4%
2011	2,376	9,585	24.8%	944,258	2,846,726	33.2%	31,740	172,945	18.4%	695,594	5,747,523	12.1%	353,321	1,273,270	27.7%	2,027,289	10,050,049	20.2%
2012	4,810	9,144	52.6%	958,074	2,787,892	34.4%	49,917	129,240	38.6%	205,963	666,080	30.9%	289,076	910,939	31.7%	1,507,840	4,503,295	33.5%
2013	1,330	8,115	16.4%	1,092,905	2,966,188	36.8%	135,684	322,455	42.1%	553,362	7,808,222	7.1%	358,244	1,083,602	33.1%	2,141,525	12,188,582	17.6%

	Chinook Salmon			***Sockeye Salmon***			***Coho Salmon***			***Pink Salmon***			***Chum Salmon***			***Salmon Total***		
Year	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***	***Unimak/SW District drift and purse seine***	***Total AK PEN***	***% of Total***
2014	1,708	8,823	19.4%	511,442	3,400,787	15.0%	177,662	405,682	43.8%	311,237	855,894	36.4%	253,310	633,831	40.0%	1,255,359	5,305,017	23.7%
2015	5,769	56,585	10.2%	622,502	5,946,541	10.5%	49,041	329,076	14.9%	3,570,051	16,727,647	21.3%	228,524	872,421	26.2%	4,475,887	23,932,270	18.7%
2016	1,712	17,669	9.7%	724,743	6,001,334	12.1%	39,865	266,949	14.9%	1,883,460	2,906,702	64.8%	176,770	521,201	33.9%	2,826,550	9,713,855	29.1%

Note: Unimak and Southwestern District drift gillnet and purse seine harvest reflects harvest recorded in Unimak or Southwestern District ADF&G statistical areas by vessels fishing with Alaska Peninsula salmon drift gillnet (S03M) permits or purse seine permits (S01M). This represents the maximum amount of harvest that has been taken from EEZ waters. Total Alaska Peninsula harvest is associated with the following CFEC permit types: Alaska Peninsula salmon purse seine (S01M), Alaska Peninsula salmon drift gillnet (S03M), Alaska Peninsula salmon set gillnet (S04M), Bristol Bay salmon drift gillnet (S03T) in statistical areas 31622, 31720, or 31820, and Bristol Bay salmon set gillnet (S04T) in statistical areas 31622, 31720, or 31820. However, over this time period, no S03T or S04T harvest is found in Ilnik Lagoon (statistical area 31622). All salmon associated with commercial activity are included, regardless of disposition, and including test fishing and hatchery cost recovery. With the exception of commercially sold sport fish derby harvest, no other harvest is excluded based on the disposition of the salmon.

4.3 Salmon Stocks

The State manages Alaska salmon stocks according to the best scientific information available to achieve escapement goals that provide for sustainable yield. Salmon are targeted throughout their adult life by a variety of fisheries from mixed stock troll fisheries to terminal net fisheries, sport fisheries, subsistence fisheries, and personal use fisheries. Escapement-based management, with real-time monitoring of run strength, inherently accounts for total harvest and all sources of natural mortality. 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. As explained above, overfishing is prevented by in-season monitoring and data collection that indicates when an escapement goal is not being met. When the data indicate low run strength due to natural fluctuations in salmon abundance, ADF&G restricts and at times closes the fishery to ensure the escapement goal range is reached. This may result in low catches for the target fisheries, but it prevents overfishing and ensures sustained yield over the long term.

The majority of escapement goals in Upper Cook Inlet, Prince William Sound, and the Alaska Peninsula are sustainable escapement goal ranges (SEGs), including lower-bound SEGs. Escapement goals for sockeye, Chinook, and chum salmon comprise 72 percent of all escapement goals statewide, with the majority of goals for each species being SEGs. An exception to this general pattern is Southeast Alaska, where the majority of escapement goals are biological escapement goals (BEGs). Optimal escapement goals (OEGs), management targets, and goals based upon international agreements collectively represent a small proportion of escapement goals in Alaska. There are many reasons why escapement goal types differ between regions including fishery structure, stock assessment capacity, and technical approaches.

The State does not have the necessary resources to monitor all the salmon runs in Upper Cook Inlet, Prince William Sound, or the Alaska Peninsula. Therefore, the State does not have the information necessary to set escapement goals for many of the salmon runs. However, the State (in conjunction with users) has identified the most important species and runs, and has tried to monitor those salmon runs. Even though the State doesn't monitor some of the smaller stocks of sockeye, Chinook, and pink, chum, and coho stocks; the State does have other information (aerial surveys, catch and test fish indices) to monitor and track abundance of some of the smaller stocks. In the absence of specific stock information, the State has managed these stocks conservatively following the precautionary principle and based on the information it collects from indicator stocks (stocks that can be assessed) and the performance of salmon fisheries.

4.3.1 Salmon Stocks of Concern and Actions to Address Concerns

There are currently 295 established and monitored salmon stock escapement goals in Alaska, which provide benchmarks for assessing stock performance (Munro and Volk, 2016). Where escapements are chronically below established goal ranges or thresholds, a stock of concern designation may be recommended to the Board 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 Board 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 are designated as 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. A management concern results from a continuing or anticipated inability to maintain escapements within the escapement goal range or above the lower bound or threshold. With the determination of a management concern, ADF&G and the Board of Fisheries are required to develop an action plan to address the concern.

When stocks of concern are identified, ADF&G staff members work with the board and public to develop action plans that describe potential management actions and research programs to help 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 fish restrictions including bag limit changes, use of bait, or closures of the fisheries. Subsistence fishing restrictions may also be considered in action plans.

In the three traditional net areas, there are approximately 70 stocks (of the 295 statewide) with established salmon escapement goals. Of those stocks, only eight salmon stocks of concern are designated. Stocks of concern and the conditions which trigger concern designations are defined in the State's Policy for the Management of Sustainable Salmon Fisheries. Where Alaska salmon stocks have chronically fallen below their escapement goals or not achieved historical average harvests and concern designations have been established, the State has developed action plans to achieve stock rebuilding goals. Often, these action plans involve time and area restrictions.

Action plans responding to stocks of concern designations vary widely. If warranted, commercial fisheries are generally restricted by time, area and gear according to our best understanding of impacts on the stocks of concern. Stocks of concern in the management areas that include FMP waters are as follows:

- Chuitna, Theodore, and Lewis rivers – Chinook stocks of management concern, designation adopted 2010/11
- Alexander Creek – Chinook stock of management concern, designation adopted 2010/11
- Goose and Sheep creeks – Chinook stocks of management concern, designation adopted 2013/14
- Willow Creek – Chinook stocks of yield concern, designation adopted 2010/11
- Susitna River – sockeye stock of yield concern, designation adopted 2007/08

Action plans have been adopted for each stock of concern. As an example, for Westside Cook Inlet Chinook salmon from Theodore, Chuitna, and Lewis Rivers, the board adopted action plan called for closures of the Westside set gillnet Chinook salmon fishery in specific areas until June 25, which will likely reduce commercial harvest on these stocks of management concern. The action plan for Susitna River sockeye salmon requires the Northern District set gillnet fishery to fish with no more than one net per permit from July 20 through August 6 to reduce harvest on these stocks. Restrictions to sport fisheries are generally a part of action plans addressing Chinook salmon. A recent action plan calls for

sport fish closures on Chinook stocks of management concern in the Theodore, Chuitna and Lewis Rivers. Fishing time restrictions and reductions in bag and possession limits were also instituted to conserve Willow Creek stocks of yield concern. Fishing for any fish species is closed within a one-half mile radius of the mouth of Alexander Creek from May 1 – July 13.

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 Lewis, Chuitna and Theodore Rivers, the department 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 Chinook salmon and sampling and analyses of marine Chinook salmon harvests were instituted in 2013. The improved baseline and marine sampling is also part of the Goose and Willow Creek action plan. Aerial survey programs will continue monitoring escapements for these stocks, and installation of weirs from 2012-2014 on the Theodore and Lewis Rivers improved assessment of escapements and provided a platform for collection of reliable age, sex and size information. Continued monitoring of salmon escapements against established stock goals allows ADF&G, the Board and the public to gauge success of these actions and modify action plans accordingly.

4.3.2 Over-escapement

Over-escapement has been a concern for some members of the public and perceived over-escapement is one reason UCIDA advocated for Federal management of the Cook Inlet salmon fishery. Over-escapement means that the number of spawning salmon exceeds the upper bound of the escapement goal range established for any particular system. Over-escapement usually results from (1) a lack of fishing effort, (2) unexpectedly large salmon runs, or (3) management or economic constraints on the fishery. Management constraints result, in part, from State management of salmon fisheries for maximum harvest of the largest, most productive salmon stocks, while protecting less abundant salmon stocks and species. Mixed stock salmon fisheries with multiple species are complex and exploited by divergent users. It is not possible to manage mixed salmon fisheries for MSY on all stocks and species in circumstances where the composition, abundance, and productivity of stocks and species in those fisheries vary substantially.

ADF&G prepared a comprehensive review of the biological and fishery-related aspects of over-escapement in Alaska sockeye salmon stocks (Clark et al. 2007). This report is incorporated by reference and the following provides a brief summary. The topic of over-escapement in Pacific salmon stocks is controversial and complex, especially in regard to the management of Alaskan sockeye salmon. The controversy has many facets, but three major issues are (1) the definition of over-escapement, (2) the effects of over-escapement on the stock, and (3) the effects of over-escapement on the fishery. The report attempts to clarify these major issues from ADF&G's perspective and based on experience and the best available scientific information.

Understanding how over-escapement affects short- and long-term yields is dependent on knowledge of salmon production, carrying capacity, and the amount of fishing effort. The general theory is that salmon stock size is limited by habitat carrying capacity and that too many salmon returning can cause lower future production due to overcrowding and competition.

Over-escapement occurred at least once in the recent 15-year period for 37 of the 40 sockeye salmon stocks examined in the ADF&G study. The short-term cost of over-escapement is the harvest foregone as a consequence of escapement exceeding the escapement goal. Foregone harvest (expressed as average percent of the run over the recent 15 year period) due to over-escapement occurred for 37 of the 40 stocks examined. In general, the foregone harvest was small (< 5% of the run). For seven stocks the average foregone harvest averaged greater than 20 percent and for 18 stocks averaged greater than 10 percent of the run. The stock which exhibited largest foregone harvests were not heavily exploited, had limited fishing power, and were unable to fully exploit large runs when they occurred.

For most stocks, the long-term biological consequences of over-escapement were a decrease in yields relative to MSY and an increase in the variability of yield. This is consistent with the compensatory nature of salmon production and the limits of the habitat carrying capacity. In general, over-escapement and the associated decreased yield are not long-lasting for highly exploited stocks because future yields will increase as a consequence of lower future escapements and diminished competition.

For some stocks, there was little evidence for decreased yields with over-escapement. The observed exploitation rates for these stocks were higher and at times exceeded the MSY exploitation rate. For these stocks, yields tended to increase with increasing escapement even when over-escapement occurred.

The report recommended several areas of additional research to improve our understanding of the biological consequences of over-escapement. These include improving the methods for (1) determining carrying capacity of sockeye salmon watersheds, (2) defining threshold juvenile salmon densities that cause delayed density-dependent responses in rearing lake ecosystems, and (3) defining threshold population densities needed to evoke an ecological response.

Additionally, ADF&G has on-going work to provide data to better understand system carrying capacity for sockeye smolts. Examples include a program for limnological sampling in a number of Kodiak lake systems which provides information on zooplankton communities and nutrient levels. In Southcentral Alaska, similar data has been collected related to nutrient enrichment projects. For some of these systems, there are also fry and/or smolt estimates, with age composition data, that allow some important inferences regarding density dependent effects among juveniles in the lake. As the Clark et al. (2007) report points out, there are limnological methods for estimating maximum smolt capacity, but efforts to validate those methods against independent estimates of carrying capacity are scant.

Over-escapement is defined by the escapement goal developed for a given stock. On-going improvements in ADF&G's genetic stock identification capabilities help to better identify stock-specific harvest, which improves brood tables, the underpinning of stock recruit relationships used to develop escapement goals. While there are currently no specific efforts aimed at unraveling the complex biological and economic effects of over-escapement, on-going work in the study of sockeye rearing lake limnology and its relationship to population density contributes to our understanding of the issue and provides valuable data to the modeling efforts suggested in the Clark et al. (2007) report. Biometric and genetic work aimed at improving brood tables and escapement goals help to better define what over-escapement is.

5 Status Determination Criteria for West Coast Salmon

The following description provides an overview of the process the Pacific Fishery Management Council (Pacific Council) and the NMFS West Coast Region use to specify biological management and references points. This is intended as a brief overview, as the specifics of salmon management in the Pacific region are complex, involving a large number of stocks, three States, Pacific Treaty Obligations with Canada, tribes, hatchery fish, and ESA requirements. The overview describes the process used by the Pacific Council to prevent overfishing as required under NS1 of the Magnuson-Stevens Act.

The following topics are specifically covered in the discussion paper, noting that future analysis would need to relate these issues to Alaska-specific situations:

- Management objectives and definition of managed stocks
- Annual management process and NEPA
- Catch limits and status determination criteria
- Management and accountability measures
- Inseason management

5.1 Managed Stocks

The Magnuson-Stevens Act requires FMPs contain a description of the fishery, including the species of fish and their locations. The Pacific coast salmon FMP (PCFMP) covers recreational and commercial fisheries that occur within the EEZ and off the coasts of the Oregon, Washington, and California. The PSFMP includes Essential Fish Habitat (EFH) designation in the marine areas with the EEZ and estuarine and freshwater habitat in the internal waters of Oregon, Washington, Idaho, and California. However, the PCFMP does not extend its authority to management in State waters (including EFH), but must account for mortality in state waters, and incorporate ESA issues, noting that the ESA may have requirements that reach into State waters (including inland waters). State, Pacific Salmon Treaty requirements, and tribal allocations are also considered in the PCFMP's management objectives and processes.

Stocks in the PCFMP are broadly categorized as stocks and stock complexes in or out of the fishery, and whether the stock or complex is a target or non-target, based on its importance in the ocean salmon fishery. Management objectives are provided in the PCFMP for salmon species that are measurably impacted by fisheries within the Council jurisdiction. Stocks caught in small amounts (termed "inconsequential") are considered non-target stocks for which management objectives are not provided. For example, no fishery management objectives are provided for chum, sockeye, steelhead, sea-run cutthroat, or spring run Chinook from the mid-Columbia tributaries (i.e., White Salmon, Klickitat, Yakima, Deschutes, John Day, Umatilla, and Walla Walla basins).

The PCFMP partitions the coastwide aggregate of Chinook, coho, pink, and those salmon into various stock components and stock complexes with specific management objectives. While all species of salmon fall under the plan, fishery management objectives are only set for certain runs of Chinook, coho, pink (odd-numbered years), and those salmon listed under the ESA. These stocks include both hatchery and non-hatchery stocks, with hatchery stocks relying solely on propagation and non-hatchery stocks have at

least some component of the stock that relies on natural production, although some hatchery production and naturally spawning fish may contribute to abundance and spawning escapement estimates.

Stock complexes are groups of stocks of sufficient similarity in geography, life history, and vulnerabilities to the fishery such that management actions on the stocks are similar. Stock complexes are created to facilitate management requirements, such as setting ACLs in a mixed stock fishery. A stock complex contains multiple stock components, with management of the stock components considered in the conservation objective and ultimately in the harvest control measures. For example, comparing **Table 5-1** with **Table 5-2**, the Central Valley Fall Chinook Stock complex has component stocks of Sacramento River fall, Sacramento River late fall, and San Joaquin River fall runs. The methods used to relate these stocks to the conservation objectives and status determination criteria are described in **Table 5-2**. The PCFMP describes these stocks, indicating whether ESA consultation or international treaty exceptions apply and catch limits are established set under non- Magnuson-Stevens Act authorities (i.e., Pacific Salmon Treaty). Of note is that only three stocks out of 32 total stocks (or stock complexes) have requirements for ACLs. All other stocks are managed under other authorities such as limits set through ESA consultation, an international treaty, or of hatchery origin.

The PCFMP also defines “Ecosystem Species” that are shared with other FMPs. Directed fishing for these species is prohibited until the Council has had an adequate opportunity to assess potential impacts to existing fisheries, communities, and the marine ecosystem. These species include two species of herring, sand lance, Pacific saury, silversides, smelts, and pelagic squids. No salmon species are EC components.

Table 5-1 **Excerpt from PCPCFMP Chinook stock designation Table 1-1. This is table 1 of 4 for Chinook, and separate tables are used for each species in the fishery.**

Stocks and Complexes In The Fishery		Description	Target/Non-Target
Stock or Stock Complex	**Component Stocks**		
Central Valley Fall Chinook Stock Complex		Fall and late fall Chinook from the Sacramento and San Joaquin basins; the indicator stock is Sacramento River Fall Chinook.	
	Sacramento River Fall	Primarily hatchery stock with smaller natural component. Single largest contributor to ocean fisheries off California, a significant contributor off southern and central Oregon, and present north into British Columbia. Primary impact south of Pt. Arena; considerable overlap with coastal and Klamath River fall Chinook between Pt. Arena and Horse Mt.	Target
	Sacramento River Late Fall	Natural and hatchery components from upper Sacramento basin. Minor contributions to ocean fisheries.	Target
	San Joaquin River Fall	Natural and hatchery components. Minor contributions to ocean fisheries.	Target
Sacramento River Spring		ESA-listed Threatened. Minor contributions to ocean fisheries off California, also known to occur off Oregon.	Non-Target ESA
Sacramento River Winter		ESA-listed Endangered. Minor contributions to ocean fisheries south of Pt. Arena.	Non-Target ESA
California Coastal Chinook		ESA-listed Threatened. Eel, Mattole, Mad Rivers fall and spring stocks. Minor contributions to ocean fisheries off northern California and southern Oregon.	Non-Target ESA
Southern Oregon Northern California Chinook Stock Complex		Natural and hatchery stocks south of the Elk River, Oregon to, and including, the Klamath River, plus Umpqua River spring Chinook; the indicator stock is Klamath River fall Chinook.	
	Klamath River Fall	Natural and hatchery components from the Klamath basin. Major contributions to ocean fisheries from Humbug Mt. to Horse Mt. and to Klamath River tribal and recreational fisheries. Significant contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Target
	Klamath River Spring	Natural and hatchery components from the Klamath basin. Minor contributions to ocean fisheries from Cape Falcon to Pt. Sur.	Non-Target
	Smith River	Natural spring and fall stocks from the Smith River basin. Minor contributions to ocean fisheries off northern California and Oregon.	Non-Target
	Southern Oregon Coast	Aggregate of natural and hatchery fall and spring stocks in all streams south of Elk River, plus Umpqua spring stock; Rogue River fall stock is used to indicate relative abundance and ocean contribution rates. Significant contributions to ocean fisheries off northern California and Oregon.	Target

5.2 Abundance Estimation

The ocean fisheries occur on mixed stock salmon fisheries with multiple age classes impacted by fishing activities. This requires adult equivalency models to forecast harvest scenarios and assess the impact of harvest on naturally spawning stocks. For salmon, adult spawner equivalents are the basis for abundance estimates used in the salmon PCFMP. Units used for forecasting abundance and the NS1 control rules are the number of would-be spawners represented, absent any fishing (i.e., how many spawners are potentially vulnerable to fishing mortality). The total abundance, N, used in the PCFMP control rules is pre-fishery ocean abundance discounted for natural maturity and maturation. This is different from adult equivalency in the catch (i.e., AEQ), which would account for mortality on multiple year classes, not just spawners returning to their natal stream or hatchery. Hatchery fish also pay a big role in the accounting for removals and may constitute part of the natural spawners as well as fishery removals. In some situations, accounting and modeling methods are used in an attempt to assess these components.

The ocean fishery impacts, including the impacts of removals on spawning stocks, are evaluated each year in the preseason reports. The methods used to determine stock impacts (and ocean harvest levels) vary depending on the stock, ocean area fished, and the data available. Details on these methods are beyond this discussion paper; however, to provide a brief description of the potential complexity, the Klamath river model is a data rich situation and provides a general idea of the methods involved in assessing ocean harvest. The model is used annually for forecasting impacts on fisheries, and to forecast the expected number of natural spawners as a result of those fisheries (e.g., the Klamath Ocean Harvest Model- KOHM). The KOHM consists of projecting the age-specific (ages 3, 4, 5) preseason forecasted abundance through various ocean fisheries by month (see Mohr 2006). Thus, the ocean fishery impacts are assessing both in river returns and fishery impacts across cohorts using cohort reconstruction methods (a form of virtual population analysis). This modeling exercise requires fishing effort and removal estimates (e.g., fish ticket information), estimates of stock contribution to the fishery and contact rates by cohort (e.g., CWT, scales), preseason abundance (age-year specific), cohort projections, estimates of release mortality, recreational mortality, stray rates, and many other inputs. In its essence, the model is projecting impacts on each cohort as they become vulnerable to the fishery. Other fisheries and ocean areas use less complex methods.

Alaska would need to tailor its data collection and forecasting efforts to fit management needs for the stocks or complexes impacted by the fishery. The STT provides the expertise and advice to Pacific Region for assessing the ocean fishery impacts, and Alaska would likely need a similar group to evaluate methodology and establish conservation objectives in the FMP.

5.3 Optimum Yield

Optimum yield (OY) means the amount of fish that will provide the greatest overall benefit to the Nation, particularly with respect to food production and recreation opportunities, and taking into account protection of marine ecosystems. It is prescribed on the basis of Maximum Sustainable Yield (MSY) from the fishery; reduced by relevant economic, social, and ecological factors; and provides for the rebuilding of an overfished stocked, taking into the account the effects of uncertainty and management imprecision.

MSY in the PCFMP is usually approached in terms of the number of adult spawners (SMSY, i.e., production) needed to achieve the largest long-term yield. However, in situations where data are insufficient to directly estimate S_{MSY}, MSY proxies derived from more general estimates of productive capacity coupled with harvest strategies are used to achieve long-term catch approximating MSY.

To achieve OY, the PCFMP provides criteria used by the Pacific Council to specify annual management measures that comply with management and conservation needs. These annual measures rely on the best available scientific information, and include setting annual catch limits and control rules to provide for the conservation of the management of the stocks. In establishing criteria by which to determine the status of salmon stocks, the Pacific Council must consider the uncertainty and theoretical aspects of MSY as well as the complexity and variability unique to naturally producing salmon populations. These unique aspects include the interaction of a short-lived species with frequent, sometimes protracted, and often major variations in both the freshwater and marine environments. These variations may act in unison or in opposition to affect salmon productivity in both positive and negative ways. In addition, the Pacific Council must consider uncertainty that variations in natural populations may sometimes be difficult to measure due to masking by hatchery-produced salmon.

A characteristic of salmon management is high uncertainty in specifying annual management measures that meet management and conservation objectives. The management process used by the Pacific Council is an adaptive process of forecasting run size, assessing potential management measures based on forecasting, implementing annual measures using the forecasts, and assessing realized catch and escapement relative to conservation and management objectives after the season is completed (e.g., ACLs).

5.4 Annual Process

On an annual basis, the Pacific Council recommends management measures to comply with ACLs and to achieve stock conservation objectives for each stock or stock complex, based on the estimated MSY or MSY proxy, rebuilding schedule, or ESA consultation standard; while simultaneously seeking to fulfill, to the extent practicable, the harvest and allocation objectives that reflect the Council's social and economic considerations. The PCFMP describes these goals and methods for salmon management, including measure to comply with annual catch limits. Management tools such as season length, quotas, and bag limits vary depending on salmon abundance and are used to meet conservation objectives.

Annually, the Council follows a preseason process to develop recommendations for the management of ocean fisheries (Figure xx). A schedule of this process is in Appendix XX. Public involvement begins in late February, when reports describing the previous salmon season are released. These reports are followed by a Council meeting in early March to propose management alternatives. Public hearings on these alternatives are held in late March or early April, and the final recommendations are adopted at the Council meeting in April. Through rulemaking, NMFS implements the management measures to be effective May 1 – April 30. This process requires technical input provided by the SSC, the Salmon Technical Team (STT), the Salmon Advisory Subpanel (SAS), and the Model Evaluation Workgroup (MEW):

STT: The STT provides technical analysis of data, preseason run forecasts, evaluating postseason run information, and analyzing the effects of the Council's recommendations. The STT is composed of eight people drawn from state, federal, and tribal fishery management agencies, all of whom have technical expertise in salmon management. Meetings held by the STT are open to the public.

- SAS: This panel plays a large role in developing the Council's annual salmon management options in March and April. The panel is made up of 17 members who represent commercial, recreational, and tribal interests, as well as a public and conservation representative.
- MEW: This group reviews and modifies models used to predict the effects of harvest on conservation objectives and allocation provisions. The MEW is made up of scientists from the state, tribal and federal management agencies. MEW meetings are open to the public.

The STT prepares the primary decision documents. These are the annual Stock Assessment and Fishery Evaluation Report (SAFE), and three preseason reports that, together, form an Environmental Assessment (EA) of the management actions being considered:

- Preseason Report I presents key salmon stock abundance estimates and level of precision, harvest, and escapement estimates using recent regulatory regimes that are projected on the forecasted abundance. This report also serves as a tool for the development of management alternatives. State and Tribal agencies hold constituent meetings to review the abundance projections and ranges of probable fishery outcomes. From this, the Council and its advisory committees adopt regulatory alternatives for public review. The status determination of "approaching an overfishing condition" is made in this report because this determination relies on preseason forecasting and proposed fishing regulations. Release of this document to the public occurs in February.
- Preseason Report II presents the range of regulatory ocean fishery alternatives that the Council is considering for the coming salmon season. The report is distributed to the public and reviewed in public hearings to solicit public input of preferred management measures. This report contains public hearing schedules, comment instructions, management alternatives, and summaries of the biological and economic impact of the proposed management alternatives. The Pacific Council uses this document to select its final regulatory measures, based on public input. This document is finalized in the beginning of April and is released in February.
- Preseason Report III is the final document in the series prepared by the STT. It details the final management measures adopted by the Council for recommendation to NMFS for the coming season's regulations. It includes an analysis of the effects of the management measures on conservation objectives for key salmon stocks. This document along with Preseason Reports I and II constitute an EA analyzing the effects of the annual regulation alternatives on the environment. The public is able to comment on and recommend alternatives. The final EA is finalized by the end of April, with a goal of having the Federal ocean salmon regulations published May 1.

Establishing the OFL, acceptable biological catch (ABC), and ACL is an annual process that relies on forecasted abundance estimates to establish limits, and postseason recalculation to assess compliance. Forecasts and catch limits are calculated using the best information, which is generally available at the time of releasing Preseason Report I (updates may also occur in Preseason Reports II or III). The final

stock status is evaluated in the SAFE (review in January) after completion of the fishery and realized escapement is estimated. Except for the status of "approaching an overfished condition", NMFS makes its status determination based on the results of the SAFE.

The Pacific Council's annual SAFE report provides an annual review of ocean fisheries (post-season). This report provides a summary of important biological and social and economic data from which to assess the status of managed stocks, impacts of past management actions and to determine how well management objectives are being met, and to provide recommendations for improvement. The SAFE provides a summary of regulations and landings, and assessment of management objectives as outlined in the PCFMP and other laws (e.g., ESA). Finally, the status determinations for overfishing, overfished, not overfished/rebuilding, and rebuilt are reported in the annual SAFE document. The Secretary of Commerce (i.e., NMFS) makes a final status determination based on the information in the final SAFE document.

Not all stocks requiring conservation and management under the Magnuson-Stevens Act require preseason forecasting for setting the ACL. Stocks that are under the Pacific Salmon Treaty do not require an ACL, nor do stocks managed under ESA consultation since the consultation standard applies. However, ocean fisheries on high abundant stocks interact with stocks of low abundance, and these situations are considered in setting conservation objectives and annual management measures.

5.5 Status Determination and Harvest Control

To address the requirements of the Magnuson-Stevens Act, the Pacific Council established criteria based on biological reference points associated with MSY exploitation rate and MSY spawning escapement. The status criteria are based on the unique life history of salmon and the large variations in annual stock abundance due to numerous environmental variables. Uncertainty and imprecision surrounding the estimates of MSY, fishery impacts, and spawner escapements are considered in setting the harvest specifications.

The PCFMP conservation objectives are generally expressed in terms of an annual fishery or spawning escapement estimated to be optimum for producing MSY over the long-term. The escapement objective may be (1) a specific number or a range for the desired number of adult spawners (spawner escapement), (2) a specific number or range for the desired escapement of a stock from the ocean or at a particular location, such as a dam, that may be expected to result in the target number of spawners, or (3) based on the exploitation rate that would produce MSY over the long-term. Objectives may be expressed as fixed or stepped exploitation or harvest rates and may include lower limits for spawners (i.e., spawner floors) or substantially reduced harvest rates at low abundance levels. The Pacific Council must also consider requirements provided in the Pacific Salmon Treaty or NMFS consultation standards for stocks listed under the ESA. These legal issues would likely not be of concern for Alaska since no ESA stocks of concern originate in Alaska nor are the stocks in the affected area under the authority of the Pacific Salmon Treaty. The fisheries in the PCFMP also interact with complicated array of hatchery programs, the output and needs of which require consideration in setting catch limits and harvest objectives.

Conservation objectives are generally expressed as fixed quantities that provide the necessary guidance during the annual pre-season planning/forecasting process. These fixed quantities are expressed in terms

of each stock in the fishery; the conservation objective for that stock; the number of spawners that are expected to achieve MSY (S_{MSY}); Maximum Fishing Mortality Thresholds (MFMT), Minimum Stock Size Threshold (MSST), and fishing mortality criteria for setting Annual Catch Limits (e.g., **Table 5-2**). These conservation criteria are specific to naturally spawning fish, and may be set for an indicator stock that represents multiple stocks within a stock complex, or a specific stock. The control rule for S_{MSY} is generally expressed as total number of spawners needed to achieve MSY (on average) as either an absolute number or, in a few cases, as the number of fish per mile of stream during peak spawning periods.

The PCFMP defines the following Status Determination Criteria:

- **Overfishing:** A stock is subject to overfishing when the postseason estimate of fishing mortality exceeds the MFMT, where the MFMT is generally defined as less than or equal to the fishing mortality rate that results in MSY over the long-term (i.e., Fmsy or a proxy for Fmsy). Stock-specific overfishing determinations are made annually and are based on exploitation during a single biological year.
- **Overfished:** A stock is considered overfished when the 3-year geometric mean of the annual spawning escapement (postseason) falls below a specified proportion (generally 0.5 or 0.75) of the number of adult spawners that are expected, on average, to produce MSY (i.e., MSST).
- Not overfished/rebuilding status occurs when the most recent 3-year geometric mean spawning escapement is less than MSST
- A stock is rebuilt when the most recent 3-year geometric mean spawning escapement exceeds the number of number of adult spawners that are expected to produce MSY, on average.

Overfishing Limits: OFLs are defined in terms of spawner escapement (S_{OFL}) and are determined annually based on stock abundance, in spawner equivalent units (N) and exploitation rate F_{OFL} (defined as being equal to F_{MSY} or the MFMT). The OFLs are initially determined preseason using forecasts and revised post-season in the annual SAFE. However, annual status determination, including whether an OFL or ACL is exceeded, is determined using post-season estimates of abundance in the annual SAFE. For most stocks, a simple control rule is defined that sets a fixed MFMT and F_{MSY} that maybe the same value or different values depending on the stock. For example, Queets River coho have an MFMT of 65% and an F_{MSY} of 68%, whereas the North Fork Lewis River Fall has the MFMT= F_{MSY}=76%. This is done on a stock-by-stock or stock group basis. In other situations, treaty and ESA obligations drive conservation objectives. In general, these limits are set based on available information, legal status of the stock, and biological characteristics of the stock.

$$S_{OFL}=N*(1-F_{OFL})$$

ABC: The ABC, in terms of spawner escapement (S_{ABC}), is derived from an ABC control rule and is equal to the ACL. On an annual basis, the spawner escapement is determined based on stock abundance, in terms of N and exploitation rate (i.e., F_{ABC}). The F_{ABC} is a fixed value, reduced from F_{MSY} (or proxy), to account for scientific uncertainty (i.e., the ABC buffer). The calculation requires applying the F_{ABC} to the adult spawner abundance estimate (N).

The PCFMP defines two tiers for establishing the F_{ABC}: Tier 1 is a 5% buffer from F_{MSY} and is used for stocks where F_{MSY} can be directly estimated; and Tier 2 is a 10% buffer from F_{MSY}^{proxy} and is used when F_{MSY} cannot be directly estimated. Like the OFLs, the ABC/ACL is generally determined preseason based on forecasting models, and the management performance evaluated postseason in the annual SAFE. Note that F_{ABC} is equal to F_{ACL}, and F target is less than or equal to F_{ABC}, resulting in the forecasted escapement exceeding the estimated S_{ACL}. This is an upper limit associated with preventing overfishing and is not necessarily a harvest objective that would use a target F-value.

The ABC control rule defines two tiers:

Tier 1: $F_{ABC}=F_{MSY} \times 0.95$

Tier 2: $F_{ABC}=F_{MSY} \times 0.90$

$S_{ABC}=N*(1-F_{ABC})$ or equivalently $S_{ACL}=N*(1-F_{ACL})$ since F_{ABC} is equal to F_{ACL}

- **Preseason:** During the preseason salmon management process (i.e., Preseason Reports I-III), the number of spawners corresponding to the ACL limit (S_{ACL}) is estimated using a fixed exploitation rate and the preseason spawner abundance forecast (i.e., N). The Council recommends fishery management measures to NMFS that are anticipated to result in an expected spawning escapement that is at or above the S_{ACL}. The management measures may be designed to achieve a targeted exploitation rate that is less than the F_{ACL} as a result of stock specific conservation objectives, which results in the forecast escapement exceeding the estimated S_{ACL}.
- **Postseason:** The post season value of the S_{ACL} is determined annually using a fixed F_{ACL} exploitation rate and the post season estimate of spawner abundance for a stock (i.e., N). The postseason value of S_{ACL} is compared to the realized spawner escapement to determine if realized escapement was below the S_{ACL}. This evaluation is necessary to determine whether AMs should be triggered, and whether the ACL performance standards are being met: not meeting the performance standard more than once in four years results in a re-evaluation of the ACL framework (i.e., the rules for setting the ACL).

Table 5-2 **Example table showing stock, conservation objective, and reference points for several stocks in the Pacific Salmon PCFMP. Excepted from Table 3-1 on page 20 of the Pacific Salmon PCFMP.**

TABLE 3-1. Conservation objectives and reference points governing harvest control rules and status determination criteria for salmon stocks and stock complexes in the Pacific Coast salmon FMP. These may change periodically. The most recent values are reported annually in Preseason Reports I and III. (Page 1 of 7)

CHINOOK					
Stocks In The Fishery	**Conservation Objective**	S_{MSY}	MSST	MFMT (F_{MSY})	ACL
Sacramento River Fall Indicator stock for the Central Valley fall (CVF) Chinook stock complex.	122,000-180,000 natural and hatchery adult spawners (MSY proxy adopted 1984). This objective is intended to provide adequate escapement of natural and hatchery production for Sacramento and San Joaquin fall and late-fall stocks based on habitat conditions and average run-sizes as follows: Sacramento River 1953-1960; San Joaquin River 1972-1977 (ASETF 1979; PFMC 1984; SRFCRT 1994). The objective is less than the estimated basin capacity of 240,000 spawners (Hallock 1977), but greater than the 118,000 spawners for maximum production estimated on a basin by basin basis before Oroville and Nimbus Dams (Reisenbichler 1986).	122,000	91,500	78% Proxy (SAC 2011a)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 2 (10%) uncertainty
Sacramento River Spring ESA Threatened	NMFS ESA consultation standard/recovery plan: Conform to Sacramento River Winter Chinook ESA consultation standard (no defined objective for ocean management prior to listing).	Undefined	Undefined	Undefined	ESA consultation standard applies.
Sacramento River Winter ESA Endangered	NMFS ESA consultation standard/recovery plan: Recreational seasons: Point Arena to Pigeon Point between the first Saturday in April and the second Sunday in November; Pigeon Point to the U.S./Mexico Border between the first Saturday in April and the first Sunday in October. Minimum size limit ≥ 20 inches total length. Commercial seasons: Point Arena to the U.S./Mexico border between May 1 and September 30, except Point Reyes to Point San Pedro between October 1 and 15 (Monday through Friday). Minimum size limit ≥ 26 inches total length. Guidance from NMFS in 2010 and 2011 required implementation of additional closures and/or increased sized limits in the recreational fishery South of Point Arena. A new winter-run management framework and consultation standard is expected to be in place for the 2012 fishing season, or no later than March 1, 2012. (NMFS ESA Guidance for 2011).	Undefined	Undefined	Undefined	
California Coastal Chinook ESA Threatened	NMFS ESA consultation standard/recovery plan: Limit ocean fisheries to no more than a 16.0% age-4 ocean harvest rate on Klamath River fall Chinook.	Undefined	Undefined	Undefined	
Klamath River Fall Indicator stock for the Southern Oregon Northern California (SONC) Chinook stock complex.	At least 32% of potential adult natural spawners, but no fewer than 40,700 naturally spawning adults in any one year. Brood escapement rate must average at least 32% over the long-term, but an individual brood may vary from this range to achieve the required tribal/nontribal annual allocation. Natural area spawners to maximize catch estimated at 40,700 adults (STT 2005).	40,700	30,525	71% (STT 2005)	Based on F_{ABC} and annual ocean abundance. F_{ABC} is F_{MSY} reduced by Tier 1 (5%) uncertainty
Klamath River - Spring	Undefined	Undefined	Undefined	Undefined	Component stock of SONC complex; ACL indicator stock is KRFC
Smith River	Undefined	Undefined	Undefined	78% Proxy (SAC 2011a)	
Southern Oregon	Unspecified portion of an aggregate 150,000 to 200,000 natural adult spawners for Oregon coast (Thompson 1977 and McGie 1982) measured by 60-90 fish per mile in index streams. ODFW developing specific conservation objectives for spring and fall stocks that may be implemented without plan amendment upon approval by the Council.	60 fish per mile in index streams	30 fish per mile in index streams	78% Proxy (SAC 2011a)	

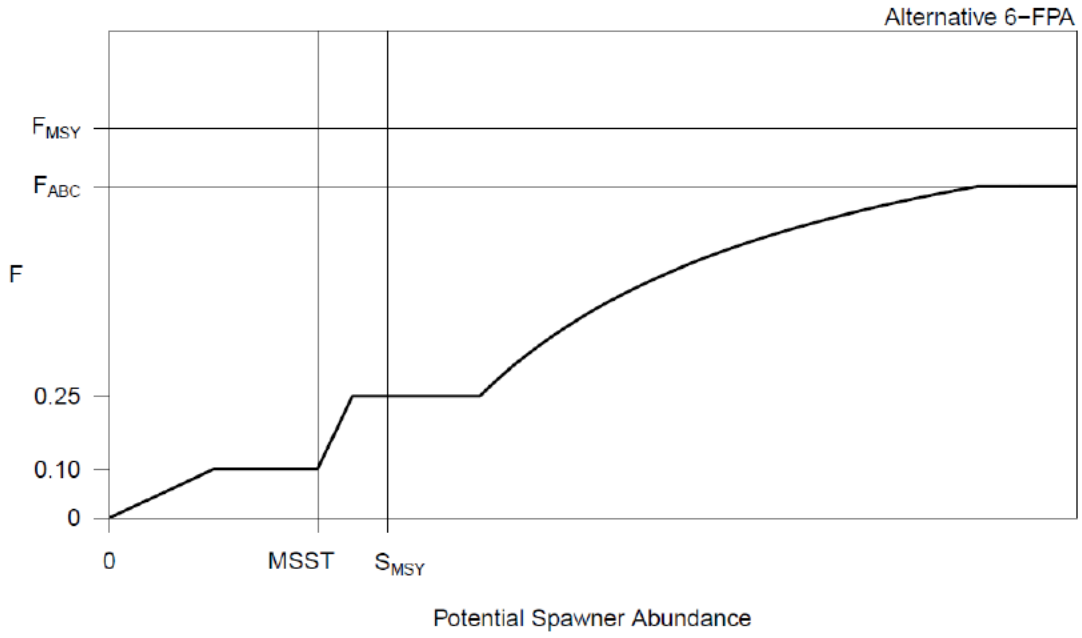
The ocean fisheries occur on mixed stocks, some of which are likely at low levels. Stocks with low adult abundance require management measures that allow enough spawning adults to meet conservation objectives. Thus, stocks of low abundance can limit fisheries on stocks with adequate abundance to support a target fishery. Prior Amendment 16, the PCFMP used a "conservation alert" mechanism that required the closure of all Council-area salmon fisheries that affected stocks that were projected to not meet their conservation objective. However, since these are mixed stock fisheries, this provision resulted in the closure of fisheries and foregone harvest of more abundant stocks, and in other cases resulted in the promulgation of emergency rules by NMFS to gain access to more abundant stocks.

Amendment 16 expanded the use of *de minimis* fishing provisions. These provisions are defined in the PCFMP and provide flexibility to the process of setting annual regulations when the conservation objectives for limiting stocks are projected to not be met (i.e., potential spawners is less than a conservation goal). Hence, the provisions allow exploitation while minimizing the risk of overfishing on a low abundance stock. Specifically, the provisions provide opportunity for fishers to access abundant salmon stocks that are typically available in the Council management area when the status of at least one stock may otherwise preclude all ocean salmon fishing in a large region. Allowing low levels of exploitation mitigates severe economic consequences to local communities and States (satisfying National Standard 8). However, while this action seeks to provide management flexibility in times of scarcity, there remains an overriding mandate to preserve the long-term productive capacity of all stocks, and to ensure the total fishing mortality rate does not exceed F_{MSY}.

For example, the *de minimis* measures are implemented for the Klamath River fall Chinook and Sacramento River Fall Chinook. The control rule describes a target exploitation rate that is less than the ACL exploitation rate. The Council is to consider the following factors when setting the *de minimis* exploitation rate: spawner abundance in recent years, the status of co-mingled stocks, indicators of marine and freshwater environmental conditions, minimal needs for tribal fisheries, whether the stock is currently approaching an overfished condition or overfished, other relevant information, and the exploitation rates used must not jeopardize the long-term capacity of the stock produce MSY on a continuing basis.

In its general form, a *de minimis* provision uses an F-based control rule that, as the stock declines, the allowable exploitation rate declines from F_{ABC}, until a basement F rate is reached (e.g., F=0.25), where F might remain constant, or potentially be reduced further at certain potential spawner abundance levels, and is analogous to an F_{Target} for the purpose of discussion (i.e., F_{Target} where $F_{Target} < F_{ACL}$). Setting the F_{Target} below the F_{ACL} is implemented to address stock-specific conservation concerns since it results in the forecasted escapement to exceed the escapement at S_{ACL}. However, the spawner goal under the F_{target} is not used to assess compliance with ACL requirements- ACL rules are fixed. Figure XX provides an example of a control rule used for the Sacramento river Fall Chinook with two levels of de minimis exploitation (F=0.25 and F=0.10), noting that there are other methods of specifying de minimis control rules defined in the PCFMP and considered during implementation (e.g., Figure 5-1, NMFS 2011, page ES-15). The example control rule adjusts F_{Target} to low levels to allow some exploitation at low spawner levels.

Figure 5-1 **Example of control rule for the *de minimis* fishing provision (from NMFS 2011). The control rule describes the maximum allowable exploitation rates at any given level of abundance.**



5.6 Process of ABC Specification and SSC Approval

The SSC was involved in the review and approval of the control rules initially specified in the PCFMP, and has an ongoing role in reviewing technical documents and recommending ABCs to the Council. This includes reviewing work by the STT on forecasting methods, methods to project compliance with the control rules, and annual model input data (e.g. Preseason Report I). The STT is delegated responsibility for applying the control rules and developing annual management specifications, but in all other aspects, the SSC is responsible for review and oversight of the process, and making recommendations to the Council.

5.7 Accountability Measures

Accountability measures (AM) are required for all stocks and stock complexes that are required to have management and conservation. The purpose of AMs is to prevent escapement below the S_{ACL} and to correct or mitigate these situations. AMs are specified in the PCFMP as preseason and inseason, or post-season measures. Preseason measures are enacted during the preseason planning process, while postseason measures are implemented through monitoring and reporting requirements.

Preseason and Inseason: The PCFMP provides for the use of the following measures that 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.

- In-season authority to manage quota fisheries– allows NMFS to close fisheries on short notice when mixed stock quotas are projected to be met. As described above, quotas are designed to ensure that ACLs and conservation objectives for component stocks are met.
- Mixed stock quota monitoring (PCFMP § 7.1) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Quota partitioning (PCFMP § 5.3 and 10.2) – partitioning overall quota among fishery sectors and port areas and time periods allows finer scale management, thereby reducing the chance that overall quota will be exceeded.
- Quota trading (PCFMP § 5.3 and 10.2) – quota trading allows overages in one sector/time/area to be made up by reductions in others.
- Changes to gear/bag/size/trip limits (PCFMP § 6 and 10.2) – allow a measure of control over catch rates to reduce the chance of quotas being exceeded.
- Boundary modifications (PCFMP § 6 and 10.2) – allow limited control over catch composition to limit impacts on constraining stocks.
- Landing restrictions (PCFMP § 6 and 10.2) - allow better accounting of the location of catches and thus better estimates of catch composition.
- In-season monitoring and reporting requirements. (PCFMP § 7) – collection of data on a daily basis during the season allows projection of when quotas will be met.
- Annual catch targets - intended to account for management uncertainty.

Postseason: The AMs are implemented through the assessment and review phases of the salmon management process:

- Salmon Methodology Review Process: re-evaluation of management objectives, reference points, and modifications to models that relate impacts to stock-specific objectives.
- SAFE- post season assessment of objectives and management performance.
- Report on escapement shortfalls in the Council preseason reports and notify state, tribal, and federal managers. If necessary, problems can be corrected in the assessment and changes in management methods can be made during the annual review of salmon methods and management.

5.8 Inseason Management

Inseason changes are made to meet the preseason intent of the management measures described in the Preseason III report, but must also meet the Council's PCFMP goals, especially in regard to conservation and allocation goals, Federally-recognized Indian fishing rights, consultation standards for ESA-listed salmon stocks, and obligations under the PST.

As an example, inseason actions that are anticipated for the 2016-2017 management season included, but are not limited to, the following possibilities:

- Adjustments in landing limits and days open for non-Indian commercial fisheries.
- Changing the days or number of days of fishing allowed per calendar week for recreational fisheries.

- Transfer of coho quotas among recreational port areas north of Cape Falcon.
- Trading portions of Chinook and coho quotas between recreational and non-Indian commercial sectors north of Cape Falcon.
- Routine openings and closings, and other management measures associated with quota management, including modifying open areas, bag limits, species retention limits, and mark-selective retention restrictions.
- Transferring unused or exceeded quota to subsequent fisheries on an impact neutral, fishery equivalent basis.
- Closing Oregon recreational and commercial fisheries scheduled to open March 15, 2017 if necessary to meet 2017 management objectives.
- Closing California recreational fisheries scheduled to open April 1, 2017, or commercial fisheries scheduled to open April 16, 2017, if necessary to meet 2017 management objectives.
- Adjustments to incidental Pacific halibut catch regulations in commercial fisheries, including landing and possession ratios and landing and possession limits per trip.

Inseason actions are generally accomplished through NMFS sponsored conference calls attended by representatives of affected state and tribal management agencies, the Council, the Salmon Advisory Subpanel (SAS), and the STT. The Council may also make recommendations for inseason actions at any of its regularly scheduled meetings. State water fisheries also occur, and these fisheries are considered when establishing annual management measures and setting ocean fishery limits.

5.9 Inseason Analysis

The preseason reports form the EA on annual salmon management measures. The EA evaluates whether an action being considered by a Federal agency has significant environmental impacts. The first part of the EA (Preseason Report I), includes a description of the No Action Alternative and analysis of effects of the No Action Alternative on salmon stocks managed under the PCFMP. The forecasts are applied against the previous year's management measure to assess the No Action Alternative. The second component, Preseason Report II, provides a statement of purpose and need, a description of the affected environment, and a description of alternative regulatory measures the Council is to consider for meeting conservation objectives (e.g., **Table 5-3**). The Council solicits public comments on the alternatives. The final component of the EA, a description and analysis of the Proposed Action, is provided in Preseason Report III, which also indicates whether the Council's recommendations are anticipated to meet applicable conservation objectives in the PCFMP- i.e., ACLs, protection requirements under ESA consultation, and obligations under the Pacific Salmon Treaty. NMFS publishes the recommended measures through rulemaking with waived notification. Notification is waived since such notification is impractical due to the short pre-season planning period being compressed into a two month period (February and March), and the need for management measures to be effective by May 1.

Staffing is required to shepherd the analysis through the process and complete the regulatory package. The Pacific Council has a staff person dedicated to the annual salmon process, and NMFS has several staff members responsible for policy development, inseason management, and regulatory writing. In addition, the STT requires technical staff to provide assessment and input, NMFS has assessment authors dedicated to salmon, and the Salmon Advisory Subpanel are comprised of user groups and staffed by the

Pacific Council. **Alaska Region and the Alaska Fishery Science Center would need to develop this staffing capacity since salmon is not an actively managed species by NMFS in Alaska.**

Table 5-3 Example of management alternatives from the 2016 Preseason Report III.

TABLE 1. Commercial troll management Alternatives adopted by the Council for non-Indian ocean salmon fisheries, 2016 (Page 1 of 10)		
A. SEASON ALTERNATIVE DESCRIPTIONS		
ALTERNATIVE I	ALTERNATIVE II	ALTERNATIVE III
North of Cape Falcon	**North of Cape Falcon**	**North of Cape Falcon**
Supplemental Management Information	**Supplemental Management Information**	**Supplemental Management Information**
1. Overall non-Indian TAC: 114,600 (non-mark-selective equivalent of 110,000) Chinook and 45,000 coho marked with a healed adipose fin clip (marked). 2. Non-Indian commercial troll TAC: 56,000 Chinook and 7,200 marked coho. 3. Trade: May be considered at the April Council meeting. 4. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	1. Overall non-Indian TAC: 60,000 Chinook and the equivalent coho mortality of a TAC of 35,000 coho consisting of 14,700 marked coho retained in the recreational fishery in the Columbia River Subarea and non-retention coho mortality in the recreational fisheries in the Neah Bay, La Push, and Westport Subareas and the commercial troll fishery north of Cape Falcon. 2. Non-Indian commercial troll TAC: 30,000 Chinook and the equivalent coho mortality of the commercial portion of the overall non-Indian coho TAC consisting of non-retention coho mortality in the commercial troll fishery north of Cape Falcon. 3. Overall Chinook and/or coho TACs may need to be reduced or fisheries adjusted to meet NMFS ESA guidance, FMP requirements, upon conclusion of negotiations in the North of Falcon forum, or upon receipt of preseason catch and abundance expectations for Canadian and Alaskan fisheries.	Closed.
U.S./Canada Border to Cape Falcon • May 1 through the earlier of June 15 or 28,000 Chinook, no more than 9,000 of which may be caught in the area between the U.S./Canada border and the Queets River and no more than 9,000 may be caught in the area between Leadbetter Pt. and Cape Falcon. Seven days per week with a landing and possession limit of 60 Chinook per vessel per trip from the U.S./Canada Border to the Queets River and a landing and possession limit of 75 Chinook per vessel per trip in the area between Leadbetter Pt. and Cape Falcon (C.1). All salmon except coho (C.4, C.7). Chinook minimum size limit of 28 inches total length (B). When it is projected that 21,000 Chinook have been landed overall, or 6,750 Chinook have been landed in the area between the U.S./Canada border and the Queets River, or 6,750 Chinook have been landed in	**U.S./Canada Border to Cape Falcon** • May 1 through the earlier of June 30 or 18,000 Chinook, no more than 5,700 of which may be caught in the area between the U.S./Canada border and the Queets River and no more than 5,800 may be caught in the area between Leadbetter Pt. and Cape Falcon. Five days per week, Friday through Tuesday with a landing and possession limit of 40 Chinook per vessel per trip from the U.S./Canada Border to the Queets River and a landing and possession limit of 50 Chinook per vessel per trip in the area between Queets River and Cape Falcon (C.1). All salmon except coho (C.4, C.7). Chinook minimum size limit of 28 inches total length (B). When it is projected that 13,500 Chinook have been landed overall, or 4,275 Chinook have been landed in the area between the U.S./Canada border and the Queets River, or 4,350	**U.S./Canada Border to Cape Falcon** Closed.

Table 5-4 PFMC's schedule and process for developing 2017 Ocean Salmon Measures.

PACIFIC FISHERY MANAGEMENT COUNCIL PROPOSED SCHEDULE AND PROCESS FOR DEVELOPING 2017 OCEAN SALMON FISHERY MANAGEMENT MEASURES

Nov. 13-21, 2016	The Council and advisory entities meet at the Hyatt Regency Orange County, Garden Grove, California, to consider any changes to methodologies used in the development of abundance projections or regulatory alternatives.
Jan. 17-20, 2017	The Salmon Technical Team (STT) meets in Portland, Oregon to draft The Stock Assessment and Fishery Evaluation (SAFE) document *Review of 2016 Ocean Salmon Fisheries*. This report summarizes seasons, quotas, harvest, escapement, socioeconomic statistics, achievement of management goals, and impacts on species listed under the Endangered Species Act. (Available early February.)
Feb. 21-24	STT meets in Portland, Oregon to complete *Preseason Report I Stock Abundance Analysis and Environmental Assessment Part 1 for 2017 Ocean Salmon Fishery Regulations*. This report provides key salmon stock abundance estimates and level of precision, harvest, and escapement estimates when recent regulatory regimes are projected on 2017 abundance, and other pertinent information to aid development of management options. (Available early March.)
Feb. 24 -Mar. 6	State and tribal agencies hold constituent meetings to review preseason abundance projections and range of probable fishery options.
Mar. 7-14	Council and advisory entities meet at the Hilton Hotel in downtown Vancouver, Washington to adopt 2017 regulatory alternatives for public review. The Council addresses inseason action for fisheries opening prior to May 1 and adopts final alternatives for public review.
Mar. 15-21	The STT completes Preseason Report II: Proposed Alternatives and Environmental Assessment Part 2 for 2017 Ocean Salmon Fishery Regulations. (Available late March.)
Mar. 15-31	Management agencies, tribes, and the public develop their final recommendations for the regulatory alternatives. North of Cape Falcon Forum meetings are held between the March and April Council meetings.
Mar. 22	Council staff distributes *Preseason Report II: Proposed Alternatives and Environmental Assessment Part 2 for 2017 Ocean Salmon Fishery Regulations* to the public. The report includes the public hearing schedule, comment instructions, alternative highlights, and tables summarizing the biological and economic impacts of the proposed management alternatives.
Mar. 27-28	Tentative sites and dates of public hearings to review the Council's proposed regulatory options are: Westport, Washington (March 27); Coos Bay, Oregon (March 27); and Ft. Bragg, California (March 28). Comments on the alternatives will also be taken during the April Council meeting in Sacramento, California.
Apr. 6-12	Council and advisory entities meet to adopt final regulatory measures at the DoubleTree by Hilton in Sacramento, California. Preseason Report II: Proposed Alternatives and Environmental Assessment Part 2 for 2017 Ocean Salmon Fishery Regulations, results from the public hearings, and information developed and public comment received at the Council meeting are considered during the course of the week.
Apr. 13-21	The STT and Council staff complete Preseason Report III: Analysis of Council-Adopted Management Measures and Environmental Assessment Part 3 for 2016 Ocean Salmon Fishery Regulations (Available April 21). Council and NMFS staff completes required National Environmental Policy Act documents for submission.
Apr. 21	Council staff distributes adopted ocean salmon fishing management recommendations, and Preseason Report III is available to the public.
May 1	NMFS implements Federal ocean salmon fishing regulations.

6 Additional Issues

The chapter provides some background information on issues that will be analyzed in the Environmental Assessment prepared for the proposed action and its alternatives.

6.1 Endangered Species Act

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 program is administered by NMFS (for most marine mammal species, marine and anadromous fish species, and marine plants species) and by the United States Fish and Wildlife Service (USFWS; for bird species, some marine mammals, and terrestrial and freshwater wildlife and plant species). 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 (Secretary), 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. Section 7 outlines procedures for interagency cooperation to conserve federally listed species and designated critical habitat. Section 7 requires federal agencies to consult to ensure that they are not undertaking actions that are likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat.

The key sections of the ESA relevant to non-federal actions are section 9 and section 10. Section 9 prohibits the taking of endangered species of fish and wildlife. Section 10 provides exceptions to the section 9 prohibition by allowing NMFS or USFWS to issue a permit to take listed species incidental to otherwise legal activity. Specifically, Section 10(a)(1)(B) allows non-federal parties planning activities that have no federal nexus, but which could result in the incidental taking of listed animals, to apply for an incidental take permit.

For federal fishery actions, NMFS-Sustainable Fisheries Division is the action agency that initiates the section 7 consultation. The North Pacific Fishery Management Council (Council) may be invited to

participate in the compilation, review, and analysis of data used in the consultations. 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, however, is the responsibility of the appropriate consulting agency (NMFS Protected Resources Division or USFWS). If the action is determined to result in jeopardy, the resulting BiOp includes reasonable and prudent measures that are necessary to alter the action so that jeopardy is avoided. If an incidental take of a listed species is expected to occur under normal promulgation of the action, an incidental take statement is appended to the BiOp.

Section 7 consultations have been done for the Southeast Alaska troll fishery and ESA-listed species, some individually and some as groups. In 2008, NMFS issued the *Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation on the Approval of Revised Regimes under the Pacific Salmon Treaty and the Deferral of Management to Alaska of Certain Fisheries Included in those Regimes* (2008 BiOp, NMFS 2008a).[23] The 2008 BiOp analyzed the potential effects on 28 salmon and steelhead species that are listed currently as threatened or endangered under the ESA and killer whales, green sturgeon, and Steller sea lions. The subsequent sections summarize the findings of that consultation, provide any relevant new information, and analyze the impacts of the alternatives on ESA-listed species to determine whether re-initiation of the consultation is required.

Section 7 consultations have 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 Biological Opinion* (2010 BiOp, NMFS 2010). The best available information on the interactions between these FMP salmon fisheries and ESA-listed Pacific salmon, marine mammals, and seabirds is provided in the EA for Amendment 12 and summarized in the following sections.

NMFS Sustainable Fisheries Division conducted informal section 7 consultations prior to the decision to approve Amendment 12. The action to manage the salmon fisheries in Cook Inlet, Prince William Sound, and the Alaska Peninsula would also require NMFS to conduct section 7 consultations. Any adverse effects of the salmon fisheries in these areas on listed species or critical habitat and any takings that may occur are subject to an ESA section 7 consultation. This is a primary distinction between the 2012 Salmon FMP and a new FMP that manages the three areas. The 2012 FMP eliminated federal discretion or control over salmon fishing activities in the EEZ within the traditional net fishing areas that may affect listed species or critical habitat, and thus removed the federal nexus that triggers ESA section 7 consultation. Persons participating in salmon fisheries within these areas are still subject to ESA § 9 prohibition on the taking of listed species. ESA § 10 would allow the Secretary to grant incidental take permits to persons who take listed species incidentally as part of their lawful fishing activities as long as they mitigate the risk of take. 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. A new FMP that manages the three areas would reestablish the federal nexus that triggers ESA section 7 consultation

[23] Available on the NMFS Alaska Region website at http://www.alaskafisheries.noaa.gov/analyses/salmon/salmonbiop122208.pdf

for the action to approve the FMP amendment and any future actions where there is potential to affect listed species or critical habitat.

6.2 ESA-listed Pacific Salmon

No species of Pacific salmon originating from freshwater habitat 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. At least some of the listed salmon and steelhead are presumed to range into marine waters off Alaska during ocean migration and growth to maturity phases of their anadromous life history. During ocean migration to the Pacific marine waters a small (undetermined) portion of the stock go into the Gulf of Alaska (GOA) as far east as the Aleutian Islands (Weitkamp 2011). 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 the other, 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 incidentally take ESA-listed salmon. A new FMP that manages the three areas would reestablish the federal nexus that triggers an ESA section 7 consultation for the salmon fisheries impacts on ESA listed Pacific salmon.

The consultation would analyze new information on the potential for take of ESA listed salmon in the fisheries that operate in EEZ waters. ADF&G has released new information on the genetic stock composition of the commercial and sport harvest of Chinook salmon in the Westward region, 2014–2016 (Shedd et al 2016). The following is excerpted from the abstract –

> The primary goal of this study was to estimate the stock of origin, age, size, and sex composition of Chinook salmon, *Oncorhynchus tshawytscha*, harvested in Westward Region commercial and Kodiak area sport fisheries during 2014–2016 as part of the larger statewide Chinook Salmon Research Initiative. Chinook salmon commercial and sport harvest in the Kodiak area were sampled from 2014 to 2016; however, budgetary constraints limited sampling of North Peninsula, South Peninsula, and Chignik commercial harvest to 2014. A total of 10,154 Chinook salmon tissue samples were collected from 4 commercial fishery areas and sport fisheries in the Kodiak area. Of these, 8,829 samples were genotyped to represent 25 spatiotemporal strata. Stock compositions were estimated with genetic mixed stock analysis for all strata using a comprehensive, coastwide Chinook salmon baseline with important local stocks defined as separate reporting groups, to the extent possible. Harvests in both the commercial and marine sport fisheries were dominated by British Columbia and West Coast U.S. stocks, followed by smaller contributions from Southeast Alaska/Northeast Gulf of Alaska, Cook Inlet, and Kodiak. Stock composition estimates were consistent among strata within commercial and marine sport harvests, although there were differences between these fisheries. In the annual commercial harvest, over 50% of the fish were from British Columbia and over 30% of the fish were from the West Coast U.S. In the marine sport fishery, the relative abundance of British Columbia and West Coast U.S. fish varied, but jointly represented over 80% of annual harvest. In both the commercial and sport

fisheries, the annual harvest of Kodiak-origin Chinook salmon was below 5% of the total harvest. These results provide the most comprehensive estimates of stock composition and stock-specific harvests of Chinook salmon in the Kodiak area, supplement previous studies, and should inform fishery management and regulatory decision makers.

6.3 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 6-1 provides a summary of the status of the marine mammals potentially affected by these salmon fisheries. The 2015 marine mammal stock assessment report[24] provides background information, population estimates, population trends, and estimates of the potential biological removal levels for each stock.

Interactions between marine mammal species and the salmon fishery occur when fishing vessels disturb marine mammals, marine mammals prey on hooked salmon, and marine mammals become snagged or entangled in fishing gear. The term incidental take in regards to commercial fishing refers to the catch or entanglement of animals that were not the intended target of the fishing activity. Reports of marine mammal injuries or mortalities 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 FMP salmon fisheries and the reported incidental takes are detailed in the EA for Amendment 12.

Humpback whales, beluga whales, killer whales, seals, Northern fur seals, and Steller sea lions eat salmon (Table 6-2). Salmon is primarily a summer prey species for Steller sea lions, resident killer whales, spotted seals, beluga whales, and northern fur seals (NPFMC 2011b). Salmon harvested in the commercial salmon fisheries may otherwise be available as prey for marine mammals.

This section provides a preliminary analysis of the salmon fisheries in the three areas and their potential for interactions with identified marine mammal species. A complete analysis of the interactions between the salmon fisheries in the three areas with marine mammals would be conducted in the environmental assessment prepared for the proposed action.

[24] The 2015 Marine Mammal Stock Assessment Report (Muto et al. 2015) is available at http://www.nmfs.noaa.gov/pr/sars/pdf/alaska2015_final__corrected_.pdf.

Table 6-1 Status of marine mammal stocks potentially affected by the salmon fisheries in Cook Inlet, Prince William Sound, and the Alaska Peninsula

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 DPS	Endangered (WDPS)	Depleted & a strategic stock	There is strong evidence that non-pup counts of western stock Steller sea lions in Alaska increased between 2000 and 2014. However, there are strong regional differences across the range in Alaska. Regional variation in trends in pup counts in 2000-2014 is similar to that of non-pups. Overall, there is strong evidence that pup counts increased in the overall western stock in Alaska and that there is considerable regional variation west and east of Samalga Pass. The EDPS is increasing, driven by growth in pup counts in all 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 AK 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.
Harbor seal – Gulf of Alaska Bering Sea	None	None	Moderate to large population declines have occurred in the Bering Sea and Gulf of Alaska stocks. *Aleutian Islands*: a 36% probability that the stock is decreasing. *Prince William Sound*: a 56% probability that the stock is decreasing *Cook Inlet/Shelikof Strait*: a 38% probability that the stock is decreasing.	GOA stock found primarily in the coastal waters and may cross over into the Bering Sea coastal waters between islands.
Northern sea otter – Southwest Southcentral	SW - Threatened	SW - Depleted & a strategic stock	*SW*: overall population trend for the southwest Alaska stock is believed to be declining, particularly in the Aleutian Islands. *SC*: overall population trend is stable.	Coastal waters from Central GOA to W. Aleutians within the 40 m depth contour. Critical habitat designated in primarily nearshore waters with few locations into federal waters in the GOA.
Harbor porpoise	None	Strategic	Reliable data on population trends are unavailable.	Primarily in coastal waters in the GOA, usually less than 100 m.
Pacific white-sided dolphin	None	None	Reliable data on population trends are unavailable.	Found throughout the GOA.

Marine mammal species and stock	Status under the ESA	Status under the MMPA	Population Trends	Distribution in action area
Killer whale – AT1 Transient; Eastern North Pacific GOA, AI, and BS transient; West Coast transient; and Eastern North Pacific Alaska Resident	Southern resident – endangered. The rest of the stocks – none.	AT1 Transient - depleted & a strategic stock. The rest of the stocks – none.	Southern residents have declined by more than half since 1960s and 1970s. Unknown abundance for the Alaska resident; and Eastern North Pacific GOA, Aleutian Islands, and Bering Sea transient stocks. The minimum abundance estimate for the Eastern North Pacific Alaska Resident stock is likely underestimated because researchers continue to encounter new whales in the Alaskan waters.	Transient-type killer whales from the Aleutian Islands and Bering Sea are considered to be part of a single population that includes Gulf of Alaska transients. Killer whales are seen in the northern Bering Sea and Beaufort Sea, but little is known about these whales. Southern resident do not occur in the GOA.
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.
Humpback whale- Western North Pacific Central North Pacific	Endangered and under status review	Depleted & a strategic stock	Increasing. The Structure of Populations, Levels of Abundance, and Status of Humpbacks (SPLASH) abundance estimate for the North Pacific represents an annual 4.9% increase since 1991–93. SPLASH abundance estimates for Hawaii show annual increases of 5.5% to 6.0% since 1991-1993(Calambokidis et al. 2008).	W. Pacific and C. North Pacific stocks occur in Alaskan waters and may mingle in the North Pacific feeding area. Humpback whales in the Bering Sea cannot be conclusively identified as belonging to the western or Central North Pacific stocks, or to a separate, unnamed stock.
Beluga Whale – Bristol Bay, Eastern Bering Sea, Cook Inlet, and eastern Chukchi Sea	Cook Inlet stock is endangered	Depleted & a strategic stock	Abundance estimate is 3,710 animals and population trend is not declining for the eastern Chuckchi Sea stock. Minimum population estimate for the eastern Bering Sea stock is 14,898 animals and population trend is unknown. The minimum population estimate for the Bristol Bay stock is 1,619 animals and the population trend is stable and may be increasing. For Cook Inlet Belugas, estimated decline of 71 percent in 30 years with 375 animals estimated in 2008.	Summer in the Arctic Ocean and Bering Sea coastal waters, and winter in the Bering Sea in offshore waters associated with pack ice. Cook Inlet belugas remain in Cook Inlet year round and eat salmon.

Source: Muto et al. 2015 and List of Fisheries for 2017 (82 FR 3655, January 12, 2017).
Northern fur seal pup data available from http://www.alaskafisheries.noaa.gov/newsreleases/2007/fursealpups020207.htm.
Northern sea otter information from http://www.nmfs.noaa.gov/pr/pdfs/sars/seaotter2008_ak_sw.pdf and 74 FR 51988, October 8, 2009.

Table 6-2 Marine Mammals that eat salmon

Species	Prey
Humpback whale	Zooplankton, schooling fish (pollock, herring, capelin, saffron cod, sand lance, Arctic cod, and **salmon** species)
Beluga whale	Wide variety invertebrates and fish including **salmon** and pollock
Killer whale	Marine mammals and (resident) fish (including herring, halibut, **salmon,** and cod)
Seals	Primarily pelagic and nearshore fish (pollock and **salmon**), occasionally cephalopods and crustaceans
Northern fur seal	Pollock, squid, and bathylagid fish (northern smoothtongue*)*, herring, **salmon,** and capelin. (Females at Bogoslof eat primarily squid and bathylagid fish and less pollock than in the Pribilofs, and salmon irregularly.)
Steller sea lion	pollock, Atka mackerel, Pacific herring, Capelin, Pacific sand lance, Pacific cod, and **salmon**

Source: NPFMC 2011b

6.3.1 Alaska Purse Seine Fishery

The Alaska purse seine fishery is classified as a category III fishery under the Marine Mammal Protection Act (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.

6.3.2 Drift Gillnet Fisheries in Cook Inlet, Prince William Sound, and the Alaska Peninsula

The Cook Inlet, Prince William Sound, and Alaska Peninsula drift gillnet fisheries are classified as category II fisheries under the MMPA. A fishery that has occasional incidental mortality or serious injury of marine mammals is placed in category II. Fishermen participating in a category II fishery are required to accommodate an Alaska Marine Mammal Observer Program (AMMPO) observer onboard the vessel(s) upon request by NMFS (50 CFR 229.7). NMFS has placed observers on vessels in these fisheries in the past and this observer data is 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. Fishermen participating in a category II fishery are required to comply with any applicable take reduction plans. NMFS has not developed a take reduction plan for these fisheries. Additionally, each vessel fishing in a category II fishery must have a NMFS-issued certificate under the MMPA.

It is important to note that the classification of fisheries and the requirements NMFS places on the category II fisheries under the MMPA are irrespective of whether the fishery is under state or federal jurisdiction. For example, NMFS deployed marine mammal observers on the state-managed Southeast Alaska gillnet fishery in 2012 and 2013.

Cook Inlet drift gillnet fishery

According to the List of Fisheries[25], the Cook Inlet drift gillnet fishery has the potential to interact with the following marine mammal species: Cook Inlet beluga whale *(Delphinapterus leucas)*, Dall's porpoise (*Phocoenoides dalli*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and the Steller sea lion (*Eumetopias jubatus*). The reported interactions between this fishery and marine mammals are shown in Table 6-3. This fishery was categorized as a Category II based on logbook data. Observer coverage levels were inadequate to determine mortality and serious injury levels across all fisheries, but available data suggested that, if observer data were available, the data would likely indicate that serious injury and mortality were more than 10% of the Potential Biological Removal (PBR) for at least one stock with which this fishery interacts. Data suggests that levels of mortality and serious injury would be similar to those in other Category II drift gillnet fisheries which interact with similar marine mammal species.

A marine mammal observer program for the Cook Inlet salmon drift gillnet fisheries was implemented in 1999 and 2000 in response to the concern that there may be significant numbers of marine mammal injuries and mortalities that occur incidental to these fisheries (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 1994 (see Appendix 7 to Muto et al. 2015).

Table 6-3 Reported interactions between the Cook Inlet drift gillnet fishery and marine mammals. (Source: 2017 List of Fisheries and Muto et al 2015)

<table>
<tr><th>Marine Mammal</th><th>Year</th><th>Observed mortality in that year</th><th>Extrapolated mortality in that year</th><th>Estimated Mean annual mortality</th><th>Self-reporting</th></tr>
<tr><td>Harbor Seal</td><td colspan="4">No takes reported by observers.</td><td>6 incidents were self-reported in 1990 and 1 in 1992</td></tr>
<tr><td rowspan="2">Harbor Porpoise</td><td>1999</td><td>0</td><td>0</td><td rowspan="2">15.6</td><td rowspan="2">3 incidents were self-reported in 1990.</td></tr>
<tr><td>2000</td><td>1</td><td>31.2</td></tr>
<tr><td>Cook Inlet Beluga whale</td><td colspan="3">No takes reported by observers.</td><td>0- based on a lack of reported mortalities</td><td>None</td></tr>
<tr><td>Dall’s Porpoise</td><td colspan="4">No takes reported by observers.</td><td>1 incident was self-reported in 1990 and in 1992</td></tr>
<tr><td>Steller sea lions</td><td colspan="5">No takes reported by observers and no additional information on interactions is available.</td></tr>
</table>

[25] The 2017 List of Fisheries is available at https://www.gpo.gov/fdsys/pkg/FR-2017-01-12/pdf/2017-00250.pdf.

Prince William Sound drift gillnet fishery

According to the List of Fisheries, the Prince William Sound drift gillnet fishery has the potential to interact with the following marine mammal species: Dall's porpoise, harbor porpoise, harbor seal, Northern fur seal (*Callorhinus ursinus*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), sea otter (*Enhydra lutris*), and the Steller sea lion WDPS. The reported interactions between this fishery and marine mammals are shown in Table 6-3. Category II classification is based on the total annual mortality and serious injury of harbor porpoise (GOA stock) and Steller sea lion (WDPS) in this fishery being greater than 1% and less than 50% of the stocks' PBR level.

Observers monitored the Prince William Sound salmon drift gillnet fishery in 1990 and 1991 (Wynne et al. 1991 and Wynne et al. 1992). In 1990, observers were onboard 300 (57.3%) of the 524 vessels that fished in the Prince William Sound salmon drift gillnet fishery, monitoring a total of 3,166 sets, or roughly 4% of the estimated number of sets made by the fleet. In 1991, observers were onboard 531 (86.9%) of the 611 registered vessels and monitored a total of 5,875 sets, or roughly 5% of the estimated sets made by the fleet. This fishery has not been observed since 1991; therefore, no additional observer data are available. Self-reporting information is available from 1990 to 1994 (see Appendix 7 to Muto et al. 2015).

Table 6-4 **Reported interactions between the Prince William Sound drift gillnet fishery and marine mammals. (Source: 2017 List of Fisheries and Muto et al 2015)**

Marine Mammal	Year	Observed mortality in that year	Extrapolated mortality in that year	Estimated Mean annual mortality	Additional notes
Harbor Seal	1990	2	36	24	Self-reports of harbor seal mortalities are 19, 4, 7, 24, and 0 mortalities in 1990, 1991, 1992, 1993, and 1996, respectively. The mean annual mortality accounts for these mortalities
	1991	1	12		
Harbor Porpoise	1990	1	8	20	From 1990 to 1994, 12 harbor porpoise scarred with gillnet marks were discovered stranded in Prince William Sound (Copper River Delta). No confirmed harbor porpoise strandings in this area during 1999-2003.
	1991	3	32		
Northern Fur Seal	No takes reported by observers and 1 incident was self-reported in 1990 and in 1991.				
Dall's Porpoise	No takes reported by observers and 2 incidents were self-reported in 1991.				
Pacific white-sided dolphin	No takes reported by observers and 1 incident was self-reported in 1990 and 4 were reported in 1991.				
Sea otters	In 1990, self-report records show one mortality and four injuries due to gear interaction, and three injuries due to deterrence.				
Steller sea lions	1990	0	0	14.5	None
	1991	2	29		

Alaska Peninsula drift gillnet fishery

According to the List of Fisheries, the Alaska Peninsula drift gillnet fishery has the potential to interact with the following marine mammal species: Dall's porpoise, harbor porpoise, harbor seal, and Northern fur seal. The reported interactions between this fishery and marine mammals are shown in Table 6-5. This fishery was categorized as a Category II by analogy with other category II AK drift gillnet fisheries, and because of inadequate observer data since 1991. The low levels of observer coverage across all fisheries were inadequate to determine mortality and serious injury levels of marine mammals across all fisheries, but available data suggested that mortality and serious injury may have exceeded 10% of the PBR level for Dall's porpoise and harbor porpoise.

In 1990, observers were onboard 59 (38.3%) of the 154 vessels participating in the Alaska Peninsula/Aleutian Island salmon drift gillnet fishery, monitoring a total of 373 sets, or roughly 4% of the estimated number of sets made by the fleet (Wynne et al. 1991). This fishery has not been observed since

1990; therefore, no additional observer data are available. Self-reporting information is available from 1990 to 1994 (see Appendix 7 to Muto et al. 2015).

Table 6-5 Reported interactions between the Alaska Peninsula drift gillnet fishery and marine mammals. (Source: 2017 List of Fisheries and Muto et al 2015)

Marine Mammal	Year	Observed mortality in that year	Extrapolated mortality in that year	Estimated Mean annual mortality	Additional notes
Dall's Porpoise	1990	1	28	28	1.8% of PBR (PBR=1,556)
Harbor Seal	No takes reported by observers and self-reported incidents were 9 in 1990, 2 in 1991, 12 in 1992, and 5 in 1993.				
Harbor Porpoise	No takes reported by observers and 2 incidents were self-reported in 1990 and 1 in 1992.				
Northern Fur Seal	No takes reported by observers and two incidents were self-reported in 1990.				

6.3.3 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). In 2010, NMFS estimated the Cook Inlet beluga whale population to be 340 individuals, up from the 2009 estimate of 321 whales, although the 10-year annual trend is still declining 1.1% per year. Historical abundance is estimated at approximately 1,300 whales (NMFS 2008b). Cook Inlet belugas primarily occur in the northern portion of Cook Inlet. Beluga whales do not normally transit outside of Cook Inlet.

Based on the best scientific data available of the ecology and natural history of Cook Inlet beluga whales and their conservation needs, NMFS determined the following physical or biological features are essential to the conservation of this species (74 FR 63080[26]):

1. Intertidal and subtidal waters of Cook Inlet with depths <30 feet (9.1 m) (MLLW) and within 5 miles (8.0 km) of high and medium flow accumulation 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. The absence of toxins or other agents of a type or amount harmful to beluga whales;

4. Unrestricted passage within or between the critical habitat areas; and

5. Absence of in-water noise at levels resulting in the abandonment of habitat by Cook Inlet beluga whales.

[26] http://www.fakr.noaa.gov/prules/74fr63080.pdf

NMFS has identified more than one third of Cook Inlet as critical habitat (Figure 6-1, 76 FR 20180, April 11, 2011). Pacific salmon constitute one of the primary constituent elements for the Cook Inlet beluga whale's critical habitat. When designating critical habitat under the ESA, NMFS is required to identify specific areas, within the geographical area occupied by the species, on which are found those physical or biological features (i) essential to the conservation of the species and (ii) which may require special management considerations or protection.[27] As a primary constituent element, NMFS concluded that salmon are essential to the conservation of the Cook Inlet beluga whale and may require special management considerations or protection in the future. The term "special" does not necessarily mean "beyond existing". This conclusion does not mean that salmon are presently impaired or limiting, or that existing laws and regulations managing salmon are not sufficient. NMFS continues to work with the State to ensure that Cook Inlet Beluga whales are considered in fish management planning for Cook Inlet.

This analysis focuses on incidental take of belugas and reduction of prey, as these were the two areas identified in the Conservation Plan for the Cook Inlet beluga whale that are impacted by salmon fisheries (NMFS 2008b). 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 EEZ. Operation times change depending upon 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) during June through September, when the salmon fisheries occur.

Incidental Take NMFS designed a rotational observer program to identify potential interaction 'hot spots' among commercial fisheries operations in Alaska. With the heightened concern in Cook Inlet, the program observed two Cook Inlet fisheries, salmon drift gillnet and upper and lower Cook Inlet set gill net, in 1999 and 2000. Manly (2006) reported that the Cook Inlet drift net 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). The Conservation Plan for the Cook Inlet beluga whale concluded that the current rate of direct mortality from commercial fisheries in Cook Inlet appears to be insignificant and should not delay recovery of these whales (NMFS 2008b). The proposed action would not change the likelihood of incidental takes in the Cook Inlet drift gillnet fishery.

Reduction of Prey Aside from direct mortality and injury from fishing activities, commercial fisheries may compete with beluga whales in Cook Inlet for salmon and other prey species. The following information is summarized from the Conservation Plan for the Cook Inlet beluga whale (NMFS 2008b). 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. Any diminishment in the ability of beluga whales to reach or utilize spring/summer feeding habitat, or any 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

[27] 16 U.S.C. § 1532(5)(A)(i) and § 1533(b)(6)(C).

salmon. These habitats may change quickly as each species of salmon, and often each particular river, is characterized as having its individual run timing.

Any escapement necessary to meet the needs of wild belugas would have to consider the feeding efficiency of these whales (which is unknown). The amount of fish required to sustain this population is unknown. However, data from captive beluga whales show daily consumption rates of 4-7 percent of body weight per day. Additional research, such as continued stomach and fatty acid analyses, may shed more light on feeding and prey requirements for beluga whales.

The current State salmon management plan oversees Cook Inlet fisheries in the lower, middle, and northern districts. Most of fisheries occur "upstream" of the river mouths and estuaries where beluga whales typically feed. However, the Cook Inlet drift gillnet fishery occurs in the off-shore waters of Cook Inlet. Whether the escapement into these rivers, having passed the gauntlet of the commercial fisheries, is sufficient for the wellbeing of Cook Inlet beluga whales is unknown.

However, 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. Even if large salmon runs must be present for a beluga whale to efficiently capture a single fish, this would still be a small fraction of the total salmon return. The State carefully manages the salmon fisheries to meet escapement goals for various waters, and fisheries open and close throughout the season, presenting many opportunities for adequate numbers of salmon to reach their spawning streams. There also are salmon hatcheries operating in Cook Inlet, which have measurably added to the numbers of adult fish returning to the upper Inlet.

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). While the Conservation Plan for the Cook Inlet beluga whale concluded that it is unknown whether competition with commercial fishing operations for prey resources is having any significant or measurable effect on Cook Inlet beluga whales (NMFS 2008b), NMFS has no information to suggest prey availability is or has been a factor in the decline or is in need of improvement to promote the recovery of the Cook Inlet beluga whale (76 FR 20180, April 11, 2011). New information is provided in the Recovery Plan for the Cook Inlet Beluga Whale (NMFS 2016).

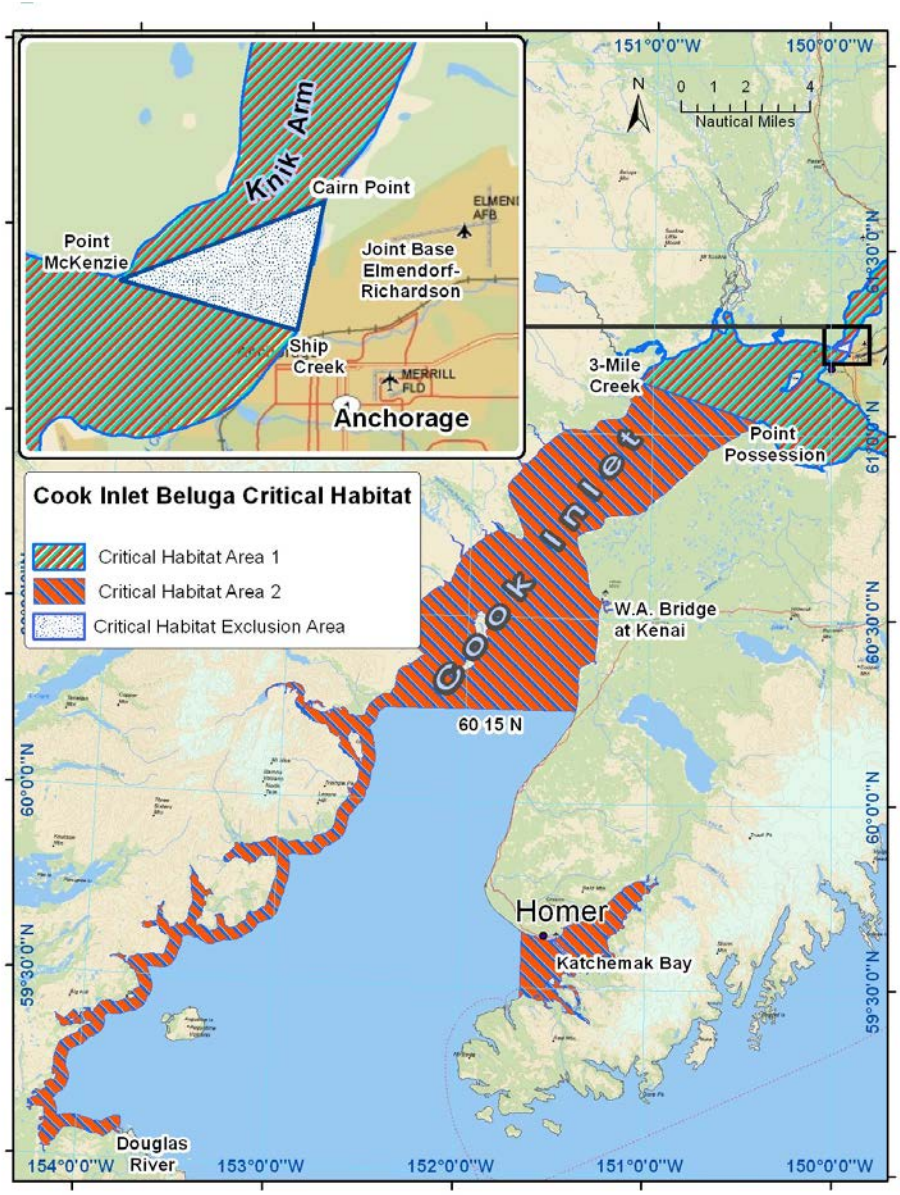


Figure 6-1. Cook Inlet Beluga Critical Habitat. NMFS Alaska Region

6.3.4 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 listed as endangered.

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.

In 2006, NMFS reinitiated an FMP-level Section 7 consultation on the effects of the groundfish fisheries on Steller sea lions, humpback whales, fin whales, and sperm whales to consider new information on these species and their interactions with the fisheries. The final BiOp was released in October 2010. NMFS released an additional BiOp in 2014 on the effects on Steller sea lions of the federal groundfish fisheries and State of Alaska parallel groundfish fisheries for Atka mackerel, Pacific cod, and pollock primarily in the Aleutian Islands subarea (NMFS 2014).

Drift Gillnet Fisheries in Cook Inlet, Prince William Sound, and Alaska Peninsula

The Cook Inlet, Prince William Sound, and Alaska Peninsula drift gillnet fisheries occur in the western portion of the GOA, in the range of the WDPS of Steller sea lions. Both the Prince William Sound and Alaska Peninsula drift gillnet fisheries occur in Steller sea lion critical habitat (Figure 6-2 and Figure 6-3, respectively). The following information on Steller sea lion interactions with the drift gillnet fisheries is summarized from the 2015 Alaska Marine Mammal Stock Assessment (Muto et al 2015) and the 2010 BiOp (NMFS 2010) and the 2014 BiOp (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.

Incidental Take No incidental takes of Steller sea lions have been observed in the Cook Inlet drift gillnet fishery or the South Alaska Peninsula drift gillnet or purse seine fisheries. 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 6-3, Kruse et al. 2000, Ferrero et al. 2000). There is no documentation of the Alaska Peninsula drift gillnet fisheries interacting with Steller sea lions. The Alaska Peninsula salmon drift gillnet fishery was observed in 1990, and no Steller sea lion mortalities were observed (Table 6-5).

The Prince William Sound drift gillnet fishery interacts with Steller sea lions and causes an estimated mean annual mortality of 14.5 Steller sea lions (Table 6-4). Based on currently available data, the minimum estimated total U. S. commercial fishery-related mortality and serious injury for this stock (25.8) is less than that 10% of the calculated PBR (254) and, therefore, can be considered to be insignificant and approaching a zero mortality and serious injury rate (Allen and Angliss 2011). Therefore, the Prince William Sound drift gillnet fishery's estimated incidental mortality rate (14.5) is insignificant and none of the alternatives would change how these fisheries interact with WDPS of Steller sea lions. Note, however, that given the limited observer data, it is not known whether these incidental mortality levels are representative of the current incidental mortality levels in these fisheries.

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, and was often higher than Pacific cod or pollock depending upon area and season. Salmon are high-energy forage species that may be important components (at least seasonally) 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, SSL 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 lions decline across all regions or all years, which disappeared at a regional scale. Soboleff (2005) felt this could be plausible as salmon fisheries occur near Steller sea lions haulouts and rookeries and salmon are important Steller sea lions 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.

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 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. However, as noted in et al. (2000) the abundance of salmon biomass increased dramatically during the time period that the WDPS of Steller sea lion has been in decline.

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). Nevertheless, many of these fisheries take 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 that 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.

However, salmon is one of many prey species eaten by Steller sea lions in the GOA and Steller sea lion population trends in the GOA in general are increasing and do not appear to be limited by prey availability (NMFS 2010). Therefore, the salmon drift gillnet fisheries in the EEZ are not likely to adversely affect the WDPS of Steller sea lions or its critical habitat beyond those effects already analyzed in the previous 2010 BiOp (NMFS 2010).

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 these marine foraging areas and may alter the distribution of certain prey resources in ways that reduce the foraging effectiveness of Steller sea lions. More data on the foraging habits of Steller sea lions from research in key geographic areas could aid our understanding of where and when these effects might be most important.

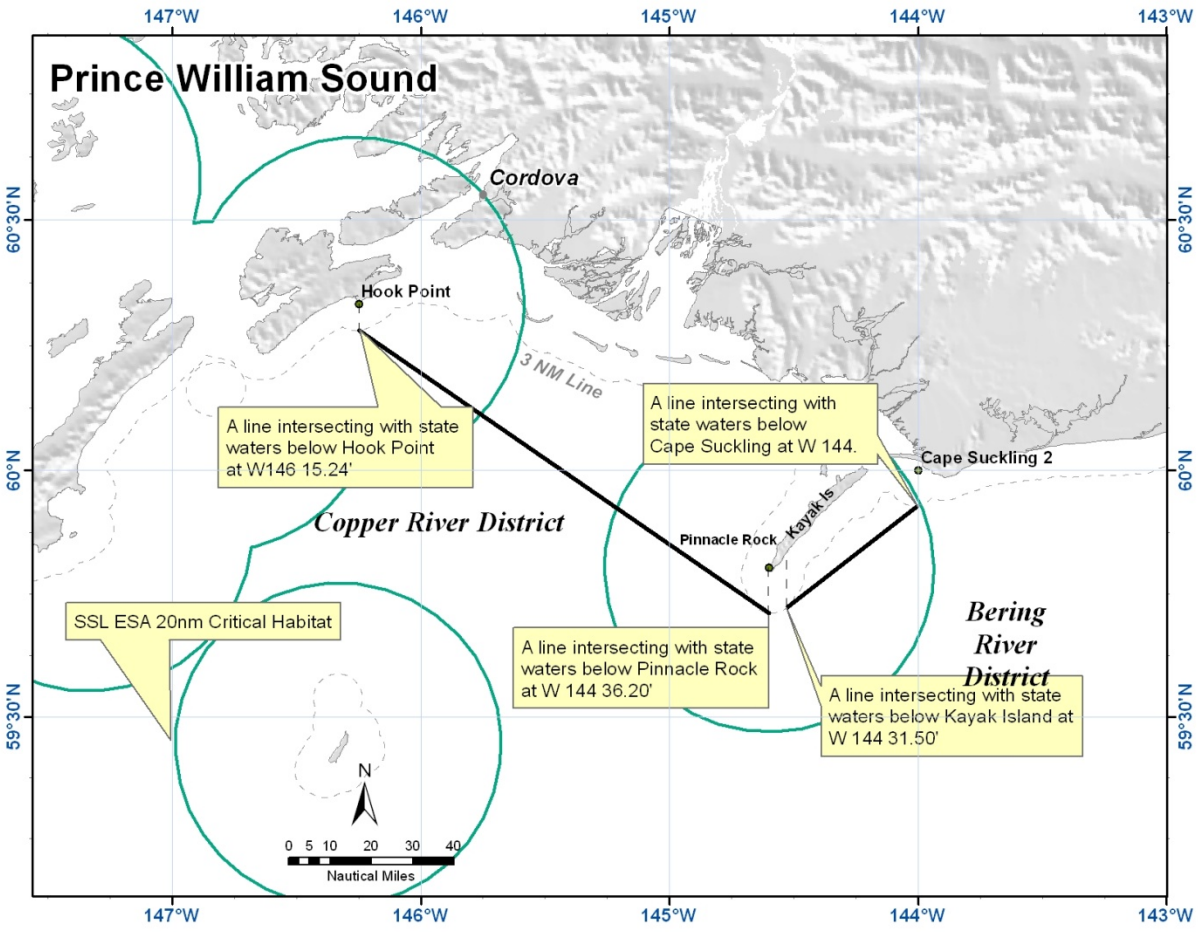


Figure 6-2 Overlap of Steller sea lion critical habitat and the Prince William Sound traditional net fishing area (Steve Lewis, NMFS Alaska Region)

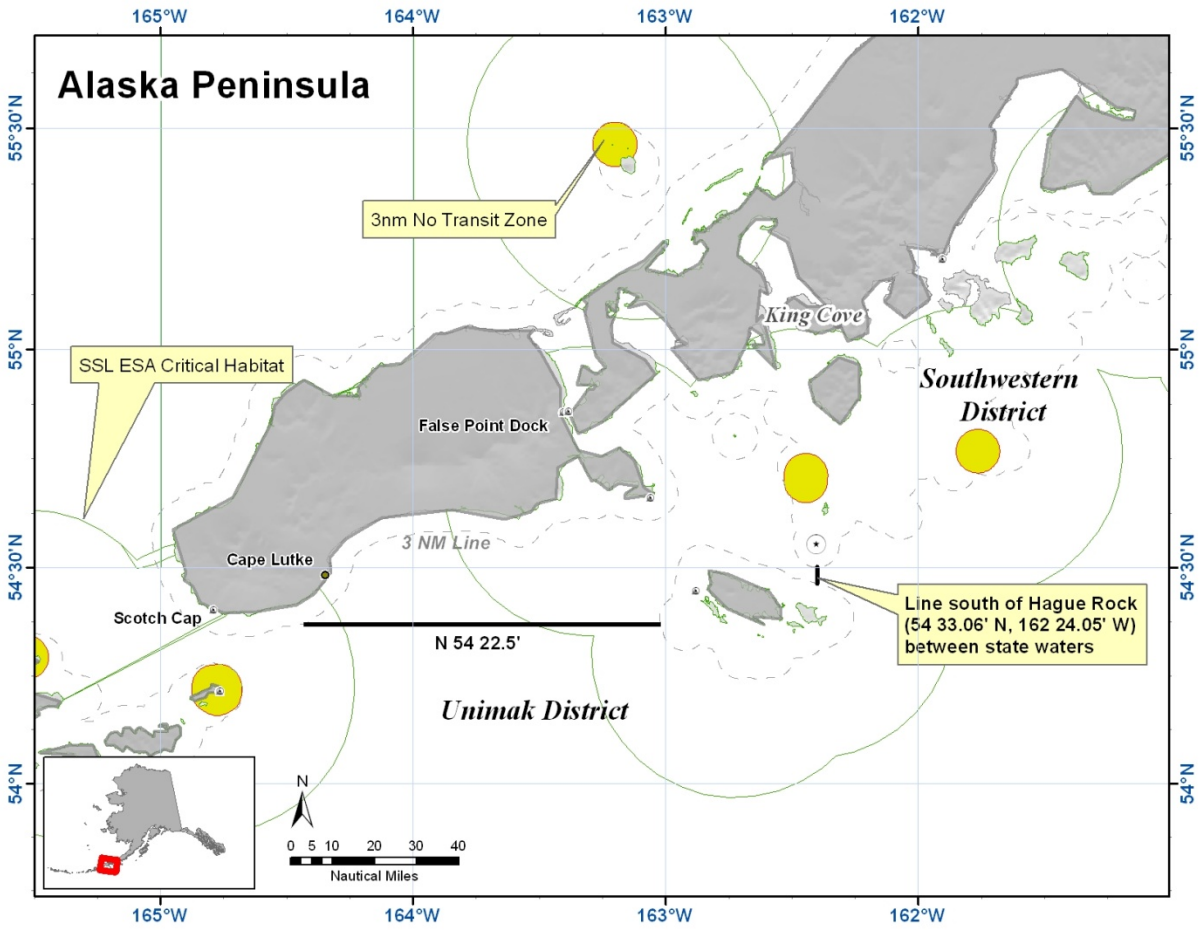


Figure 6-3 Overlap of Steller sea lion critical habitat and the Alaska Peninsula traditional net fishing area (Steve Lewis, NMFS Alaska Region)

6.3.5 Southern Resident Killer Whales

The Southern Resident killer whale DPS was listed as endangered under the ESA on November 18, 2005 (70 FR 69903), and critical habitat was designated on November 29, 2006 (71 FR 69054). Southern Residents are designated as "depleted" and "strategic" under the MMPA (68 FR 31980; May 29, 2003). The final recovery plan for Southern Residents Killer Whales, issued in January of 2008, provides more detailed information about this DPS (NMFS 2008c).[28] This section summarizes information taken largely from the recovery plan and 2008 BiOp (NMFS 2008a).

Several potential factors identified in the final recovery plan for Southern Residents may have caused the decline or may be limiting recovery of the DPS. These are: quantity and quality of prey, toxic chemicals which accumulate in top predators, and disturbance from sound and vessel effects. Oil spills are also a

[28] Available at www.nwr.noaa.gov.

potential risk factor for this species. Research has yet to identify which threats are most significant to the survival and recovery of Southern Residents. It is likely that multiple threats are acting in concert to impact the whales.

Southern Residents are found throughout the coastal waters off Washington, Oregon, and Vancouver Island and are known to travel as far south as central California and as far north as the Queen Charlotte Islands, British Columbia.

The FMP salmon fisheries occur outside of the range of the Southern Resident killer whales, therefore, there are no direct interactions between the whales and these fisheries. The FMP salmon fisheries may, however, affect Southern Residents indirectly by reducing availability of their primary prey, Chinook salmon. Based on the high percentage of Chinook in the diet of the whales, this analysis focuses on Chinook salmon.

Southern Resident killer whales consume a variety of fish species, but salmon are identified as their preferred prey. Feeding records for Southern and Northern Residents show a strong preference for Chinook salmon (72 percent of identified salmonids) during late spring to fall (Ford and Ellis 2006). Chum salmon (23 percent) are also taken in significant amounts, especially in autumn. Other salmon eaten include coho (2 percent), pink (3 percent) steelhead and sockeye (*O. mykiss, O. nerka* < 1 percent). The non-salmonids included Pacific herring, sablefish, Pacific halibut, quillback and yelloweye rockfish. Chinook were preferred despite the much lower abundance of Chinook in the study area in comparison to other salmonids (primarily sockeye), probably because of the species' large size, high fat and energy content and year-round occurrence in the area.

The 2008 BiOp concludes, for the Southeast Alaska fisheries, while the Southeast Alaska troll fishery has the potential to adversely affect Southern Resident killer whales and their critical habitat by reducing prey in their range and critical habitat, the many factors reduce the severity of the impacts or mitigate concerns. For example, the extent of adverse impact is limited by management measures that define catch or total mortality limits on Chinook in the Pacific Salmon Treaty Agreement. Therefore, the Southeast Alaska troll fishery is not likely to adversely affect the Southern Resident killer whales or critical habitat beyond those effects previously analyzed in the 2008 BiOp (NMFS 2008a).

For the fisheries in the West Area, the potential for impacts on prey availability is nominal because of the *de minimus* amount of Chinook salmon caught in the FMP salmon fisheries that may return to the range of Southern Resident killer whales. Spatially, only a fraction of Chinook salmon stocks caught in the FMP salmon fisheries overlap with stocks commonly found in the Southern Resident killer whale's range and diet. Additionally, only a small fraction of those fish would have potentially entered inland waters of Washington that are designated critical habitat for Southern Residents, and that reduction is not anticipated to affect the conservation value of the critical habitat.

NMFS has consulted on the impacts of the Chinook salmon bycatch caught in the BSAI and GOA groundfish fisheries (NMFS 2012b). In that consultation, NMFS Protected Resources, Northwest Region, found that, given the total quantity of prey available to Southern Residents in coastal waters, the anticipated reduction in prey is extremely small, and although measurable is anticipated to be less than a 1% reduction under all scenarios analyzed. Therefore, NMFS Protected Resources, Northwest Region,

NMFS concurred with the determination of "may effect, not likely to adversely affect" for Southern Resident killer whales because all potential adverse effects to the Southern Resident killer whales would be insignificant. In addition, because all potential adverse effects to the Southern Resident killer whale critical habitat would be insignificant, NMFS made a determination that the proposed project may effect, but is not likely to adversely affect Southern Resident killer whale critical habitat.

The FMP salmon fisheries in the three traditional net fishing areas are further away from the Southern resident killer whale critical habitat, and target more Alaska salmon, and harvest fewer Chinook salmon than the groundfish fisheries. Therefore NMFS concluded these fisheries will not effect on the Southern Resident killer whales or critical habitat beyond those effects previously analyzed in the 2008 BiOp (NMFS 2008a).

6.3.6 Sea Otters

USFWS determined the status of the Southwest Alaska DPS of the northern sea otter as threatened on August 9, 2005, effective September 8, 2005. The Southwest Alaska DPS has declined from an estimated 94,050 to 128,650 sea otters in the mid-1970s to an estimated 53,674 sea otters, based on surveys conducted from 2000 to 2008 and adjusted for animals not detected (USFWS 2010a). Evidence suggests that increased predation by killer whales, rather than disease, starvation or contaminants, is responsible for the increase in morality (USFWS 2009). In 2009, the USFWS designated critical habitat for the SWDPS of the northern sea otter (74 FR 51988, October 8, 2009). In response to this designation, NMFS reinitiated consultation on the SWDPS of the northern sea otter and its designated critical habitat. NMFS prepared a Biological Assessment that included the best available commercial data, including analysis techniques that were not available during the 2006 consultation on the Alaska fisheries effects on northern sea otters (NMFS 2013). This Biological Assessment included the 2012 Salmon FMP. In a letter date July 10, 2013, USFWS concurred with NMFS's determination that authorization of the specified fisheries is not likely to adversely affect sea otters or impair the conservation value of the habitat and therefore, will not result in adverse modification of sea otter critical habitat.

There have been no reported takes of the Southwest Alaska DPS northern sea otter in the FMP salmon fisheries: Cook Inlet and Alaska Peninsula drift gillnet and Alaska salmon purse seine. The Prince William Sound drift gillnet fishery is out of the range of this DPS. The only recorded incidental takes resulting in mortalities for Southwest Alaska DPS northern sea otter is the AK Kodiak set gillnet through a logbook record in 1991 (Funk 2003) and a fisherman's NMFS self-report in 2002. Entanglements in the AK Kodiak set gillnet have also been observed. In 2002, sea otters were observed entangled in four sets and entangled in one set in 2005. Two of the entanglements in 2002 and the one in 2005 were of a short duration, and the sea otters freed themselves unharmed. The two entangled sea otters in 2002 were released unharmed with human assistance (USFWS 2010a).

With respect to the non-ESA listed South Central Alaska DPS of the northern sea otter, in 1990, one mortality and four injuries due to gear interaction, and three injuries due to deterrence in the Prince William Sound drift gillnet fishery were recorded in a fisher self-report. Between 2000 and 2004, the estimated mean annual mortality and serious injury of sea otters is zero as there were no records of incidental take by commercial fisheries in this region (Muto et al. 2015).

6.4 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. This can benefit populations of some species but it can be detrimental to others, which may be displaced or preyed upon. 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

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.

Several species of conservation concern occur in the GOA (Table 6-6). Short-tailed Albatross is listed as endangered, Steller's Eider is listed as threatened, and Kittlitz's Murrelet is a candidate species[29] for listing under the ESA.

This section provides a preliminary analysis of the salmon fisheries in the three areas and their potential for interactions with identified seabird species. A complete analysis of the interactions between the salmon fisheries in the three areas with seabirds would be conducted in the environmental assessment prepared for the proposed action.

Table 6-6 ESA-listed and candidate 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
Kittlitz's Murrelet	Brachyramphus brevirostris	Candidate

6.4.1 Drift Gillnet Fisheries in Cook Inlet, Prince William Sound, and the South Alaska Peninsula

The impacts of the salmon fisheries in the three traditional net fishing areas on seabirds were analyzed in the Environmental Assessment for Amendment 12 (NMFS 2012). Under Section 118 of the MMPA, NMFS is required to monitor the rate of incidental take of marine mammals in commercial fisheries. 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 are designed for estimating marine mammal take, not seabird take. However, seabird bycatch information collected by this program is the best available information we have to assess the potential impact of these fisheries on seabirds.

USFWS has identified gillnet fisheries as one sources of human-caused mortality for Kittlitz's Murrelets (USFWS 2010b). Being small-bodied, nearshore divers, these birds sometimes get caught in gillnets and drown (Day et al. 1999). Mortalities have been documented in gillnet fisheries in Alaska in Prince William Sound (Wynne et al. 1992), Kodiak (Manly et al. 2007), and Yakutat Bay (Manly 2009). The Kittlitz's Murrelet forages in shallow waters for schooling fishes (including capelin, Pacific sandlance Pacific herring, and walleye pollock), zooplankton, and other invertebrates. In areas with tidewater glaciers within its range, the Kittlitz's Murrelet associates with icebergs (but not heavy ice) and outflows of glacial streams (Day et al. 1999, USFWS 2010b), sometimes nesting up to 45 miles inland on rugged mountains near glaciers. Most recent population estimates indicate a global population between 30,900

[29] For more information on the Kittlitz's Murrelet's candidate status, see http://alaska.fws.gov/media/murrelet/qa.pdf.

and 56,800 individuals (USFWS 2010b). Significant population declines have been reported in several of its core population centers (USFWS 2010b).

USFWS recently lowered the listing priority for Kittlitz's Murrelet from a 2 (highest possible priority for the species) to an 8 (out of 12) (76 FR 66370, October 26, 2011). 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 leads 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. However, 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/ship wrecks, number and location of gillnets) (76 FR 66370, October 26, 2011).

The following analysis provides the best available information on seabird interactions with the Cook Inlet, Prince William Sound, and Alaska Peninsula draft gillnet fisheries and the Alaska Peninsula purse seine fishery.

Cook Inlet drift gillnet fishery

Potential marine bird interactions are of concern in the drift gillnet fisheries, 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.

Bird species in Cook Inlet include Short-tailed Shearwaters (*Puffinus tenuirostris*), Tufted Puffins (*Fratercula cirrhata*), Black-legged Kittiwakes (*Rissa tridactyla*), Common Murres (*Uria aalge*), *Brachyramphus* murrelets, phalaropes (mainly Rednecked Phalaropes, *Phalaropus lobatus*), Fork-tailed Storm-petrels (*Oceanodroma furcata*), Northern Fulmars (*Fulmarus glacialis*), Glaucous-winged Gulls (*Larus glaucescens*), Horned Puffins (*Fratercula corniculata*), and Pigeon Guillemots (*Cepphus columba*).

The Alaska Marine Mammal Observer Program for the Cook Inlet salmon drift gillnet fisheries 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 these fisheries. 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.

Prince William Sound and Alaska Peninsula salmon fisheries

The Prince William Sound salmon drift gillnet fishery was observed in 1990 and 1991 (Wynne et al. 1991 and Wynne et al. 1992). In 1990, observers were onboard 300 (57.3%) of the 524 vessels that fished in the Prince William Sound salmon drift gillnet fishery, monitoring a total of 3,166 sets, or roughly 4% of the estimated number of sets made by the fleet. In 1991, observers were onboard 531 (86.9%) of the 611 registered vessels and monitored a total of 5,875 sets, or roughly 5% of the estimated sets made by the fleet. This fishery has not been observed since 1991; therefore, no additional observer data are available.

The South Unimak drift gillnet fishery was observed in 1990 (Wynne et al. 1991). Observers were onboard 59 (38.3%) of the 154 vessels participating in this salmon drift gillnet fishery, monitoring a total of 373 sets, or roughly 4% of the estimated number of sets made by the fleet. This fishery has not been observed since 1990; therefore, no additional observer data are available.

In 1990, a total of 615 marine birds, representing at least 20 species, were encountered, which means they were observed within 10m of active drift gillnets in these fisheries. Of the 336 marine birds that were observed to encounter PWS drift gillnets, 41 became entangled. Of the 279 marine birds that were observed to encounter South Unimak drift gillnets, 19 became entangled. Two Kittlitz's Murrelets were encountered but not entangled. No Short-tailed albatrosses or Steller's Eiders were encountered.

In 1991, nearly 2000 marine birds, representing at least 19 species, were encountered. Of these, 62 birds became entangled in driftnets. Gulls and kittiwakes were the marine birds most commonly observed near driftnets, but murres and murrelets were the species most frequently entangled and killed. Ten Kittlitz's Murrelets were observed and seven were entangled and killed in PWS drift gillnets. This is estimated to equate to 5-30% of the total murrelet bycatch in salmon gillnets during 1990 and 1991. No Short-tailed Albatrosses or Steller's Eiders were encountered.

6.5 Essential Fish Habitat

Section 303(a)(7) of the Magnuson-Stevens Act 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 2012 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. The 2012 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 due to the life history needs of salmon.

As part of the 5-year review process, NMFS Alaska Region and Alaska Fisheries Science Center (AFSC) staff have developed a new methodology using oceanic variables to refine EFH descriptions for all marine life stages of salmon. This methodology has under gone peer review and has been published (Echave et al, 2012). The Council is currently considering amending the FMP to include these new marine salmon EFH descriptions as part of its second 5-year review. An action to amend the FMP to manage the fisheries in the three areas would not change the salmon EFH descriptions.

No evidence suggests salmon drift gillnet gear or salmon purse seine gear impacts habitat. The activity targets only adult salmon in the water column, successfully avoiding any significant disturbance of the benthos, substrate, or intertidal habitat. The EEZ salmon fisheries do not occur on any areas designated as Habitat Areas of Particular Concern.

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 (NMFS 2016). That report is incorporated by reference.

The waters and substrates that comprise salmon EFH are susceptible to a wide array of human activities unrelated to fishing. Broad categories of such 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 each of these activity categories, known and potential adverse impacts to EFH are described in Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska (NMFS 2016). Further, mechanism or processes that may cause the adverse effects and how these may affect habitat function are described in that report.

Coordination and consultation on EFH is required by Magnuson-Stevens Act § 305(b). However, this consultation does not supersede the regulations, rights, interests, or jurisdictions of other federal or state agencies. The report Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska contains non-binding recommendations for reasonable steps that could be taken to avoid or minimize adverse effects of non-fishing activities on EFH (NMFS 2016).

Non-fishing activities discussed in Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska (NMFS 2016) 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 Magnuson-Stevens Act's EFH consultation requirements.

6.6 Northern pike control and eradication

Northern pike has been a concern for the public throughout the development of Amendment 12, even though Federal management of the Cook Inlet salmon fishery would not extend to FMP having any authority to take actions to eradicate Northern pike. This section provides background information on the State's efforts to control and eradicate Norther pike.

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 nearly $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 lead efforts to eliminate northern pike populations from four 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 or 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 a reasonable 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 (34 lakes- including Nancy Lake Recreational Area)
- Anchorage lakes (5 lakes)
- Kenai Peninsula lakes (13 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 gathered 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 conclude 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—

- removed >4,000 pike from 50 side-channel sloughs of Alexander Creek system by gillnet,

- evaluated 2010 eradication projects,
- used a $50K Alaska Sustainable Salmon Fund (AKSSF) awarded to USFWS/ADF&G partnership for a multi-media education campaign on invasive pike in Southcentral Alaska,
- concluded the Stormy Lake pike movement study, and
- used a Cooperative Agreement with USFWS to secure ~$250K for Stormy Lake pike eradication project - activities completed include public scoping and collection of Stormy Lake arctic char broodstock to preserve remnant population (in significant decline) due to pike predation.

ADF&G's ongoing projects and partnerships include —

- continue to control net in side-channel sloughs of Alexander Creek to reduce pike abundance;
- study pike movement with radio telemetry in Alexander Creek system;
- AKSSF grant (match provided by Kenai River Sportfishing) provided ADF&G $40K for Stormy Lake pike eradication supplies and equipment;
- Stormy Lake pike eradication project scoping and permitting are completed (phase one), plan is to eradicate pike in Stormy Lake in September of 2012 and restock native fish assemblage after the detoxifies in 2012 (phase two);
- Soldotna Creek pike eradication project carried out over the past few years and is currently in the final stages;
- Joint project by USGS, ADF&G Commercial Fish Division, and CIAA to (1) study effectiveness of electrical barrier and hydrogun for controlling pike – to be conducted in June, 2012 at Derks Lake on Kenai Peninsula - and (2) conduct pike movement, distribution, and mitigation studies in Susitna drainage; and
- develop an eDNA study on the Kenai Peninsula to assess the pike detection sensitivity of eDNA in water samples. The USGS is providing technical help to ADF&G to develop this study based on its invasive pike bioenergetics and eDNA study in Susitna drainage.

7 Preparers and Persons Consulted

National Marine Fisheries Service, Sustainable Fisheries, Alaska Region

Gretchen Harrington, Jason Gasper

Alaska Department of Fish & Game

Forrest Bowers, Trent Hartill, Andrew Munro, Bill Templin, James Hasbrouck

NOAA Office of General Counsel, Alaska Region

Lauren Smoker

North Pacific Fishery Management Council Staff

Jim Armstrong

8 References

Alaska Department of Fish & Game (ADF&G). South Alaska Peninsula Annual Management Report URL: http://www.adfg.alaska.gov/FedAidPDFs/FMR16-02.pdf

ADF&G. 2010. State of Alaska's Salmon Fisheries Management Program. Response to Council request (June 30, 2010), August 31, 2010. Correspondence. Juneau, AK.

ADF&G. 2010. Report to the NPFMC, June 2010, Sitka, Alaska. B Reports. Juneau, AK.

ADF&G. 2009. 2009-2012 Southeast Alaska and Yakutat Commercial Salmon Fishing Regulations. Juneau.

ADF&G. 2001. Policy for Statewide Salmon Escapement Goals, 5 AAC 39.223. Juneau, AK

ADF&G. 2000. Alaska Salmon Sustainable Fisheries Policy, 5AAC 39.222. Juneau, AK.

Calambokidis, J., E.A. Falcone, T.J. Quinn, A.M. Burdin, P.J. Clapham, J.K.B. Ford, C.M. Gabriele, R. LeDuc, D. Mattila, L. Rojas-Bracho, J.M. Straley, B.L. Taylor, J. Urbán R., D. Weller, B.H. Witteveen, M. Yamaguchi, A. Bendlin, D. Camacho, K. Flynn, A. Havron, J. Huggins, and N. Maloney. 2008. SPLASH: Structure of Populations, Levels of Abundance and Status of Humpback Whales in the North Pacific. Final report for Contract AB133F-03-RP-00078 U.S. Dept of Commerce Western Administrative Center, Seattle, Washington. http://www.cascadiaresearch.org/SPLASH/SPLASH-contract-Report-May08.pdf

Clark, R., M. Willette, S. Fleischman, and D. Eggers. 2007. Biological and Fishery-Related Aspects of Overescapement in Alaskan Sockeye Salmon *Oncorhynchus nerka*. Alaska Department of Fish and Game Special Publication No. 07-17, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/Sp07-17.pdf

Day, R.H., K.J. Kuletz, and D.A. Nigro. 1999. Kittlitz's Murrelet (*Brachyramphus brevirostris*). *In* The Birds of North America, No. 435 (A. Poole and F. Gill, eds.). The Birds of North America, Inc., Philadelphia, PA.

Echave, K., M. Eagleton, E. Farley, and J. Orsi. 2012. A refined description of essential fish habitat for Pacific salmon within the U.S. Exclusive Economic Zone in Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-236, 104 p. (.pdf, 4.51 MB).

Ferrero, R.C., D.P. DeMaster, P.S. Hill, M.M. Muto, and A.L. Lopez. 2000. Alaska Marine Mammal Stock Assessments, 2000. NOAA Technical Memorandum, NMFS-AFSC-119, U.S. Department of Commerce, NOAA. p. 191-43.

Ford, J.K.B. and G.M. Ellis. 2006. Selective foraging by fish-eating killer whales *Orcinus orca* in British Columbia. Marine Ecology Progress Series 316:185-199.

Funk, F. 2003. Overview of State-Managed Marine Fisheries in Southwestern Alaska with Reference to the Southwest Stock of Sea Otters. Alaska Department of Fish and Game, Juneau Alaska, 119 p.

Keyse, M.D., C.W. Russell, and E.K.C. Fox. 2016. South Alaska Peninsula salmon annual management report, 2015. Alaska Department of Fish and Game, Fishery Management Report No. 16-02, Anchorage. URL: http://www.adfg.alaska.gov/FedAidPDFs/FMR16-02.pdf.

Kruse, G.H., F.C. Funk, H.J. Geiger, K.R. Mabry, H.M. Savikko, and S.M. Siddeek. 2000. Overview of State managed Marine Fisheries in the Central and Western Gulf of Alaska, Aleutian Islands, and the Southeastern Bering Sea, with Reference to Steller Sea Lions. ADF&G, Division of Commercial Fisheries, P.O. Box 25526, Juneau, Alaska 99802.

Kuletz, K.J., S.G. Speckman, J.F.Piatt, and E.A. Labunski. 2011. Distribution, population status and trends of Kittlitz's Murrelet Brachyramphus brevirostris in Lower Cook Inlet and Kachemake Bay, Alaska. Marine Ornithology 39:85-95.

Lowry, L.F., K.J. Frost, D.G. Calkins, G.L. Swartzman, and S. Hills. 1982. Feeding habits, food requirements, and status of Bering Sea marine mammals. Document Nos. 19 and 19A, NPFMC, Anchorage, Alaska.

Manly B.F.J. 2009. Incidental take and interactions of marine mammals and birds in the Yakutat salmon setnet fishery, 2007 and 2008. Unpublished report. Western EcoSystems Technology Inc, Cheyenne, Wyoming. 96p.

Manly B.F.J, Sternfeld M, Kuletz KJ. 2007. Incidental Take and Interactions of Marine Mammals and Birds in the Kodiak Island Salmon Set Gillnet Fishery, 2002 and 2005. Final report by Western EcoSystems Technology Inc., Cheyenne, Wyoming, for National Marine Fisheries Service, Juneau, Alaska.

Manly, B. F.J. 2006. Incidental Catch and Interactions of Marine Mammals and Birds in the Cook Inlet Salmon Driftnet and Setnet Fisheries, 1999-2000. Western EcoSystems Technology Inc. URL: http://www.fakr.noaa.gov/protectedresources/observers/bycatch/1999-2000cookinlet.pdf

McCullough, J. N. 2001. Alaska Peninsula Management Area salmon systems: managers manual. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K01-1, Kodiak.

Munro, A. R., and E. C. Volk. 2016. Summary of Pacific salmon escapement goals in Alaska with a review of escapements from 2007 to 2015. Alaska Department of Fish and Game, Fishery Manuscript Series No. 16-04, Anchorage. URL: http://www.adfg.alaska.gov/FedAidPDFs/FMS16-04.pdf

Muto, M. M., V. T. Helker, R. P. Angliss, B. A. Allen, P. L. Boveng, J. M. Breiwick, M. F. Cameron, P. J. Clapham, S. P. Dahle, M. E. Dahlheim, B. S. Fadely, M. C. Ferguson, L. W. Fritz, R. C. Hobbs, Y. V. Ivashchenko, A. S. Kennedy, J. M. London, S. A. Mizroch, R. R. Ream, E. L. Richmond, K. E. W. Shelden, R. G. Towell, P. R. Wade, J. M. Waite, and A. N. Zerbini. 2016.

Alaska marine mammal stock assessments, 2015. U.S. Dep. Commer., NOAA Tech. Memo. NMFS AFSC-323, 300 p. doi:10.7289/V5/TM-AFSC-323.

National Marine Fisheries Service (NMFS). 2016. Recovery Plan for Cook Inlet Beluga Whales (*Delphinapterus leucas*). NMFS Alaska Region, Protected Resources Division, Juneau, Ak.

NMFS. 2013. Biological Assessment of the Effects of the Federal Fisheries, State Parallel Groundfish Fisheries and Pacific Halibut Fisheries on the Southwest Alaska Distinct Population Segment of the Northern Sea Otter and Its Designated Critical Habitat. June 2013. NMFS Alaska Region, P.O. Box 21668, Juneau, AK 99802-1668.

NMFS. 2012a. Endangered Species Act Section 7(a)(2) Supplemental Biological Opinion. January 9, 2012. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Salmon Management Division, Northwest Region, Seattle, WA.

NMFS. 2012b. Endangered Species Act Section 7 informal consultation on the effects of the Alaska groundfish fisheries and Amendment 93 to the Fishery Management Plan for Groundfish of the Gulf of Alaska on endangered Southern Resident killer whales. February 9, 2012. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Protect Resources Division, Northwest Region, Seattle, WA.

NMFS. 2012c. Final Environmental Assessment/Regulatory Impact Review For Amendment 12: Revisions to the Fishery Management Plan for the Salmon Fisheries in the EEZ Off the Coast of Alaska. June 2012. NMFS Alaska Region, P.O. Box 21668, Juneau, AK 99802-1668. URL: https://alaskafisheries.noaa.gov/sites/default/files/analyses/earir_salmonfmpamds0612.pdf

NMFS. 2010. ESA Section 7 Biological Opinion on the Alaska Groundfish Fisheries. November 2010. NMFS Alaska Region, P.O. Box 21668, Juneau, AK 99802-1668.

NMFS. 2009. Supplemental Biological Opinion Reinitiating Consultation on the January 11, 2007 Biological Opinion regarding Authorization of Bering Sea/Aleutian Islands (BSAI) Groundfish Fisheries. December 2, 2009. U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Seattle, WA.

NMFS. 2008a. Endangered Species Act Section 7(a)(2) Consultation Biological Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation: Consultation on the Approval of Revised Regimes under the Pacific Salmon Treaty and the Deferral of Management to Alaska of Certain Fisheries Included in those Regimes. United States Department of State and National Marine Fisheries Service, Northwest Region. December 22, 2008.

NMFS. 2008b. Conservation Plan for the Cook Inlet Beluga Whale (*Delphinapterus leucas*). National Marine Fisheries Service, Juneau, Alaska.

NMFS. 2008c. Recovery Plan for Southern Resident Killer Whales (*Orcinus orca*). National Marine Fisheries Service, Northwest Region, Seattle, Washington.

NMFS. 2005. Environmental impact statement for essential fish habitat identification and conservation in Alaska. April 2005, U.S.DOC, NOAA, NMFS; Alaska Region, P.O. Box 21668, Juneau, AK 99802-1668.

NMFS. 2003. 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. November 2003. National Marine Fisheries Service, Northwest Region, 7600 Sand Point Way NE, Bldg. #1, Seattle, Washington 98115-007. http://www.nwr.noaa.gov/Salmon-Harvest-Hatcheries/Salmon-Fishery-Management/upload/slmn-hrvst-FPEIS.pdf

NMFS. 2001. Environmental Assessment for Amendment 6 to the Fishery Management Plan for the Salmon Fisheries off the Coast of Alaska to Revise Definitions of Overfishing. December 2001. NMFS Alaska Region. Juneau, Alaska. http://www.fakr.noaa.gov/sustainablefisheries/amds/6/salmon_amd6_1201.pdf

NMFS. 1999. ESA Reinitiated Section 7 Consultation Biological Opinion. Take of Listed Salmon in the Groundfish Fisheries Conducted Under the Bering Sea and Aleutian Islands and Gulf of Alaska Fishery Management Plans. December 22, 1999. NMFS Northwest Region.

NMFS. 1997. Environmental Assessment for Salmon Fisheries in the EEZ and State Waters Off the Coast of Alaska. NMFS Alaska Region, P.O. Box 21668, Juneau, Alaska 99802. Sept. 30, 1997. 76 pp. plus attachment.

North Pacific Fishery Management Council (NPFMC). 1978. Fishery Management Plan and Environmental Impact Statement for the High Seas Salmon Fishery Off the Coast of Alaska East of 175 degrees East Longitude. December 1, 1978. Anchorage, AK 99501.

NPFMC. 1990. Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska. Anchorage, AK 99501.

NPFMC. 1990. Appendix F. Environmental Assessment and Regulatory Impact Assessment/Initial Regulatory Flexibility Analysis for the Third Amendment of the Fishery Management Plan for the High-Seas Salmon Off the Coast of Alaska. In: Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska. April, 1990. Anchorage, AK 99501.

NPFMC. 2010. Discussion Paper on the FMP for the Salmon Fisheries in the US EEZ off the Coast of Alaska. December 2010. Anchorage, AK 99501.

NPFMC. 2011b. Secretarial Review Draft Environmental Assessment/ Regulatory Impact Review/ Initial Regulatory Flexibility Analysis for Amendment 93 to the Fishery Management Plan for Groundfish of the Gulf of Alaska Chinook Salmon Bycatch in the Gulf of Alaska Pollock Fishery. July, 2011. Anchorage, AK 99501.

NPFMC. 2011a. Bering Sea Non-Chinook Salmon Bycatch Management, Initial Review Draft Environmental Assessment, May 2011. NPFMC, 605 West 4th Ave., Suite 306, Anchorage, AK 99503.

Pacific Fishery Management Council. 2011. Public Review Draft Environmental Assessment for Pacific Coast Salmon Plan Amendment 16: Classifying Stocks, Revising Status Determination Criteria, Establishing Annual Catch Limits and Accountability Measures, and De Minimis Fishing Provisions. Prepared by the Ad Hoc Salmon Amendment Committee. May 2011. URL: http://www.pcouncil.org/wp-content/uploads/C1b_SAC_RPT1_JUN2011BB.pdf.

Soboleff, N.J. 2005. Potential interactions between state-managed fisheries and Steller sea lions (*Eumetopias jubatus*). M.S. Thesis, University of Alaska Fairbanks, Fairbanks, AK. 124 p.

Treaty between the Government of Canada and the Government of the United States of America Concerning Pacific Salmon. 2009. http://www.psc.org/pubs/Treaty.pdf

U.S. Fish and Wildlife Service (USFWS). 2010a. Southwest Alaska Distinct Population Segment of the Northern Sea Otter (*Enhydra lutris kenyoni*) - Draft Recovery Plan. U.S. Fish and Wildlife Service, Region 7, Alaska. 171 pp.

USFWS. 2010b. Kittlitz's Murrelet Species Assessment and Listing Priority Assignment Form. Anchorage, AK. 46 p. Accessed online on October 17, 2011. At http://ecos.fws.gov/docs/candidate/assessments/2010/r7/B0AP_V01.pdf

USFWS. 2009. Sea Otter Critical Habitat in Southwest Alaska – Fact Sheet. U.S. Fish and Wildlife Service, Region 7.

Weitkamp, L.A. 2010. Marine Distributions of Chinook Salmon from the West Coast of North America Determined by Coded Wire Tag Recoveries, Transactions of the American Fisheries Society, 139:1, 147-170. At http://dx.doi.org/10.1577/T08-225.1

Woods, G.F. and N. Zeiser. 2010. 2010 Yakutat set gillnet fishery management plan. Alaska Department of Fish and Game Division of Commercial Fisheries, Regional Information Report No. 1J10-10, Douglas.

Wynne, Kate M., D.L. Hicks, N.R. Munro. 1991. 1990 Salmon Gillnet Fisheries Observer Programs in Prince William Sound and South Unimak Alaska. Final Report, March 18, 1991. Saltwater, Inc. 540 L Street, Suite 202, Anchorage, Alaska 99501. URL: http://www.fakr.noaa.gov/protectedresources/observers/bycatch/1990pws.pdf

Wynne, Kate M., D.L. Hicks, N.R. Munro. 1992. 1991 Marine Mammal Observer Programs for the Salmon Driftnet Fishery of Prince William Sound Alaska. Final Report, May 1, 1992. Saltwater, Inc. 540 L Street, Suite 202, Anchorage, Alaska 99501. URL: http://www.fakr.noaa.gov/protectedresources/observers/bycatch/1991pws.pdf