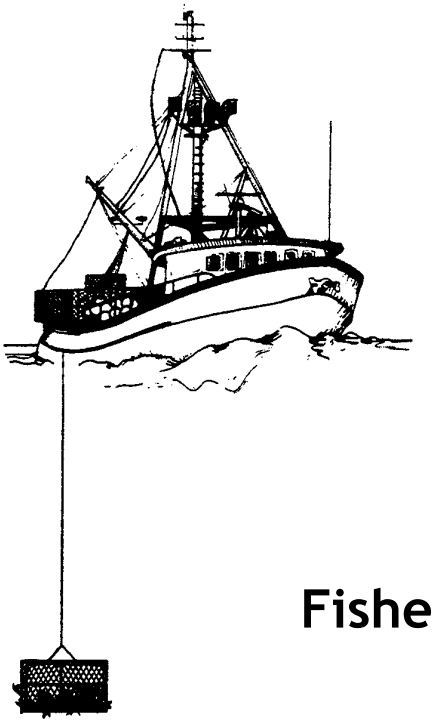

Fishery Management Plan

for

Bering Sea/Aleutian Islands

King and Tanner Crabs

November 2023

North Pacific Fishery Management Council
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Acronyms, Abbreviations, and Definition of Terms used in the FMP

A note to the reader: Several acronyms and abbreviations are used throughout this FMP. In addition to the list below, please visit: https://www.npfmc.org/library/acronyms/ for the most up to date compilation of frequently used acronyms and abbreviations.

The following terms are used extensively throughout this FMP, and as such are defined below:

Acceptable biological catch (ABC) is a level of annual catch of a stock that accounts for the scientific uncertainty in the estimate of the overfishing level (OFL), and any other specified scientific uncertainty. The ABC is set below the OFL to prevent, with a greater than 50 percent probability, the OFL from being exceeded.

ABC Control Rule is the specified approach in the five-tier system for setting the maximum permissible ABC for each stock as a function of the scientific uncertainty in the estimate of OFL and any other specified scientific uncertainty.

Annual catch limit (ACL) is the level of annual catch of a stock that serves as the basis for invoking accountability measures. For crab stocks, the ACL will be set at the ABC.

Essential Fish Habitat (EFH) means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH: waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species full life cycle.

Guideline Harvest Level (GHL) means the preseason estimated level of allowable fish harvest which will not jeopardize the sustained yield of the fish stocks. A GHL may be expressed as a range of allowable harvests for a species or species group of crab for each registration area, district, subdistrict, or section

Habitat Conservation Areas: Areas where fishing restrictions are implemented for purposes of habitat conservation.

Habitat Conservation Zone: A subset of a habitat conservation area in which additional restrictions are imposed on fishing beyond those restrictions established for the habitat conservation area to protect specific habitat features.

Habitat Protection Areas: Areas of special, rare habitat features where fishing activities that may adversely affect the habitat are restricted.

Maximum sustainable yield (MSY) is the largest long-term average catch or yield that can be taken from a stock or stock complex under prevailing ecological and environmental conditions. MSY is estimated from the best information available.

F_{MSY} control rule means a harvest strategy which, if implemented, would be expected to result in a long-term average catch approximating MSY.

B_{MSY} stock size is the biomass that results from fishing at constant F_{MSY} and is the minimum standard for a rebuilding target when a rebuilding plan is required.

Maximum fishing mortality threshold (MFMT) is defined by the F_{OFL} control rule, which is annually estimated according the tier system, and is expressed as the fishing mortality rate.

Minimum stock size threshold (MSST) is one half the B_{MSY} stock size.

Optimum Yield (OY) The term optimum, with respect to the yield from a fishery, means the amount of crab which --

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;

is prescribed as such on the basis of maximum sustainable yield from the fishery, as reduced by any relevant economic, social, or ecological factor; and

in the case of an overfished fishery, provides for rebuilding to a level consistent with producing the maximum sustainable yield in such fishery.

Registration year is defined as June 28 through June 27 for king crab, and August 1 through July 31 for Tanner crab.

Guideline harvest level (GHL) means the preseason estimated level of allowable fish harvest which will not jeopardize the sustained yield of the fish stocks. A GHL may be expressed as a range of allowable harvests for a species or species group of crab for each registration area, district, subdistrict, or section.

Overfished is determined by comparing annual biomass estimates to the established MSST. For stocks where MSST (or proxies) are defined, if the biomass drops below the MSST (or proxy thereof) then the stock is considered to be overfished.

Overfishing is defined as any amount of catch in excess of the overfishing level (OFL). The OFL is calculated by applying the F_{OFL} control rule, annually estimated using the tier system in Chapter 0 to abundance estimates.

Registration (statistical) area. State of Alaska (State) regulations define a registration area as all the waters within the registration area which are territorial waters of Alaska; and an adjacent exclusive economic zone comprised of all the waters adjacent to a crab registration area and seaward to a boundary line drawn in such a manner that each point on the line is 200 nautical miles from the baseline from which the territorial sea is measured.

Commercial fishing means the taking, fishing for, or possession of fish, shellfish, or other fishery resources with the intent of disposing of them for profit, or by sale, barter, trade, or in commercial channels.

Subsistence Uses means the noncommercial, customary and traditional uses of wild, renewable resources by resident domiciled in a rural area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of nonedible by-products of fish and wildlife resources taken for personal or family consumption, and for the customary trade, barter, or sharing for personal or family consumption.

Total allowable catch (TAC) is the annual catch target for the directed fishery for a stock, set to prevent exceeding the ACL for that stock and in accordance with Section 3.5.2.

ES 1 Executive Summary

This Fishery Management Plan (FMP) governs groundfish fisheries of the Bering Sea and Aleutian Islands Management Area (BSAI). The FMP management area is the United States (U.S.) Exclusive Economic Zone (EEZ) of the Bering Sea and Aleutian Islands is defined as those waters lying south of the Chukchi Sea statistical area east of the 1990 U.S./Russian maritime boundary line, and extending south of the Aleutian Islands for 200 miles between the convention line and Scotch Cap Light (164°44'36"W. longitude). The FMP covers 10 stocks of king and Tanner crab:

1. Eastern Bering Sea snow crab,
2. Bristol Bay red king crab,
3. Eastern Bering Sea Tanner crab,
4. Pribilof Islands red king crab,
5. Pribilof Islands blue king crab,
6. Saint Matthew Island blue king crab,
7. Norton Sound red king crab,
8. Aleutian Islands golden king crab,
9. Pribilof Islands golden king crab, and
10. Western Aleutian Island red king crab.

The Fishery Management Plan (FMP) for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands (BSAI) was approved by the Secretary of Commerce on June 2, 1989. The king and Tanner crab FMP is a framework plan, allowing for long-term management of the fishery. The FMP establishes a State/Federal cooperative management regime that defers crab management to the State of Alaska with Federal oversight. State regulations are subject to the provisions of the FMP, including its goals and objectives, the Magnuson-Stevens Fishery Conservation and Management Act national standards, and other applicable federal laws. The FMP has been amended many times since its implementation.

ES 1.1 Management Goal and Objectives

The management goal in the FMP is to maximize the overall long-term benefit to the nation through coordinated Federal and State management of BSAI king and Tanner crab stocks, consistent with responsible stewardship for conservation of the crab resources and their habitats. Within the scope of the management goal, the FMP identifies seven management objectives and a number of relevant management measures used to meet these objectives. Several management measures may contribute to more than one objective, and several objectives may align in any given decision on a case-by-case basis.

1. Biological Conservation Objective. Ensure the long-term reproductive viability of king and Tanner crab populations.
2. Economic and Social Objective. Maximize economic and social benefits to the nation over time.
3. Gear Conflict Objective. Minimize gear conflict among fisheries.
4. Habitat Objective. Preserve the quality and extent of suitable habitat.
5. Vessel Safety Objective. Provide public access to the regulatory process for vessel safety considerations.
6. Due Process Objective. Ensure that access to the regulatory process and opportunity for redress are available to interested parties.
7. Research and Management Objective. Provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions.

ES 1.2 FMP Management Measures

The FMP defers much of the management of the BSAI crab fisheries to the State of Alaska using the following three categories of management measures:

1. Those that are fixed in the FMP and require a FMP amendment to change;
2. Those that are framework-type measures that the State can change following criteria set out in the FMP; and
3. Those measures that are neither rigidly specified nor frameworked in the FMP.

The management measures that govern the Bering Sea and Aleutian Islands groundfish fishery are summarized in ES Table 1.

ES Table 1 A summary of management measures in the BSAI King and Tanner Crab Fishery

Types of Measures	Category 1 (Fixed in FMP)	Category 2 (Frameworked in FMP)	Category 3 (Discretion of State)
Management and Registration Areas	FMP area	Districts, Subdistricts, and Sections	
Harvest Levels	Status Determination Criteria Annual Catch Limits Rebuilding Plans	Guideline Harvest Levels and TACs	
Permit and Access	Voluntary cooperative Permit Requirements Limited Access Norton Sound Superexclusive Registration AFA Sideboard Restrictions	Registration Areas Harvest Limitations for AFA Vessels	
Gear	Legal Gear	Pot Limits	Gear Placement and Removal Gear Storage Gear modifications
Retention and Discard		Sex Restrictions Minimum Size Limits	Bycatch Limits (in crab fisheries)
Time and Area Restrictions	Essential Fish Habitat Habitat Areas of Particular Concern	Fishing Seasons Closed Waters In-season Adjustments	
Monitoring and reporting	Federal Observer Requirements		Reporting Requirements Vessel Tank Inspections State Observer Requirements

Category 1 Management Measures

Legal Gear-The FMP specifically prohibits the use of trawls and tanglenet gear for catching king and Tanner crab because of the high mortality rates that could be inflicted on nonlegal crab.

Permit Requirements-The FMP assumes that all crab fishermen are licensed and vessels are licensed and registered under the laws of the State, and as such, while fishing in the EEZ are subject to all State regulations that are consistent with the FMP, Magnuson-Stevens Act, and other applicable law. Hence, no fishing permits are required for harvesting vessels, except as required by the Moratorium and, in the future, the License Limitation Program.

Federal Observer Requirements – Any vessel fishing for or processing king and Tanner crab in the BSAI shall be required to carry an observer if requested so by the NMFS Regional Administrator.

Limited Access – A system of limited access is a type of allocation of fishing privileges that may be used to promote economic efficiency or conservation. Beginning in 1996, a moratorium on vessels entering the

BSAI crab fisheries was implemented. This moratorium will be in effect until superseded by implementation of the License Limitation System that was approved by the Secretary in 1997.

Norton Sound Superexclusive Area Registration – The FMP establishes the Norton Sound section of the Norther District king crab fishery as a superexclusive registration area. Any vessel registered and participating in this fishery would not be able to participate in other BSAI king crab fisheries.

Essential Fish Habitat (EFH) – The FMP describes and identifies EFH for BSAI crab and identifies fishing and non-fishing threats to BSAI crab EFH, research needs, and EFH conservation and enhancement recommendations.

Habitat Areas of Particular Concern (HAPC) – The FMP identifies specific HAPCs for the BSAI crab fisheries and establishes management measures to reduce potential adverse effects of fishing on HAPCs.

Category 2 Management Measures

Minimum Size Limits-Under the FMP, the state can adjust size limits within the constraints of available information. Biological considerations are used to establish minimum legal size limits to ensure that conservation needs are served. Preference for larger crabs based upon market and other economic considerations is accommodated by industry rather than through regulation.

Guideline Harvest Levels – The FMP authorizes the state to set preseason GHLs, which limit the total annual harvest of crab. Seasons or areas may be closed when the GHL is reached, or earlier or later based on current inseason information.

Inseason Adjustments – When an event occurs inseason that affects preseason predictions, or a preseason prediction proves to be incorrect, compensatory inseason adjustments must be made to keep the management system on track toward meeting the biological and economic objectives of the FMP. The FMP authorizes the state to make inseason adjustments to GHLs, to fishing period lengths, and to close areas under state regulations.

District, Subdistrict, and Section Boundaries – The FMP authorizes the state to adjust district, subdistrict, and section boundaries to manage reasonably distinct stock of crab.

Fishing Seasons – Under the FMP, fisheries should be closed during sensitive biological periods to protect crab from mortality caused by handling and stress when shells are soft, and to maximize meat recovery by delaying harvest until the shells have filled out. Fisheries conducted during sensitive biological periods should prevent any irreparable damage to the stocks.

Sex Restrictions – The FMP authorizes an experimental harvest and processing of females when a surplus is determined to be available; otherwise female crabs may not be taken. The surplus would be dependent on the number of crabs above the threshold amount used in the spawning stock calculation of optimum yield. When a surplus of crabs exists, harvest is by state permit if fishermen provide accurate documentation of harvest rates and location, and processing and marketing results are made available to the management agency.

Pot Limits – The FMP authorizes the State to use pot limits to attain the biological conservation objective and the economic and social objective of the FMP. Pot limits must be designed in a nondiscriminatory manner. Pot limits are warranted to restrict deployment of excessive amounts of gear to attain the biological conservation objective in the event of pot loss to advancing ice cover that may result in wastage. Pot limits may also be warranted to restrict excessive amounts of gear to allow a small guideline harvest level from a depressed stock to attain the economic and social objective within biological conservation constraints.

Registration Areas – The FMP adopts existing state registration areas within the BSAI fishery management unit. The management unit is divided by the state into three king crab registration areas – Bering Sea, Bristol Bay, and Aleutian Islands and one Tanner crab registration area – Westward.

Registration areas may be further divided into fishing districts, subdistricts, and sections for purposes of management and reporting. State regulations require vessels to register for fishing in these areas, and may require vessels to register for specific districts within a registration area. Registration areas may be designated as either exclusive or nonexclusive. Vessels can register for any one exclusive area but cannot fish in any other exclusive area during the registration year. Vessels can fish any or all nonexclusive areas.

Closed Waters – The FMP recognizes the current state regulations that prohibit commercial fishing for king crab in waters within 10 miles of mean lower low water around St. Lawrence, King, and Little Diomede Islands. The FMP also recognizes the state closure to protect the Norton Sound subsistence king crab fishery. The state may designate new closed water areas or expand or reduce existing state closed water areas in order to meet state subsistence requirements.

Category 3 Management Measures

Reporting Requirements – Reporting requirements for catchers and processors are important component in achieving the biological conservation, economic, social, research, and management objectives of the FMP.

Gear Placement and Removal – Placement of unbaited gear, with doors secured open on the fishing grounds before and after a season, has been allowed within certain limits.

Gear Storage – Crab pots are generally stored on land or in designated storage areas at sea.

Vessel Tank Inspections – Vessel tank (or live-hold) and freezer inspections are required before the opening of a king or Tanner crab fishing season to meet the legal requirements of the states landing laws, provide effort information, and provide for a fair start to the fishery.

Gear Modifications – Pots are the specified legal commercial gear for capturing crab in the BSAI area. An escape mechanism is required on all pots. This mechanism will terminate a pots catching and holding ability in case the pot is lost. Escape areas may be incorporated or mesh size adjusted to allow the escape of nonlegal crabs. Various devices may be added to pots to prevent capture of other species.

Bycatch Limits – The state may implement bycatch limits of crab in crab fisheries managed under the FMP.

State Observer Requirements – The state may place observers aboard crab fishing or processing vessels to obtain catch, effort, and biological data. The state currently has a mandatory observer requirement on all catcher/processors and floating processors participating in the king, Tanner, and snow crab fisheries as a condition of obtaining a processing permit. It is important that the state observer program and any future federal observer program be coordinated.

Other – State government is not limited to only the management measures described in the FMP. Implementation of other management measures not described in the FMP must be consistent with the FMP, the Magnuson-Stevens Act, and other applicable federal laws, and may occur only after consultation with the NPFMC. Other management measures the state may implement are subject to the review and appeals procedures described in the FMP.

ES 1.3 Organization of the FMP

The FMP is organized into six sections. Section 1 contains an introduction to the FMP, and Section 2 describes the policy and management goals and objectives of the FMP. Section 3 contains the conservation and management measures that regulate the BSAI crab fisheries. Section 3 details the fishery management unit (3.1), the Status determination criteria and rebuilding overfished stocks (3.2) and Management measures. The category 1 federal management measures fixed in the FMP are described in Section 3.3 including the voluntary 3 pie cooperative (3.4). Section 3.5 summarizes the category 2

frameworked management measures, and Section 3.6 details management measures delegated to the State of Alaska. Sections 3.7, 3.8, and 3.9 provide the procedures for FMP implementation, Council and Secretarial participation, and procedures of appeal, respectively.

Section 4 contains a description of the stocks and their habitat, fishing activities, the economic and socioeconomic characteristics of the fisheries and communities, and ecosystem characteristics. Additional descriptive information is also contained in the appendices. Section 5 specifies the relationship of the FMP with applicable law and other fisheries. Section 6 references additional sources of material on the crab fisheries, and includes the bibliography.

Appendices to the FMP include supplemental information. Appendix A contains a summary of amendments to the FMP. Appendix B describes the establishment of the fishery management plan. Appendix C details the community profiles of those communities actively engaged in BSAI crab fisheries. Appendix D includes habitat information by life stage for managed species, maps of essential fish habitat, and a discussion of adverse effects on essential fish habitat. Appendix E provides coordinates for the registration areas described in the FMP. Appendix F details the research needs in the BSAI crab fisheries.

1 Introduction

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801, et seq.) (MSA) requires that a fishery management plan (FMP) be prepared for any fishery that requires conservation and management. On December 7, 1984, the North Pacific Fishery Management Council (Council) adopted findings regarding fishery management policy which address the need for Federal management of fisheries off Alaska. The history of fluctuations in the abundance of king and Tanner crabs off Alaska, and the interstate nature of the crab fleet and heavy capitalization in crab fisheries spanning the last several decades, particularly in the Bering Sea, create a situation that demands the Federal management oversight contemplated by the Magnuson-Stevens Act and the findings of the Council, as follows:

1. The fishery resources off Alaska are the property of the United States and should be managed for the benefit of everyone in the U.S. in accordance with the provisions of the Magnuson Act.
2. The common property nature of fishery resources tends to cause overcapitalization in the industry, increases the chances of resource depletion, and decreases the incentive for conservation of the resource by the users.
3. The lack of timely and adequate data has hampered Federal decision-making and management to the detriment of the resource and the economy.

Pursuant to the Magnuson-Stevens Act (MSA), the Council has responsibility for preparing FMPs and amendments to FMPs for the conservation and management of fisheries in the Exclusive Economic Zone (EEZ) off Alaska.

This FMP is written as a cooperative FMP between the Council and the State of Alaska. It contains a general management goal with seven management objectives identified (Section 2.2) and relevant management measures required to meet the objectives that are presented (Section 3). Several management measures may contribute to more than one objective, and several objectives may mesh in any given decision on a case-by-case basis. This FMP attempts to avoid unnecessary duplication of effort. It defers much of the management to the State (Sections 3.5, and 3.6), while the most controversial measures are fixed in the FMP and require a Plan amendment to change (Section 3.3). Federal management oversight to determine if an action is consistent with this FMP, the Magnuson-Stevens Act, and other applicable Federal law is also provided in the form of a review and appeals procedure for both State preseason and in-season actions and through formation of a Council Crab Interim Action Committee (Sections 3.7, 3.8, and 3.9).

1.1 Historical development of the FMP

In January 1977, the Secretary of Commerce (Secretary) adopted and implemented a Preliminary Fishery Management Plan (PMP) for the foreign king and Tanner crab fisheries in the eastern Bering Sea (U.S. Department of Commerce, 1977). Under the PMP, no foreign fishing for king crab was allowed and restrictions were continued on the foreign Tanner crab fishery.

After this initial action, the decision was made to coordinate Federal management of crab fisheries with the State of Alaska (State). This decision was based on a desire to optimize the use of limited State and Federal resources and prevent duplication of effort by making use of the existing State management regime. The State has managed king crab fisheries inside and outside State waters since statehood in 1959. It also managed domestic Tanner crab fisheries since their inception in the Bering Sea in 1968, in the Aleutians in 1973, and jointly managed the Tanner crab fishery in the Bering Sea and Aleutian Islands (BSAI) area and the Gulf of Alaska (GOA) from December 6, 1978, until November 1, 1986, in

accordance with the FMP for the Commercial Tanner Crab Fishery off the Coast of Alaska. The Alaska Board of Fisheries (Board)[1] is currently responsible for regulating and establishing policy for management of the crab fisheries for vessels regulated under the laws of the State. The State's regulatory system provides for extensive public input, ensures necessary annual revisions, is flexible enough to accommodate changes in resource abundance and resource utilization patterns, and is familiar to crab fishermen and processors. The State has made a substantial investment in facilities, communications, information systems, vessels, equipment, experienced personnel capable of carrying out extensive crab management, and research and enforcement programs.

The Tanner crab FMP was approved by the Secretary and published in the Federal Register on May 16, 1978, (43 FR 21170) under the authority of the Magnuson-Stevens Act. Final implementing regulations applicable to vessels of the United States were published on December 6, 1978, (43 FR 57149). Final implementing regulations applicable to vessels of foreign nations were published on December 19, 1978, (43 FR 59075, 43 FR 59292). To achieve its conservation and management objectives and to coordinate management effectively with the State, the FMP adopted many of the management measures employed by the State. In October 1981, the Council and the State adopted a joint statement of principles for the management of domestic king crab fisheries in the BSAI area (Appendix B) This agreement formed the basis for interim management during development of the BSAI king crab FMP. A notice of availability of the FMP was published on July 19, 1984, (49 FR 29250). A final rule was published on November 14, 1984, (49 FR 44998). Although the Federal regulations implementing framework provisions of the FMP were effective December 2, 1984, actual implementation of management measures under the FMP was deferred pending acceptance of the delegation of authority by the Governor of Alaska. In a letter dated June 20, 1986, the Governor declined the delegation of authority. His principal objections to the delegation were: excessive Federal oversight, uncertainties in the regulatory approval process, unnecessary governmental duplication, and concerns for the degree to which discretionary authority of the Board would be constrained.

At its March 1986 meeting, the Council voted to suspend the implementing regulations for the Tanner crab FMP because it did not provide for management based on the best available scientific information, provide for timely coordination of management with the State, or conform to several of the Magnuson-Stevens Act's national standards. Following the March meeting, the Council published management alternatives for public comment. The three major alternatives were: (1) State management with no Federal FMP, (2) an FMP that delegates management to the State; or (3) an FMP with direct Federal management. Three overriding concerns were evident in the public comments reviewed by the Council in September. Any management arrangement must provide efficient and effective management, conservation of the crab stocks, and fair access by all user groups to management's decision-making. The Council, at its September 24-26, 1986 meeting, appointed a workgroup of both industry representatives and Council members to develop a comprehensive management approach for crab fisheries off Alaska that would address these concerns.

On November 1, 1986, the National Oceanic and Atmospheric Administration (NOAA) promulgated an emergency interim rule, at the request of the Council, to repeal the regulations implementing the Tanner crab FMP for a period of 90 days (November 1, 1986, through January 29, 1987, (51 FR 40027).

On November 20, 1986, the Council workgroup met and recommended repeal of the Tanner crab FMP and its implementing regulations. The workgroup recommended that the Council's crab plan team draft a new FMP that includes both king and Tanner crabs, limits its scope to the BSAI area, and defers management to the State to the maximum extent possible.

At its December 1986 meeting, the Council voted to request extension of the emergency interim rule repealing regulations implementing the Tanner crab FMP for a second 90-day period (January 30 through

[1] Hereafter the term "Board" will be used to denote the "Alaska Board of Fisheries" or its successor entities.

April 29, 1987). The Council also accepted the recommendation of the Council workgroup to begin preparation of a new king and Tanner crab FMP that would replace both previous FMPs for the BSAI area, but not address king and Tanner crab fisheries in the Gulf of Alaska for the present time. The Council also determined that the 180-day duration of the emergency interim rule was insufficient to complete a study of management options, prepare a new FMP, and complete the Secretarial review process. The Council, therefore, requested the Secretary to prepare and implement a Secretarial amendment repealing the Tanner crab FMP and its implementing regulations, to allow time for preparation, approval, and implementation of a new FMP for king and Tanner crabs in the BSAI area, and to prevent reinstitution of the Tanner crab FMP implementing regulations which did not conform to the Magnuson-Stevens Act national standards. A final rule was published on May 11, 1987, (52 FR 17577) implementing the Secretarial Amendment repealing the Tanner crab FMP effective April 29, 1987.

This FMP is written as a cooperative FMP in an attempt to avoid problems that were encountered in the previous Tanner and king crab FMPs. The FMP was implemented effective June 1989. In 2003, the Council recommended a major restructuring (rationalization) of the BSAI crab fisheries to allow for a voluntary cooperative program with harvest shares, processor quota shares, and regional landings distribution provisions in order to protect communities. The share-based program was implemented effective April 1, 2005 (70 FR 10174). There have been over 50 amendments to the FMP as of 2023 (Appendix A).

2 Goals and Objectives

2.1 Management Goal

The management goal in the FMP is to maximize the overall long-term benefit to the nation of Bering Sea Aleutian Islands (BSAI) king and Tanner crab stocks by coordinated federal and state management, consistent with responsible stewardship for conservation of the crab resources and their habitats.

2.2 Management Objectives

Within the scope of the management goal, seven specific objectives have been identified. These relate to stock condition, economic and social objectives of the fishery, gear conflicts, habitat, weather and ocean conditions affecting safe access to the fishery, access of all interested parties to the process of revising this FMP and any implementing regulations, and necessary research and management. Each of these objectives requires relevant management measures (see Section 3). Several management measures may contribute to more than one objective, and several objectives may mesh in any given management decision on a case-by-case basis.

1. Biological Conservation Objective. Ensure the long-term reproductive viability of king and Tanner crab populations.
2. Economic and Social Objective. Maximize economic and social benefits to the nation over time.
3. Gear Conflict Objective. Minimize gear conflict among fisheries.
4. Habitat Objective. Preserve the quality and extent of suitable habitat.
5. Vessel Safety Objective. Provide public access to the regulatory process for vessel safety considerations.
6. Due Process Objective. Ensure that access to the regulatory process and opportunity for redress are available to interested parties.
7. Research and Management Objective. Provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions.

2.2.1 Biological Conservation Objective

Ensure the long-term reproductive viability of king and Tanner crab populations.

To ensure the continued reproductive viability of each king and Tanner crab population through protection of reproductive potential, management must prevent overfishing (see acronyms and definitions). Management measures may also be adopted to address other biological concerns such as: restricting harvest of crabs during soft shell periods and maintaining low incidental catch of nonlegal crab. The maintenance of adequate reproductive potential in each crab stock will take precedence over economic and social considerations.

2.2.2 Economic and Social Objective

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 social benefits such as the economic stability of coastal communities. To ensure that economic and social benefits derived for fisheries covered by this FMP are maximized over time, the following will be examined in the selection of management measures:

1. The value of crab harvested (adjusted for the amount of crab dying prior to processing and discarded, which is known as deadloss) during the season for which management measures are considered,
2. The future value of crab, based on the value of a crab as a member of both the parent and harvestable stock,
3. Subsistence harvests within the registration area, and
4. Economic impacts on coastal communities.

This examination will be accomplished by considering, to the extent that data allow, the impact of management alternatives 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.

Social benefits are tied to economic stability and impacts of commercial fishing associated with coastal communities. While social benefits can be difficult to quantify, economic indices may serve as proxy measures of the social benefits which accrue from commercial fishing. Subsistence harvests must also be considered to ensure that subsistence requirements are met as required by law. State law requires that a reasonable opportunity be provided for subsistence use before other consumptive use is allowed. It is very difficult to evaluate the economic impact of subsistence fishing. Yet, fish, shellfish, and game harvested by subsistence users to provide food for the family or social group can greatly exceed the economic value of the product itself (Wise et. al., 2022). Some coastal communities in the BSAI region are even more heavily dependent on commercial fish harvesting and/or processing. Appendix C details the community profiles for those communities heavily engaged in the BSAI crab fisheries, including catcher/processor and subsistence dependence.

2.2.3 Gear Conflict Objective

Minimize gear conflict among fisheries.

Management measures developed for the king and Tanner crab fisheries will take into account the interaction of those fisheries, and the people engaged in them, with other fisheries. To minimize gear conflict among fisheries, the compatibility of different types of fishing gear and activities on the same fishing grounds should be considered. King and Tanner crab fisheries are conducted with pots, which are stationary gear. Many other fisheries in the fishery management unit, both domestic and foreign, are

conducted with mobile trawl or seine gear. Seasons, gear storage, and fishing areas may be arranged to eliminate, insofar as possible, conflicts between gear types and preemption of fishing grounds by one form of gear over another.

2.2.4 Habitat Objective:

To protect, conserve, and enhance adequate quantities of essential fish habitat (EFH) to support king and Tanner crab populations and maintain a healthy ecosystem.

Habitat is defined as the physical, chemical, geological, and biological surroundings the support healthy, self-sustaining populations of living marine resources. Habitat includes both the physical component of the environment which attracts living marine resources (e.g. salt marshes, sea grass beds, coral reefs, intertidal lagoons, and near shore characteristics) and the chemical (e.g. salinity, benthic community) and biological characteristics (e.g. scallop life stage histories, oceanography) that are necessary to support living marine resources. The quality and availability of habitat supporting the king and Tanner crab populations are important. Fishery managers should strive to ensure that those waters and substrate necessary to king and Tanner crabs for spawning, breeding, feeding, or growth to maturity are available. It is also important to consider the potential impact of king and Tanner crab fisheries on other fish and shellfish populations. King and Tanner crab EFH is described in Appendix D of this FMP.

Those involved in both management and exploitation of king and Tanner crab resources will actively review actions by other human users of the management area to ensure that their actions do not cause deterioration of habitat. Any action by a State or Federal agency potentially affecting king and Tanner crab habitat in an adverse manner may be reviewed by the Council for possible action under the Magnuson-Stevens Act. The Council will also consider the effect on king and Tanner crab habitat of its own management decisions in other fisheries.

2.2.5 Vessel Safety Objective

Provide public access to the regulatory process for vessel safety considerations.

Upon request, and when appropriate, the Council and the State shall consider, and may 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 safety of vessels.

2.2.6 Due Process Objective

Ensure that access to the regulatory process and opportunity for redress are available to all interested parties.

In order to attain the maximum benefit to the nation, the interrelated biological, economic and social, habitat, and vessel safety objectives outlined above must be balanced against one another. A continuing dialogue between fishery managers, fishery scientists, fishermen, processors, consumers, and other interested parties is necessary to keep this balance. Insofar as is practical, management meetings will be scheduled around fishing seasons and in places where they can be attended by fishermen, processors, or other interested parties.

Access to the FMP development and regulatory process is available through membership in a Council work group, testimony on the record before the Council's Advisory Panel or SSC, or before the Council itself, testimony before the Board, conversations with members of the plan team or officials of regulatory agencies, and by commenting on the FMP, any subsequent amendments and any regulations proposed for their implementation.

This FMP defers much of day-to-day crab management to the State. Means of access to the regulatory process at the State level and of redress of perceived wrongs by the State are necessary. Section 5.2 describes the State management system and mechanisms for public input. Sections 3.8 and 3.9 of this

FMP contain procedures for challenge of State laws or regulations regarding management of these fisheries alleged to be inconsistent with the Magnuson-Stevens Act, the FMP, or any other applicable Federal law.

2.2.7 Research and Management Objective

Provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions.

Necessary data must be collected and analyzed in order to measure progress relative to other objectives and to ensure that management actions are adjusted to reflect new knowledge. Achieving the objective will require new and ongoing research and analysis relative to stock conditions, dynamic feedback to market conditions, and adaptive management strategies. For example, some possible research topics could include (1) the basis for exclusive registration areas, (2) the basis for sex restrictions in retained catch, (3) the basis for size limits, (4) the process for determining GHLs, (5) bioeconomic analyses of specific regulatory proposals, and (6) defining oceanographic conditions important to maximizing productivity of crab stocks.

An annual area management report to the Board discussing current biological and economic status of the fisheries, GHL ranges, and support for different management decisions or changes in harvest strategies will be prepared by the State (ADF&G lead agency), with NMFS and crab plan team input when appropriate. This will be available for public comment, and presented to the Council on an annual basis. TACs will be revised when new information is available. Such information will be made available to the public.

3 Conservation and Fishery Management Measures

The BSAI King and Tanner Crab FMP authorizes the commercial harvest of crab species listed in Section 3.1 of this FMP. Section 3.2 describes the procedures for determining harvest levels for crab species. The FMP defers much of the management of the BSAI crab fisheries to the State of Alaska using the following three categories of management measures:

1. Those that are fixed in the FMP and require a FMP amendment to change; (Category 1; Section 3.3 and Section 3.4 for the Voluntary Cooperative Program)
2. Those that are framework-type measures that the state can change following criteria set out in the FMP; and (Category 2; Section 3.5)
3. Those measures that are neither rigidly specified nor frameworked in the FMP. (Category 3; Section 3.6)

Table 3-1 provides a summary of the management measures in each category.

Table 3-1 Management measures in the FMP, by category

Types of Measures	Category 1 (Fixed in FMP)	Category 2 (Frameworked in FMP)	Category 3 (Discretion of State)
Management and Registration Areas	FMP area	Districts, Subdistricts, and Sections	
Harvest Levels	Status Determination Criteria Annual Catch Limits Rebuilding Plans	Guideline Harvest Levels and TACs	
Permit and Access	Voluntary cooperative Permit Requirements Limited Access Norton Sound Superexclusive Registration AFA Sideboard Restrictions	Registration Areas Harvest Limitations for AFA Vessels	
Gear	Legal Gear	Pot Limits	Gear Placement and Removal Gear Storage Gear modifications
Retention and Discard		Sex Restrictions Minimum Size Limits	Bycatch Limits (in crab fisheries)
Time and Area Restrictions	Essential Fish Habitat Habitat Areas of Particular Concern	Fishing Seasons Closed Waters In-season Adjustments	
Monitoring and reporting	Federal Observer Requirements		Reporting Requirements Vessel Tank Inspections State Observer Requirements

Management measures in category 1 may be addressed through submission of a proposal to the North Pacific Fishery Management Council (NPFMC; Section 3.7). The measures in Categories two and three above may be adopted as State laws subject to the appeals process outlined in the FMP (see Sections 3.8 and 3.9).

The description of management measures in this chapter is not intended to limit the State government to only these measures. However, implementation of other management measures not described in the FMP must be consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law, and may occur only after consultation with the Council. Although specific strategies for attainment of objectives in the FMP are not described, management measures described in this section are all derived to attain one or more of those objectives. Any subsequent management measures must also be justified based upon consistency with the objectives in this FMP. All management measures must, further, be consistent with the Magnuson-Stevens Act and other applicable Federal law.

Sections 3.7, 3.8, and 3.9 define the procedures for FMP implementation, procedures for Council/Secretary of commerce participation and procedures for appeals, respectively.

3.1 Description of the Fishery Management Unit

3.1.1 Stocks

The BSAI King and Tanner crab FMP applies to commercial fisheries for red king crab *Paralithodes camtschaticus*, blue king crab *P. platypus*, golden (or brown) king crab *Lithodes aequispinus*, Tanner crab *Chionoecetes bairdi*, and snow crab *C. opilio* in the BSAI area, except for the following stocks exclusively managed by the State of Alaska: Aleutian Islands Tanner crab, Dutch Harbor red king crab, St. Matthew golden king crab, and St. Lawrence blue king crab.

The common and scientific names used in this FMP are those included in Williams et al. (1988), appropriately amended, with secondary common names sometimes used in the fishery included in parentheses. Members of the genus *Chionoecetes* are often collectively referred to as Tanner crabs; to avoid confusion, the name Tanner crab is used for *C. bairdi* and snow crab is used for *C. opilio*. Through 1989, commercial landings had only been reported for red, blue, and golden king crab; and Tanner, snow, and hybrids of these two species.

3.1.2 Management Area

The BSAI area for this FMP is defined as those waters of the EEZ lying south of the Chukchi Sea statistical area as described in 50 CFR part 679, east of the 1990 U.S./Russian maritime boundary line, and extending south of the Aleutian Islands for 200 miles between the convention line and Scotch Cap Light (164°44'36"W. longitude) (Figure 3-1). The 1988 agreement between the two parties shifted the boundary westward from the convention line of 1867. The U.S. ratified the agreement in 1990, but the Russian Federation had yet to do so as of December 2023. Nevertheless, the Russian Federation is provisionally applying the maritime boundary agreement and the U.S. position is that the maritime boundary is in force.

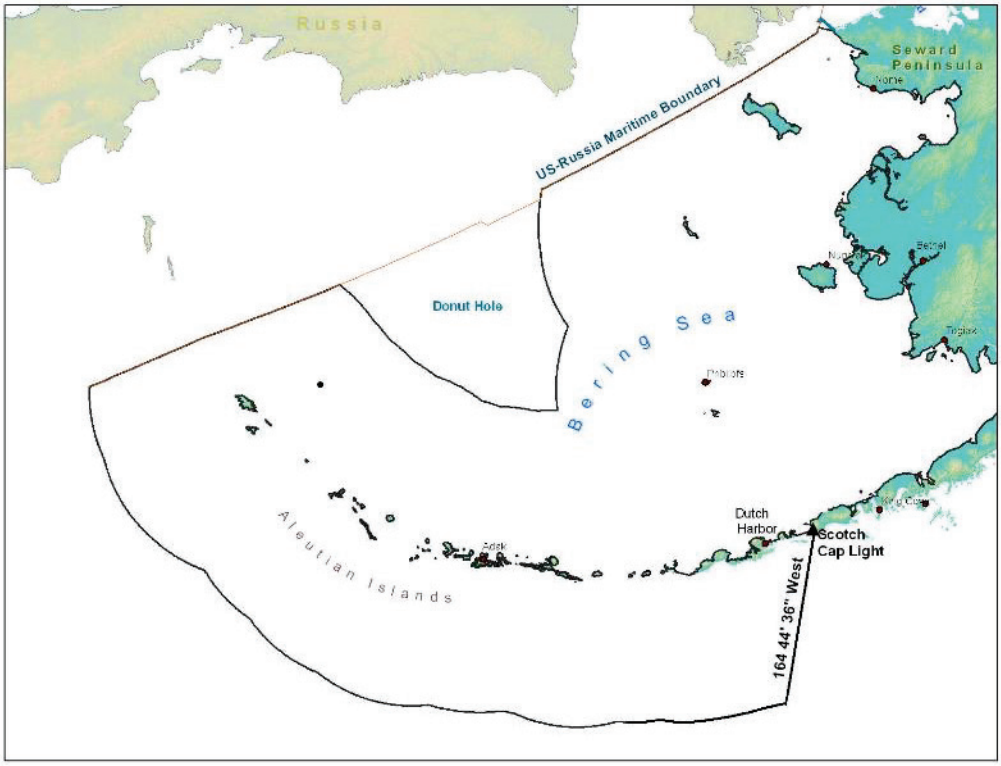

Figure 3-1 BSAI Crab FMP Management Area

The BSAI area contains several stocks of king and Tanner crabs (Section 4) that are discrete from stocks in the Gulf of Alaska. In addition, the physical environment of this area possesses attributes distinguishable from crab grounds in the Gulf of Alaska. Stocks of king and Tanner crabs in the Gulf of Alaska are not included in this management unit and will be managed by the State until the Council prepares an FMP for those stocks.

The Council considered the following in determining the boundaries for the management unit:

1. Crab fisheries outside and inside the BSAI management unit are clearly different in a number of important respects. First, historically the Gulf of Alaska fisheries rely largely on single species while the BSAI fisheries are concerned with multiple species (i.e. mainly red king crab in the

Gulf of Alaska vs. red, blue, and golden king crabs in the BSAI area, and *C. bairdi* in the Gulf of Alaska vs. *C. opilio* and *C. bairdi* in the BSAI area). Second, there is a difference in composition of resident and nonresident fishermen between the two areas (the Gulf of Alaska fisheries have been conducted mostly by Alaska residents and the BSAI fisheries mostly by residents of Washington and Oregon). Third, the composition and mix of vessel size classes is different in the two areas; the BSAI area is traditionally fished by larger vessels. Fourth, a greater proportion of the king and Tanner crab fisheries in the Gulf of Alaska occur within State waters than do the king and Tanner crab fisheries in the Bering Sea.

2. The coordination of king and Tanner crab management in the BSAI area with the BSAI groundfish FMP was another consideration. This is especially important with respect to incidental catch issues.

3.2 Status Determination Criteria, ACL and Rebuilding

Status determination criteria for crab stocks are annually calculated using a five-tier system that accommodates varying levels of uncertainty of information. The five-tier system incorporates new scientific information and provides a mechanism to continually improve the status determination criteria as new information becomes available. Under the five-tier system, overfishing and overfished criteria and acceptable biological catch (ABC) levels are annually formulated. The annual catch limit (ACL) for each stock equals the ABC for that stock. Each crab stock is annually assessed to determine its status and whether (1) overfishing is occurring or the rate or level of fishing mortality for the stock is approaching overfishing, (2) the stock is overfished or the stock is approaching an overfished condition, and (3) the catch has exceeded the ACL.

For crab stocks, the overfishing level (OFL) equals maximum sustainable yield (MSY) and is derived through the annual assessment process, under the framework of the tier system. Overfishing is determined by comparing the OFL, with the catch estimates for that crab fishing year. For the previous crab fishing year, NMFS will determine whether overfishing occurred by comparing the previous year's OFL with the catch from the previous crab fishing year. For the previous crab fishing year, NMFS will also determine whether the ACL was exceeded by comparing the ACL with the catch estimates for that crab fishing year. Catch includes all fishery removals, including retained catch and discard losses, for those stocks where non-target fishery removal data are available. Discard losses are determined by multiplying the appropriate handling mortality rate by observer estimates of bycatch discards. For stocks where only retained catch information is available, the OFL and ACL will be set for and compared to the retained catch.

NMFS will determine whether a stock is in an overfished condition by comparing annual biomass estimates to the established MSST, defined as ½ B_{MSY}. For stocks where MSST (or proxies) are defined, if the biomass drops below the MSST (or proxy thereof) then the stock is considered to be overfished. MSSTs or proxies are set for stocks in Tiers 1-4. For Tier 5 stocks, it is not possible to set an MSST because there are no reliable estimates of biomass.

If overfishing occurred or the stock is overfished, section 304(e)(3)(A) of the Magnuson-Stevens Act, as amended, requires the Council to immediately end overfishing and rebuild affected stocks.

The Magnuson-Stevens Act requires that FMPs include accountability measures to prevent ACLs from being exceeded and to correct overages of the ACL if they do occur. Accountability measures to prevent TACs and GHLs from being exceeded have been used under this FMP for the management of the BSAI crab fisheries and will continue to be used to prevent ACLs from being exceeded. These include: individual fishing quotas and the measures to ensure that individual fishing quotas are not exceeded, measures to minimize crab bycatch in directed crab fisheries, and monitoring and catch accounting

measures. Accountability measures in the harvest specification process include downward adjustments to the ACL and TAC in the fishing year after an ACL has been exceeded.

Annually, the Council, Scientific and Statistical Committee, and Crab Plan Team will review (1) the stock assessment documents, (2) the OFLs and ABCs, and total allowable catches or guideline harvest levels,(3) NMFS's determination of whether overfishing occurred in the previous crab fishing year, (4) NMFS's determination of whether any stocks are overfished and (5) NMFS's determination of whether catch exceeded the ACL in the previous crab fishing year.

Optimum yield is defined in acronyms and definitions. Information pertaining to economic, social and ecological factors relevant to the determination of optimum yield is provided in several sections of this FMP, including Sections 2.2 (Management Objectives), 3.4 (Crab Rationalization), Appendix C (Community profiles), and Appendix D (Essential Fish Habitat).

For each crab fishery, the optimum yield range is 0 to < OFL catch. For crab stocks, the OFL is the annualized maximum sustainable yield (MSY) and is derived through the annual assessment process, under the framework of the tier system. Recognizing the relatively volatile reproductive potential of crab stocks, the cooperative management structure of the FMP, and the past practice of restricting or even prohibiting directed harvests of some stocks out of ecological considerations, this optimum yield range is intended to facilitate the achievement of the biological objectives and economic and social objectives of this FMP (see Sections 2.1 and 2.2) under a variety of future biological and ecological conditions. It enables the State to determine the appropriate TAC levels below the OFL to prevent overfishing or address other biological concerns that may affect the reproductive potential of a stock but that are not reflected in the OFL itself. Under Section 3.5.2, the State establishes TACs at levels that maximize harvests, and associated economic and social benefits, when biological and ecological conditions warrant doing so.

3.2.1 Five-Tier System

The OFL and ABC for each stock are annually estimated for the upcoming crab fishing year using the five-tier system, detailed in Table 3-2 and Table 3-3. First, a stock is assigned to one of the five tiers based on the availability of information for that stock and model parameter choices are made. Tier assignments and model parameter choices are recommended through the Crab Plan Team process to the Council's Scientific and Statistical Committee. The Council's Scientific and Statistical Committee recommends tier assignments, stock assessment and model structure, and parameter choices, including whether information is "reliable," for the assessment authors to use for calculating the proposed OFLs and ABCs based on the five-tier system.

For Tiers 1 through 4, once a stock is assigned to a tier, the determination of stock status level is based on recent survey data and assessment models, as available. The stock status level determines the equation used in calculating the F_{OFL}. Three levels of stock status are specified and denoted by "a," "b," and "c" (see Table **3-2**). The F_{MSY} control rule reduces the F_{OFL} as biomass declines by stock status level. At stock status level "a," current stock biomass exceeds the B_{MSY}. For stocks in status level "b," current biomass is less than B_{MSY} but greater than a level specified as the "critical biomass threshold" (β).

In stock status level "c," the ratio of current biomass to B_{MSY} (or a proxy for B_{MSY}) is below β. At stock status level "c," directed fishing is prohibited and an F_{OFL} at or below F_{MSY} would be determined for all other sources of fishing mortality in the development of the rebuilding plan. The Council will develop a rebuilding plan once a stock level falls below the MSST.

For Tiers 1 through 3, the coefficient α is set at a default value of 0.1, and β set at a default value of 0.25, with the understanding that the Scientific and Statistical Committee may recommend different values for a specific stock or stock complex as merited by the best available scientific information.

In Tier 4, a default value of natural mortality rate (M) or an M proxy, and a scalar, γ, are used in the calculation of the F_{OFL}.

In Tier 5, the OFL is specified in terms of an average catch value over an historical time period, unless the Scientific and Statistical Committee recommends an alternative value based on the best available scientific information.

First, the assessment author prepares the stock assessment and calculates the proposed OFLs by applying the F_{OFL} and using the most recent abundance estimates. The assessment authors calculate the proposed ABCs by applying the ABC control rule to the proposed OFL.

Stock assessment documents shall:

- use risk-neutral assumptions;
- specify how the probability distribution of the OFL used in the ABC control rule is calculated for each stock; and
- specify the factors influencing scientific uncertainty that are accounted for in calculation of the probability distribution of the OFL.

Second, the Crab Plan Team annually reviews stock assessment documents, the most recent abundance estimates, the proposed OFLs and ABCs, and complies the Stock Assessment and Fishery Evaluation Report. The Crab Plan Team then makes recommendations to the Scientific and Statistical Committee on the OFLs, ABCs, and any other issues related to the crab stocks.

Third, the Scientific and Statistical Committee annually reviews the Stock Assessment and Fishery Evaluation Report, including the stock assessment documents, recommendations from the Crab Plan Team, and the methods to address scientific uncertainty.

In reviewing the Stock Assessment and Fishery Evaluation Report, the Crab Plan Team and the Scientific and Statistical Committee shall evaluate and make recommendations, as necessary, on:

- the assumptions made for stock assessment models and estimation of OFLs;
- the specifications of the probability distribution of the OFL;
- the methods to appropriately quantify uncertainty in the ABC control rule; and
- the factors influencing scientific uncertainty that the State has accounted for and will account for on an annual basis in TAC setting.

The Scientific and Statistical Committee will then set the final OFLs and ABCs for the upcoming crab fishing year. The Scientific and Statistical Committee may set an ABC lower than the result of the ABC control rule, but it must provide an explanation for setting the ABC less that the maximum ABC.

As an accountability measure, the total catch estimate used in the stock assessment will include any amount of harvest that may have exceeded the ACL in the previous fishing season. For stocks managed under Tiers 1 through 4, this would result in a lower maximum ABC in the subsequent year, all else being equal, because maximum ABC varies directly with biomass. For Tier 5 stocks, the information used to establish the ABC is insufficient to reliably estimate abundance or discern the existence or extent of biological consequences caused by an overage in the preceding year. Consequently, the subsequent year's maximum ABC will not automatically decrease. However, when the ACL for a Tier 5 stock has been exceeded, the Scientific and Statistical Committee may decrease the ABC for the subsequent fishing season as an accountability measure.

Tiers 1 through 3

For Tiers 1 through 3, reliable estimates of B, B_{MSY}, and F_{MSY}, or their respective proxy values, are available. Tiers 1 and 2 are for stocks with a reliable estimate of the spawner/recruit relationship, thereby enabling the estimation of the limit reference points B_{MSY} and F_{MSY}.

- Tier 1 is for stocks with assessment models in which the probability density function (pdf) of F_{MSY} is estimated.
- Tier 2 is for stocks with assessment models in which a reliable point estimate, but not the pdf, of F_{MSY} is made.
- Tier 3 is for stocks where reliable estimates of the spawner/recruit relationship are not available, but proxies for F_{MSY} and B_{MSY} can be estimated.

For Tier 3 stocks, maturity and other essential life-history information are available to estimate proxy limit reference points. For Tier 3, a designation of the form "F_X" refers to the fishing mortality rate associated with an equilibrium level of fertilized egg production (or its proxy such as mature male biomass at mating) per recruit equal to X% of the equilibrium level in the absence of any fishing.

The OFL and ABC calculation accounts for all losses to the stock not attributable to natural mortality. The OFL and ACL are total catch limits comprised of three catch components: (1) non-directed fishery discard losses; (2) directed fishery discard losses; and (3) directed fishery retained catch. To determine the discard losses, the handling mortality rate is multiplied by bycatch discards in each fishery. Overfishing would occur if, in any year, the sum of all three catch components exceeds the OFL.

Tier 4

Tier 4 is for stocks where essential life-history, recruitment information, and understanding are insufficient to achieve Tier 3. Therefore, it is not possible to estimate the spawner-recruit relationship. However, there is sufficient information for simulation modeling that captures the essential population dynamics of the stock as well as the performance of the fisheries. The simulation modeling approach employed in the derivation of the annual OFLs captures the historical performance of the fisheries as seen in observer data from the early 1990s to present and thus borrows information from other stocks as necessary to estimate biological parameters such as γ.

In Tier 4, a default value of natural mortality rate (M) or an M proxy, and a scalar, γ, are used in the calculation of the F_{OFL}. Explicit to Tier 4 are reliable estimates of current survey biomass and the instantaneous M. The proxy B_{MSY} is the average biomass over a specified time period, with the understanding that the Council's Scientific and Statistical Committee may recommend a different value for a specific stock or stock complex as merited by the best available scientific information. A scalar, γ, is multiplied by M to estimate the F_{OFL} for stocks at status levels a and b, and γ is allowed to be less than or greater than unity. Use of the scalar γ is intended to allow adjustments in the overfishing definitions to account for differences in biomass measures. A default value of γ is set at 1.0, with the understanding that the Council's Scientific and Statistical Committee may recommend a different value for a specific stock or stock complex as merited by the best available scientific information.

If the information necessary to determine total catch OFLs and ACLs is available for a Tier 4 stock, then the OFL and ACL will be total catch limits comprised of three catch components: (1) non-directed fishery discard losses; (2) directed fishery discard losses; and (3) directed fishery retained catch. If the information necessary to determine total catch OFLs and ACLs is not available for a Tier 4 stock, then the OFL and ACL are determined for retained catch. In the future, as information improves, data would be available for some stocks to allow the formulation and use of selectivity curves for the discard fisheries (directed and non-directed losses) as well as the directed fishery (retained catch) in the models. The resulting OFL and ACL from this approach, therefore, would be the total catch OFL and ACL.

Tier 5

Tier 5 stocks have no reliable estimates of biomass and only historical catch data is available. For Tier 5 stocks, the OFL is set equal to the average catch from a time period determined to be representative of the production potential of the stock, unless the Scientific and Statistical Committee recommends an alternative value based on the best available scientific information. The ABC control rule sets the maximum ABC at less than or equal to 90 percent of the OFL and the ACL equals the ABC.

For Tier 5 stocks where only retained catch information is available, the OFL and ACL will be set for the retained catch portion only, with the corresponding limits applying to the retained catch only. For Tier 5 stocks where information on bycatch mortality is available, the OFL and ACL calculations could include discard losses, at which point the OFL and ACL would be applied to the retained catch plus the discard losses from directed and non-directed fisheries.

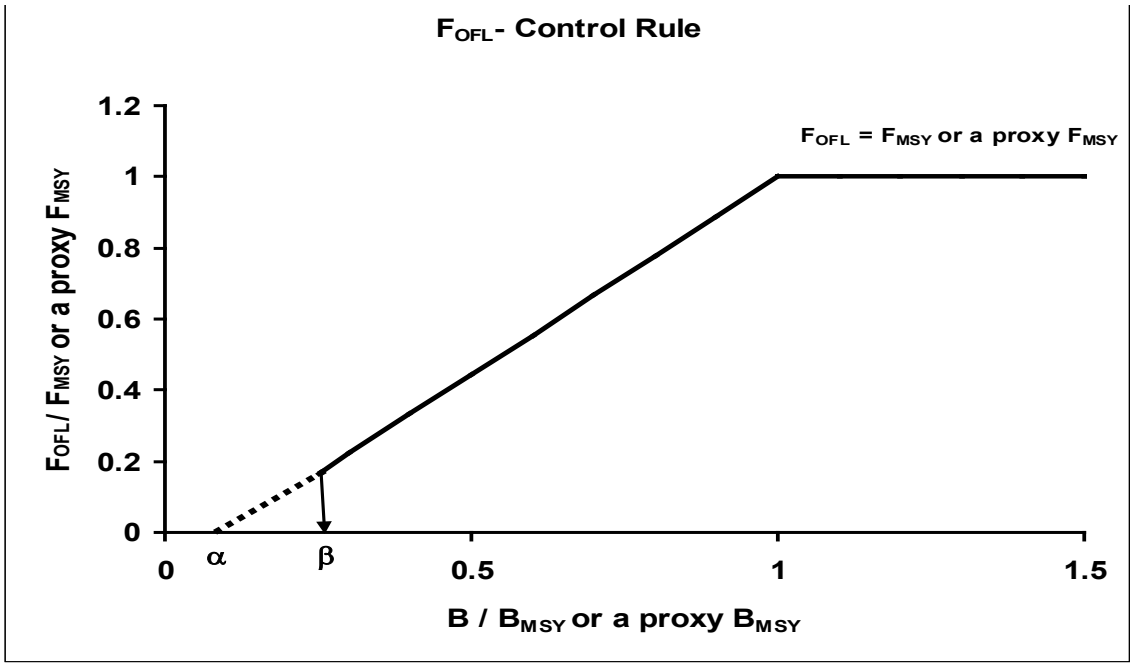

Figure 3-2 Overfishing control rule for Tiers 1 through 4. Directed fishing mortality is 0 below β.

Table 3-2 Five-Tier System for setting overfishing limits *(OFLs) and Acceptable Biological Catches (ABCs)* for crab stocks. The tiers are listed in descending order of information availability. Table 3-3 A guide for understanding the five-tier system. contains a guide for understanding the five-tier system.

Information available	Tier	Stock status level	F_{OFL}	ABC control rule
B, B_{MSY}, F_{MSY}, and pdf of F_{MSY}	1	a. $\frac{B}{B_{msy}} > 1$	$F_{OFL} = \mu_A$ =arithmetic mean of the pdf	
		b. $\beta < \frac{B}{B_{msy}} \leq 1$	$F_{OFL} = \mu_A \frac{B/B_{msy} - \alpha}{1-\alpha}$	ABC≤(1-b_y) * OFL
		c. $\frac{B}{B_{msy}} \leq \beta$	*Directed fishery F = 0* $F_{OFL} \leq F_{MSY}$†	
B, B_{MSY}, F_{MSY}	2	a. $\frac{B}{B_{msy}} > 1$	$F_{OFL} = F_{msy}$	
		b. $\beta < \frac{B}{B_{msy}} \leq 1$	$F_{OFL} = F_{msy} \frac{B/B_{msy} - \alpha}{1-\alpha}$	ABC≤(1-b_y) * OFL
		c. $\frac{B}{B_{msy}} \leq \beta$	*Directed fishery F = 0* $F_{OFL} \leq F_{MSY}$†	
B, $F_{35\%}^*$, $B_{35\%}^*$	3	a. $\frac{B}{B_{35\%*}} > 1$	$F_{OFL} = F_{35\%}$ *	
		b. $\beta < \frac{B}{B_{35\%}*} \leq 1$	$F_{OFL} = F^*_{35\%} \frac{\frac{B}{B^*_{35\%}} - \alpha}{1-\alpha}$	ABC≤(1-b_y) * OFL
		c. $\frac{B}{B_{35\%}*} \leq \beta$	*Directed fishery F = 0* $F_{OFL} \leq F_{MSY}$†	
B, M, $B_{msy^{prox}}$	4	a. $\frac{B}{B_{msy^{prox}}} > 1$	$F_{OFL} = \gamma M$	
		b. $\beta < \frac{B}{B_{msy^{prox}}} \leq 1$	$F_{OFL} = \gamma M \frac{B/B_{msy^{prox}} - \alpha}{1-\alpha}$	ABC≤(1-b_y) * OFL
		c. $\frac{B}{B_{msy^{prox}}} \leq \beta$	*Directed fishery F = 0* $F_{OFL} \leq F_{MSY}$†	
Stocks with no reliable estimates of biomass or M.	5		OFL = average catch from a time period to be determined, unless the SSC recommends an alternative value based on the best available scientific information.	ABC≤0.90 * OFL

*35% is the default value unless the SSC recommends a different value based on the best available scientific information.
† An $F_{OFL} \leq F_{MSY}$ will be determined in the development of the rebuilding plan for an overfished stock.

Table 3-3 A guide for understanding the five-tier system.

- F_{OFL} — the instantaneous fishing mortality (F) from the directed fishery that is used in the calculation of the overfishing limit (OFL). F_{OFL} is determined as a function of:
  - F_{MSY} — the instantaneous F that will produce MSY at the MSY-producing biomass
    - A proxy of F_{MSY} may be used; e.g., $F_{x\%}$, the instantaneous F that results in x% of the equilibrium spawning per recruit relative to the unfished value
  - B — a measure of the productive capacity of the stock, such as spawning biomass or fertilized egg production.
    - A proxy of B may be used; e.g., mature male biomass
  - B_{MSY} — the value of B at the MSY-producing level
    - A proxy of B_{MSY} may be used; e.g., mature male biomass at the MSY-producing level
  - β — a parameter with restriction that $0 \leq \beta < 1$.
  - α — a parameter with restriction that $0 \leq \alpha \leq \beta$.
- The maximum value of F_{OFL} is F_{MSY}. $F_{OFL} = F_{MSY}$ when $B > B_{MSY}$.
- F_{OFL} decreases linearly from F_{MSY} to $F_{MSY} \cdot (\beta-\alpha)/(1-\alpha)$ as B decreases from B_{MSY} to $\beta \cdot B_{MSY}$
- When $B \leq \beta \cdot B_{MSY}$, $F = 0$ for the directed fishery and $F_{OFL} \leq F_{MSY}$ for the non-directed fisheries, which will be determined in the development of the rebuilding plan.
- The parameter, β, determines the threshold level of B at or below which directed fishing is prohibited.
- The parameter, α, determines the value of F_{OFL} when B decreases to $\beta \cdot B_{MSY}$ and the rate at which F_{OFL} decreases with decreasing values of B when $\beta \cdot B_{MSY} < B \leq B_{MSY}$.
  - Larger values of α result in a smaller value of F_{OFL} when B decreases to $\beta \cdot B_{MSY}$.
  - Larger values of α result in F_{OFL} decreasing at a higher rate with decreasing values of B when $\beta \cdot B_{MSY} < B \leq B_{MSY}$.
- The parameter, b_y, is the value for the annual buffer calculated from a P* of 0.49 and a probability distribution for the OFL that accounts for scientific uncertainty in the estimate of OFL.
- P* is the probability that the estimate of ABC, which is calculated from the estimate of OFL, exceeds the "true" OFL (noted as OFL') (P(ABC>OFL').

3.2.2 Rebuilding Overfished Fisheries

1. Pribilof Islands blue king crab (*Paralithodes platypus*)

NMFS declared Pribilof Islands blue king crab overfished on September 23, 2002, because the spawning biomass estimated from the NMFS trawl survey was below the minimum stock size threshold. The Council developed a rebuilding plan for the Pribilof Islands blue king crab stock to satisfy the requirements of section 304(e)(4)(A) of the Magnuson-Stevens Act and comply with the national standard guidelines at 50 CFR 600.310(e). In 2009, NMFS reviewed this rebuilding plan and notified that Council that this stock had not made adequate progress toward rebuilding. The Council analyzed the best available information on Pribilof Island blue king crabs and fishery mortality and recommended additional conservations and management measures to rebuild the stock and prevent overfishing in accordance with section 304(e)(7) of the Magnuson-Stevens Act.

With the implementation of Amendment 103 to the BSAI FMP, all fishery management measures practicable have been taken to greatly eliminate Pribilof Island blue king crabs catch and protect Pribilof Island blue king crabs habitat. These measures are intended to promote adequate progress toward rebuilding.

Based on the best available information on the biology of the stock and environmental conditions, NMFS estimates that the time period to rebuild the stock will exceed 10 years, as allowed under section 304(e)(4)(A)(ii) of the Magnuson-Stevens Act. The causes of the Pribilof Islands blue king crab stock decline are thought to be predominantly due to environmental changes that inhibit blue king crab reproduction. For this stock to rebuild, the stock would likely require multiple years of above average recruitment and/or a change in environmental conditions to increase larval productivity around the Pribilof Islands. It is not possible to predict future recruitment success, however, changes in stock abundance are assessed in the annual Stock Assessment and Fishery Evaluation Report for the BSAI king and Tanner crab fisheries.

This is a framework rebuilding plan because the FMP defers to the State the authority to develop harvest strategies, with oversight by NMFS and the Council (see Section 3). The rebuilding plan utilizes the harvest strategy developed by ADF&G and adopted by the Alaska Board of Fisheries. The rebuilding harvest strategy closes the fishery until the stock is rebuilt. The stock will be considered "rebuilt" when the stock reaches B_{MSY} in two consecutive years. This harvest strategy should result in more spawning biomass as more larger male crab would be conserved and fewer juveniles and females would die due to incidental catch and discard mortality. This higher spawning biomass would be expected to produce good year-classes when environmental conditions are favorable.

Under this rebuilding plan, changes to the harvest strategy must: (1) comply with the existing criteria in the FMP and the national standard guidelines at 50 CFR 600.310(e), (2) be sufficient to rebuild the stock to the B_{MSY} level within a rebuilding time period that satisfies the requirements of section 304(e)(4)(A) of the Magnuson-Stevens Act, and (3) be consistent with applicable Federal law.

Habitat is thoroughly protected from fishing impacts by the existing Pribilof Islands Habitat Conservation Zone, which encompasses the majority of blue king crab habitat. The Pribilof Islands Habitat Conservation Zone was established to protect a majority of the crab habitat in the Pribilof Islands area based on the distribution and habitat of the blue king crab in the NMFS annual trawl surveys and on observer data.

Bycatch of blue king crab in both crab and groundfish fisheries is a negligible proportion of the total population abundance. On an annual basis, ADF&G also closes specific State statistical areas where Pribilof Island blue king crabs are known to occur during the Bristol Bay red king crab, snow crab, and Tanner crab fisheries to minimize blue king crab bycatch in those fisheries. NMFS has closed the Pribilof Islands Habitat Conservation Zone to trawl gear and to directed fishing for Pacific cod with pot gear. These measures greatly eliminate bycatch of Pribilof Island blue king crab and prevent overfishing.

NMFS has mechanisms in place for monitoring the effectiveness of the rebuilding plan. The NMFS eastern Bering Sea bottom-trawl survey provides an annual assessment of the status of the Pribilof Islands blue king crab stock. The surveys will allow the BSAI Crab Plan Team to include an assessment of the Pribilof Islands blue king crab stock status relative to the overfishing level and its progress towards the rebuilt level in the annual Stock Assessment and Fishery Evaluation Report for the BSAI king and Tanner crab fisheries.

2. St. Matthew blue king (*Paralithodes platypus*) crab

The SMBKC stock was declared overfished on October 22, 2018, because the estimated spawning biomass was below the minimum stock size threshold specified in the crab FMP. In order to comply with the MSA, a rebuilding plan was developed by the Council to be implemented prior to the start of the 2020/2021 fishing season, as required by the MSA in section 304(e). The rebuilding plan is consistent with the MSA and with NS1 Guidelines on time for rebuilding, specifically rebuilding within a time (T_{target}) that is as short as possible, taking into account the status and biology of any overfished stocks of fish, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock of fish with the marine ecosystems.

A projected time for rebuilding, taking into account the biology of the species and current environmental conditions, is 25.5 years. Through this FMP, the State of Alaska is delegated management of the SMBKC fishery the State sets preseason TACs and GHLs, and season or area closures when the TAC or GHL is reached. The State of Alaska's SMBKC harvest strategy is provided in the Alaska Administrative Code at 5 AAC 34.917 and that strategy applies during rebuilding. The State harvest strategy is more conservative than the FMP's control rule parameters for SMBKC because, under the harvest strategy, directed fishing is prohibited at or below a larger biomass level than under the F_{OFL} control rule. Throughout the rebuilding plan for SMBKC, several sources of information would be maintained to facilitate the determination of adequate progress.

The NMFS eastern Bering Sea bottom-trawl survey provides data for annual assessment of the status of crab stocks in the BSAI, including SMBKC, and would continue throughout rebuilding. The BSAI Crab Plan Team would report stock status and progress towards the rebuilt level in the Stock Assessment and Fishery Evaluation (SAFE) Report for the king and Tanner crab fisheries of the BSAI. Additionally, ADF&G and NMFS monitor directed fishery catch and bycatch of blue king crabs in other fisheries. ADF&G requires full observer coverage (100%) for both catcher vessels and catcher processors participating in the fishery. Observers monitor harvest at sea and landings by catcher vessels shoreside processors. ADF&G reports the total harvest from the commercial fishery and that report will be included annually in the SAFE. The contribution of the rebuilding plan to stock recovery would be additive to measures already in place that limit the effects of fishing activity on SMBKC. Measures are in place to protect habitat and reduce bycatch potential through prohibitions on nonpelagic trawl gear in the St. Matthew Island Habitat Conservation Area. Additionally, several other prohibitions and restrictions on commercial fishing gear are in place around and nearby St. Matthew Island.

The SMBKC stock has been in a low productivity phase since 1996 and population recovery will be greatly influenced by future environmental conditions. Despite existing protections and frequent fishery closures, the stock has remained in this low productivity phase. Projections of stock recovery incorporate ecosystem constraints on productivity by forecasting recruitment based on an empirically derived stock-recruit parameters.

3. Eastern Bering Sea snow crab (*Chionoecetes opilio*)

On October 19, 2021, NMFS determined and notified the Council that the Eastern Bering Sea (EBS) snow crab stock was overfished because the estimated mature male biomass is below the minimum stock size threshold specified in the crab fishery management plan (FMP). To comply section 304(e) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the Council developed a rebuilding plan to be implemented prior to the start of the 2023/2024 fishing season. The rebuilding plan is consistent with the MSA and with National Standard 1 (NS1) Guidelines on time for rebuilding. Specifically, rebuilding within a time (T_{target}) that is as short as possible, taking into account the status and biology of any overfished stocks, the needs of fishing communities, recommendations by international organizations in which the United States participates, and the interaction of the overfished stock with the marine ecosystems.

The projected target time for rebuilding, taking into account the biology of the species and current environmental conditions, is 6 years. Through the FMP, the State of Alaska is delegated management of the EBS snow crab fishery. The State sets a preseason TAC and (GHL, and announces season or area closures when the TAC or GHL is reached. The State of Alaska's EBS snow crab harvest strategy applies during rebuilding and is provided in the Alaska Administrative Code at 5 AAC 35.517. The State harvest strategy is more conservative than the FMP's control rule parameters for EBS snow crab because, under the harvest strategy, a higher level of biomass is required to open directed fishing than under the F_{OFL} control rule. Throughout the rebuilding plan for EBS snow crab, several sources of information would be maintained to facilitate the determination of adequate progress.

The NMFS eastern Bering Sea bottom-trawl survey provides data for annual assessment of the status of crab stocks in the BSAI, including EBS snow crab, and would continue throughout rebuilding. The BSAI Crab Plan Team would report stock status and progress towards the rebuilt level in the Stock Assessment and Fishery Evaluation (SAFE) Report for Eastern Bering Sea snow crab. Additionally, ADF&G and NMFS will continue to monitor directed fishery catch and bycatch of snow crabs in other fisheries. ADF&G requires full observer coverage (100%) for catcher processors and partial coverage (30%) for catcher vessels participating in the fishery. Observers monitor harvest at sea and landings by catcher vessels and shoreside processors. ADF&G reports the total harvest from the commercial fishery and that report will be included annually in the SAFE. The contribution of the rebuilding plan's assessment and monitoring to stock recovery would be additive to measures already in place that limit the effects of fishing activity on EBS snow crab.

The main driver in the speed of rebuilding is likely related to recruitment and the ecosystem conditions that allow for increased recruitment into the population. Uncertainty surrounding recruitment and mortality under current ecosystem conditions is expected to heavily influence the rate at which the stock is able to rebuild under the proposed projection parameters. Fishing mortality under the State's current harvest strategy is expected to have only insignificant or minimal impacts on the rate of rebuilding.

3.3 Category 1 Federal Management Measures Fixed By The FMP

3.3.1 Permit Requirements

Limitation Program as described in Section 3.3.2. and regulated by 50 CFR 679. Vessel moratorium permits are required through December 31, 1998, unless the moratorium is extended by the Council. Upon expiration of the vessel moratorium, an approved License Limitation Program, as described in Section 3.3.2. and regulated by 50 CFR 679, would require a Federal Crab License for vessels. As noted in Section 3.3.2, a Federal Crab License will be required on vessels participating in the BSAI king and Tanner crab fisheries. This FMP assumes that all crab fishermen are licensed and vessels are licensed and registered under the laws of the State, and as such, while fishing in the EEZ are subject to all State regulations that are consistent with the FMP, MSA, and other applicable Federal law. This assumption is based on the requirement of lending institutions and insurance companies that the crab vessels be registered with the State of Alaska and be able to enter State waters. If, in the future, vessels participate in the fishery without registering with the State, it is likely that a plan amendment will be required. State registered vessels are subject to enforcement sanctions issued pursuant to State procedures.

NMFS requires that vessel operators in the BSAI king and Tanner crab fisheries maintain a Federal logbook and delegates all other reporting requirements to the State. Vessel operators are required to record information on at sea discards of groundfish, Pacific herring, Pacific halibut, Pacific salmon, king crab, and Tanner crab in catcher vessel Federal Daily Fishing Logbooks (FDFLs) or catcher processor Daily Cumulative Production Logbooks (DCPLs).

3.3.2 Limited Access

3.3.2.1 Vessel License Limitation

A vessel license limitation program (LLP) was approved as Amendment 5 on September 12, 1997 and requires a Federal Crab License on harvesting vessels (including harvester/processors) participating in the BSAI King and Tanner Crab fisheries. Vessels fishing in State waters will be exempt, as will vessels $\leq$ **less than or equal to** 32'. The LLP will replace the vessel moratorium and will last until the Council replaces or rescinds the action. The crab CDQ portion of Amendment 5 became effective March 23, 1998. The crab CDQ program establishes the crab CDQ reserve and authorizes the State of Alaska to allocate the crab CDQ reserve among CDQ groups and to manage crab harvesting activity of the BSAI CDQ groups.

Beginning on January 1, 2000 a Federal Crab License is required on harvesting vessels (including harvester/processors) participating in the BSAI King and Tanner Crab fisheries. Vessels fishing in State waters will be exempt, as will vessels ≤ 32'. The LLP will replace the vessel moratorium and will last until the Council replaces or rescinds the action.

In addition to the original qualification requirements, a vessel must also have made a legal landing of any LLP crab species between January 1, 1996 and February 7, 1998 to qualify for a general license and the species/area endorsements earned under the original LLP qualification, with the following exemptions:

1. Vessels with only a Norton Sound red and blue summer king crab endorsement.
2. All vessels that are less than 60' LOA and are qualified under the original LLP.
3. Vessels that made landings in the BSAI crab fishery in 1998, on or before February 7, 1998, and for which the owner acquires license limitation rights from a vessel that meets the general qualification period (GQP) and endorsement qualification period (EQP) landing requirements.
4. A vessel that was lost or destroyed and which made a landing in the BSAI crab fishery at any time from the time when the vessel left the fishery through January 1, 2000. A vessel would be deemed to have met the recent participation criteria and would be granted a general license and all the species/area endorsements to which it was entitled under the original crab LLP.

Regarding the new provisions above, the recent landings requirement applies to each potentially qualified vessel. Further, the acquisition of any qualifying history, or entering into a contract for such acquisition, must have occurred by 8:36 a.m. Pacific time on October 10, 1998.

These provisions do not preclude a vessel owner from combining catch histories to accommodate the recency requirements so long as these histories were acquired prior to 8:36 a.m. Pacific time on October 10, 1998.

3.3.2.1.1 Elements of the License Limitation Program

1. Nature of Licenses. General crab licenses will be issued for BSAI king and Tanner crab fisheries covered under the FMP, with the following species/area endorsements:
    a. Pribilof red and Pribilof blue king crab
    b. *C. opilio* and *C. bairdi*
    c. St. Matthew blue king crab
    d. Adak brown king crab
    e. Adak red king crab
    f. Bristol Bay red king crab
    g. Norton Sound red and Norton Sound blue summer king crab

    Species/area combinations not listed above may be fished by any vessel that holds a valid Federal crab license regardless of the endorsements attached to the license, if those fisheries are open and the vessel meets all other State and Federal regulatory requirements.

2. License Recipients. Licenses will be issued to current owners (as of June 17, 1995) of qualified vessels, except in the Norton Sound summer red and blue king crab fisheries. Licenses for these fisheries would be issued to:
    a. Individuals who held a State of Alaska Permit for the Norton Sound summer king crab fisheries and made at least one landing; or
    b. Vessel owners as of June 17, 1995 in instances where a vessel was corporate owned, but operated by a skipper who was a temporary contract employee.

    The owners as of this date must be "persons eligible to document a fishing vessel" under Chapter 121, Title 46, U.S.C. In cases where the vessel was sold on or before June 17, 1995, and the disposition of

the license qualification history was not mentioned in the contract, the license qualification history would go with the vessel. If the transfer occurred after June 17, 1995, the license qualification history would stay with the seller of the vessel unless the contract specified otherwise.

3. License Designations. Licenses and endorsements will be designated as Catcher Vessel or Catcher Processor and with one of three vessel length classes (<60', ≥60' but < 125', or ≥ 125' LOA).

4. Who May Purchase Licenses. Licenses may be transferred only to "persons" defined as those "eligible to document a fishing vessel" under Chapter 121, Title 46, U.S.C. Licenses may not be leased.

5. Vessel/License Linkages. Licenses may be transferred without a vessel, i.e., licenses may be applied to vessels other than the one to which the license was initially issued. However, the new vessel is still subject to the license designations, vessel upgrade provisions, 20% upgrade rule (defined in provision seven) , and the no leasing provision. Licenses may be applied to vessels shorter than the "maximum LOA" regardless of the length of the vessel class designations. Vessels may also use catcher processor licenses on catcher vessels. However, the reverse is not allowed. It was the Council's intent that vessels be allowed to "downgrade".

6. Separability of General Licenses and Endorsements. General licenses may be issued for the Bering Sea /Aleutian Islands groundfish, Gulf of Alaska groundfish, and Bering Sea /Aleutian Islands crab fisheries. Those general licenses initially issued to a person based on a particular vessel's catch history are not separable and shall remain as a single "package", except that a BSAI general crab license may be separated solely for the purposes of a crab license buyback program if such is approved by the Council and Secretary. General licenses transferred after initial allocation shall remain separate "packages" in the form they were initially issued, and will not be combined with other general groundfish or crab licenses the person may own. Species/area endorsements are not separable from the general license they are initially issued under, and shall remain as a single "package," which includes the assigned catcher vessel/catcher processor and length designations.

7. Vessel Replacements and Upgrades. Vessels may be replaced or upgraded within the bounds of the vessel length designations and the "20% rule". This rule was originally defined for the vessel moratorium program. The maximum length over all (MLOA) with respect to a vessel means the greatest LOA of that vessel or its replacement that may qualify it to conduct directed fishing for groundfish covered under the license program, except as provided at §676.4(d). The MLOA of a vessel with license qualification will be determined by the Regional Director as follows:

    a. For a vessel with license qualification that is less than 125' LOA, the maximum LOA will be equal to 1.2 times the vessel's original qualifying length or 125', whichever is less; and

    b. For a vessel with license qualification that is equal to or greater than 125', the maximum LOA will be equal to the vessel's original qualifying length.

    If a vessel upgrades under the "20% rule" to a length which falls into a larger license length designation after June 17, 1995, then the vessel owner would be initially allocated a license and endorsement(s) based on the vessels June 17, 1995 length. Those licenses and endorsements could not be used on the qualifying vessel, and the owner would be required to obtain a license for that vessel's designation before it could be fished. Vessels in the Norton Sound summer king

crab fisheries may upgrade more than 20% (as defined in the 20% rule) so long as the vessel does not exceed 32' LOA after the upgrade is complete.

8. License Ownership Caps. No more than five general crab licenses may be purchased or controlled by a "person," with grandfather rights to those persons who exceed this limit in the initial allocation. Persons with grandfather rights from the initial allocation must be under the five general license cap before they will be allowed to purchase any additional licenses. A "person" is defined as those eligible to document a fishing vessel under Chapter 121, Title 46, U.S.C. For corporations, the cap would apply to the corporation and not to share holders within the corporation.

9. Vessel License Use Caps. There is no limit on the number of licenses (or endorsements) which may be used on a vessel.

10. Changing Vessel Designations. If a vessel qualifies as a catcher processor, it may select a one time (permanent) conversion to a catcher vessel designation.

11. Implement a Skipper Reporting System. NMFS will implement a skipper reporting system which requires crab license holders to report skipper names, addresses, and service records.

12. CDQ Vessel Exemption. Vessels < 125' obtained under an approved CDQ plan to participate in both CDQ and non-CDQ target fisheries, will be allowed to continue to fish both fisheries without a license, provided such vessel was under construction or operating in an existing CDP as of October 9, 1998. If the vessel is sold outside the CDQ plan, the vessel will no longer be exempt from the rules of the crab license program.

13. Lost Vessels. Vessels which qualified for the moratorium and were lost, damaged, or otherwise out of the fishery due to factors beyond the control of the owner and which were replaced or otherwise reentered the fishery in accordance with the moratorium rules, and which made a landing any time between the time the vessel left the fishery and June 17, 1995, will be qualified for a general license and endorsement for that species/area combination.

14. Licenses Represent a use Privilege. The Council may alter or rescind this program without compensation to license holders; further, licenses may be suspended or revoked for (serious and/or multiple) violations of fisheries regulations.

3.3.2.1.2 CDQ Allocation

CDQs will be issued for 7.5% of all BSAI crab fisheries that have a Guideline Harvest Level set by the State of Alaska. The program will be patterned after the pollock CDQ program (defined in the BSAI groundfish FMP), but will not contain a sunset provision. Also, Akutan will be included in the list of eligible CDQ communities.

3.3.3 Superexclusive Registration in Norton Sound

This FMP establishes the Norton Sound Section of the Northern District of the king crab fishery as a superexclusive registration area. Any vessel registered and participating in this fishery would not be able to participate in other BSAI red and blue king crab fisheries, such as Adak, Bristol Bay, Pribilof, or St. Matthew, during that registration year. The Norton Sound fishery is the only superexclusive registration area authorized by this FMP.

3.3.4 American Fisheries Act (AFA) sideboard restrictions

On October 21, 1998, the President signed into law the American Fisheries Act (AFA) which mandated sweeping changes to the conservation and management program for the pollock fishery of the BSAI and to a lesser extent, affected the management programs for the other groundfish fisheries of the BSAI the groundfish fisheries of the GOA, the king and Tanner crab fisheries of the BSAI, and the scallop fishery off Alaska. With respect to the fisheries off Alaska, the AFA requires a suite of new management measures that fall into four general categories: (1) regulations that limit access into the fishing and processing sectors of the BSAI pollock fishery and that allocate pollock to such sectors, (2) regulations governing the formation and operation of fishery cooperatives in the BSAI pollock fishery, (3) sideboard regulations to protect other fisheries from spillover effects from the AFA, and (4) regulations governing catch measurement and monitoring in the BSAI pollock fishery.

While the AFA primarily affects the management of the BSAI pollock fishery, the Council is also directed to develop and recommend harvesting and processing sideboard restrictions for AFA catcher vessels, AFA catcher/processors, AFA motherships, and AFA inshore processors that are fishing for or processing king and Tanner crab harvested in the BSAI. Section 211 of the AFA addresses crab harvesting and processing sideboards and this entire section of the AFA is incorporated into the AFA by reference. Crab harvesting and processing sideboard restrictions that are consistent with section 211 of the AFA will be implemented through regulation or provided to the Board of Fish as recommendations. Any measure recommended by the Council that supersedes section 211 of the AFA must be implemented by FMP amendment in accordance with the provisions of section 213 of the AFA and the Magnuson-Stevens Act.

Limits on participation by AFA vessels. NMFS may issue regulations, as approved by the Council, which define the participation criteria for AFA vessels that wish to participate in the king and/or Tanner crab fisheries of the BSAI.

3.3.5 Legal Gear

Trawls and tangle nets are specifically prohibited because of the high mortality rates which they inflict on nonlegal crab. Specification of legal gear is important to attainment of the biological conservation and economic and social objectives of this FMP.

3.3.6 Essential Fish Habitat and Areas of Particular Concern

3.3.6.1 Description of Essential Fish Habitat

Section 303(a)(7) of the MSA requires FMPs to describe and identify Essential Fish Habitat (EFH), minimize to the extent practicable adverse effects of fishing on EFH, and identify other actions to conserve and enhance EFH. This FMP describes king and tanner crab EFH in text, maps EFH distributions, and includes information on habitat and biological requirements for each life history stage of the species. Appendix D contains this required information, as well as identifying an EFH research approach.

3.3.6.2 Description of Habitat Areas of Particular Concern

The EFH regulations at 50 CFR 600.815(a)(8) provide the Councils with guidance to identify habitat areas of particular concern (HAPCs). HAPCs are meant to provide greater focus to conservation and management efforts and may require additional protection from adverse effects. FMPs should identify specific types or areas of habitat within EFH as HAPCs based on one or more of the following considerations:

1. the importance of the ecological function provided by the habitat;
2. the extent to which the habitat is sensitive to human-induced environmental degradation;
3. whether, and to what extent, development activities are, or will be, stressing the habitat type; or
4. the rarity of the habitat type.

Proposed HAPCs, identified on a map, must meet at least two of the four considerations established in 50 CFR 600.815(a)(8), and rarity of the habitat is a mandatory criterion. HAPCs may be developed to address identified problems for FMP species, and they must meet clear, specific, adaptive management objectives.

The Council will initiate the HAPC process by setting priorities and issuing a request for HAPC proposals. Any member of the public may submit a HAPC proposal. HAPC proposals may be solicited every 5 years, to coincide with the EFH 5-year review, or may be initiated at any time by the Council. The Council will establish a process to review the proposals. The Council may periodically review existing HAPCs for efficacy and considerations based on scientific research.

In 2005, the Council identified the following areas as HAPCs within EFH:

- Alaska Seamount Habitat Protection Areas
- Bowers Ridge Habitat Conservation Zone

Maps of these HAPCs, as well as their coordinates, are contained in Appendix D.

3.3.6.3 Conservation and Enhancement Recommendations for EFH and HAPC

Appendix D identifies fishing and non-fishing threats to EFH. Conservation and enhancement recommendations for non-fishing threats to EFH and HAPCs are described therein.

In order to protect EFH from fishing threats, the Council established the following areas (maps of these areas, as well as their coordinates, are contained in Appendix D:

- Aleutian Islands Habitat Conservation Area
- Aleutian Islands Coral Habitat Protection Areas
- Alaska Seamount Habitat Protection Areas
- Bowers ridge habitat conservation zone

In order to minimize adverse effects of fishing, the Council established restrictions for the EFH conservation areas and HAPCs. These restrictions are described below.

Aleutian Islands Habitat Conservation Area
The use of nonpelagic trawl gear is prohibited year-round in the Aleutian Islands Habitat Conservation Area, except in designated areas; however, the use of trawl gear is prohibited in the king and tanner crab fisheries (see Section 3.3.1).

Aleutian Islands Coral Habitat Protection Areas
The use of bottom contact gear, as described in 50 CFR part 679, and anchoring by federally permitted fishing vessels is prohibited in the Aleutian Islands Coral Habitat Protection Areas.

Alaska Seamount Habitat Protection Areas
The use of bottom contact gear and anchoring by a federally permitted fishing vessel, as described in 50 CFR part 679, is prohibited in the Alaska Seamount Habitat Protection Area. Anchoring by a federally permitted fishing vessel, as described in 50 CFR part 679, is also prohibited.

Bowers Ridge Habitat Conservation Zone
The use of mobile bottom contact gear, as described in 50 CFR part 679, is prohibited in the Bowers Ridge Habitat Conservation Zone.

3.3.6.4 Review of EFH and HAPC

An annual review of existing and new EFH information will be conducted by NMFS or the Council and this information will be provided to the Crab Plan Team for their review during the annual SAFE process. To address regulatory guidelines for review and revision of EFH FMP components, the Council will

conduct a complete review of all the EFH components of the FMP once every 5 years and will amend the FMP as appropriate to include new information.

Additionally, the Council may solicit proposals for HAPCs and/or conservation and enhancement measures to minimize the potential adverse effects of fishing. Any proposal endorsed by the Council would be implemented by FMP amendment. HAPC proposals may be solicited every 5 years, coinciding with the EFH 5-year review, or may be initiated at any time by the Council

3.3.7 Federal Observer Requirements

Any vessel fishing for king or Tanner crab, and/or processing king crab or Tanner crab within the BSAI area, shall be required to take aboard an observer, when so requested by the Director, Alaska Region, NMFS. Such an observer requirement may be imposed, notwithstanding the existence of a State mandated observer program for State registered vessels. To the maximum extent practicable, the Regional Administrator will coordinate any Federal observer program with that required by the State.

Observers are necessary aboard some crab fishing and/or processing vessels to obtain needed information such as catch per unit of effort (CPUE), species composition, sex composition, size composition of the catch, proportion of soft-shell crab being handled, and other information required to manage the crab stocks in the BSAI area.

Observer requirements are important to attainment of the biological conservation and research and management objectives of this FMP.

3.4 BSAI Crab Rationalization Program

The Council developed a "voluntary three pie cooperative" program intended to protect the interests of the BSAI crab harvest sector, the processing sector, and defined regions and communities. Allocations of harvesting and processing privileges under the program are based on historic participation to protect investment in and reliance on the program fisheries.

There are nine crab fisheries in the BSAI rationalized under the program,[2] specifically:

1. Bristol Bay red king crab
2. Bering Sea snow crab (C. opilio)
3. Eastern Bering Sea Tanner crab (C. bairdi) – East of 166º W longitude
4. Western Bering Sea Tanner crab (C. bairdi) – West of 166º W longitude
5. Pribilof Islands blue and red king crab
6. Saint Matthew Island blue king crab
7. Western Aleutian Islands (Adak) golden king crab – West of 174º W longitude
8. Eastern Aleutian Islands (Dutch Harbor) golden king crab – East of 174º W longitude
9. Western Aleutian Islands (Petrol Bank District) red king crab – West of 179º W longitude

The Eastern Aleutian Island *C. bairdi*, Western Aleutian Island Tanner crab, Dutch Harbor red king crab, Western Aleutian Island red king crab located east of 179° West longitude, and the Norton Sound red king crab stocks were excluded from the rationalization program. When the CR program was

[2] Some crab fisheries are considered one unit stock for assessment purposes, but are managed as more than one fishery. For example, Eastern and Western Aleutian Islands golden king crab are assessed as one stock, but are managed as distinct fisheries with separate TACs. There are 10 stocks assessment conducted for the BSAI crab fisheries: Eastern Bering Sea *C. opilio*, Bristol Bay red king crab, Eastern Bering Sea Tanner crab, Pribilof Islands red king crab, Pribilof District blue king crab, Saint Matthew blue king crab, Norton Sound red king crab (not rationalized), Aleutian Islands golden king crab (not fully rationalized), Pribilof Islands golden king crab (not rationalized), and Western Aleutian Islands red king crab.

implemented in 2005, the Eastern Bering Sea *C. bairdi* crab fishery and Western Bering Sea *C. bairdi* crab fishery were one fishery for management purposes. [3]

The Council designed the CR program as a "voluntary three pie cooperative" program, with elements built in to address interests of the harvesters, processors, and the communities dependent upon crab fisheries. The primary elements of the voluntary three pie cooperative CR program are:

1. Total allowable catch (TAC)
2. Harvesting sector elements including Crew shares
3. Processing sector elements
4. Regionalization elements
5. Binding arbitration system
6. Cooperatives
7. Community Development Quota and Adak allocations
8. Observer Requirements
9. Sideboards
10. Economic data collection program
11. Federal Cost Recovery Program

Following the implementation of the CR program, a formal program review took place at the first Council Meeting in the 5th year after implementation to objectively measure the success of the program, including benefits and impacts to harvesters (including vessel owners, skippers and crew), processors and communities by addressing concerns, goals and objectives identified in the CR problem statement and the Magnuson-Stevens Act standards. This review included an analysis of post-rationalization impacts to coastal communities, harvesters and processors in terms of economic impacts and options for mitigating those impacts. In 2019, the Council specified that subsequent program reviews are required every 7 years, in alignment with the requirement in the Magnuson-Stevens Act (303A(c)(G)).

The remainder of this section describes each of these program elements.

3.4.1 Total Allowable Catch

Each program fishery is managed with a TAC, which sets a specific catch limit, instead of a GHL. To discourage harvesters from exceeding the TAC in a program fishery, any overharvest of an allocation is a violation. Although penalties are at the discretion of NOAA Office of Law Enforcement and NOAA General Counsel, the Council has recommended that all overages be subject to forfeiture and that additional penalties be imposed only for overages in excess of 3% of a harvester's shares at the time of landing. Once the TAC is set for the fishery, 10% of this amount is available for the Community Development Program (CDQ) Program or Adak Community Allocation (in the Western Aleutian Islands golden king crab fishery) and 90% of the TAC is converted into IFQ for harvest under the CR Program.

Amendment 28 amended the program to allow post-delivery transfers of IFQ. This amendment was intended to improve the flexibility to the fleet, reduce the number of violations for overages, reduce enforcement costs, and allow more complete harvest of crab allocations without exceeding the overall TAC.

3.4.2 Harvesting Sector Elements

Harvesting quota shares (QS) were created in each crab fishery under the CR Program. QS are a revocable privilege and not a property right. QS allows the holder to harvest a specific percentage of the annual TAC in a program fishery.

[3] Both Eastern and Western Bering Sea Tanner crab fisheries are part of the "Eastern Bering Sea Tanner crab" stock. This stock was further divided into an Eastern and Western fishery through Amendment 20 in an effort to reduce localized depletion.

Crab QS are designated as either catcher vessel QS or catcher processor (CP) QS, depending on whether the vessel that created the privilege processed the qualifying landings on board. Approximately 97% of the QS in each program fishery is referred to as "owner QS". The remaining 3% of the QS is referred to as "C shares" or "crew QS". These types of harvesting QS were initially allocated based on different criteria described below.

3.4.2.1 Owner QS/IFQ Allocation

To be eligible for an initial allocation of owner QS in a program fishery a harvester must have a valid, permanent, fully transferable License Limitation Program (LLP) license endorsed for the fishery.

QS can be assigned for any of the participating fisheries (S3.4.2ection 3.8.2.), and separate QS can be assigned for fisheries that are considered one unit stock for assessment purposes but are managed as more than one fishery. For example golden king crab can be split into Eastern Aleutian Islands golden king crab located east of 174° W long and Western Aleutian Islands golden king crab west of 174° W longitude, and Tanner crab whereby Eastern *C. bairdi* crab are located east of 166° W longitude and Western *C. bairdi* crab west of 166° W longitude.

- Calculation of QS distribution: A harvester's allocation of initial QS in a fishery will be based on landings in that fishery, excluding landings of deadloss.

  The calculation is to be done, on a vessel-by-vessel basis, as a percent of the total catch, year-by-year during the qualifying period. Then the sum of the yearly percentages, on a fishery-by-fishery basis, is to be divided by the number of qualifying years included in the qualifying period on a fishery-by-fishery basis to derive a vessel's QS.

  Each allocation was the harvester's average annual portion of the total qualified catch during a specific qualifying period. Initial allocation was based on qualifying periods during historical participation and recent participation.

  For each of the fisheries for which such a vessel holds valid endorsement for any years between the sinking of the vessel and the entry of the Amendment 10 replacement vessel to the fishery and was active as of June 10, 2002, allocate QS according to 50% of the vessel's average history for the qualifying years unaffected by the sinking.

    Additional Sunken Vessel Provision: The following provision would apply to persons whose eligibility to replace their vessel was initially denied under PL 106-554. The sunken vessel must have been replaced with a newly constructed vessel and have been under construction by June 10, 2002, and participated in a Bering Sea crab fishery by October 31, 2002 for a person to receive a benefit under this provision.

    For each of the fisheries for which such a vessel holds a valid endorsement , for all seasons between the sinking of the vessel and the entry of the replacement vessel to the fishery within the IRS replacement period (as extended by the IRS, if applicable) allocate QS according to 50 percent of the vessel's average history for the qualifying years unaffected by the sinking. Construction means the keel has been laid.

- Basis for QS distribution: For eligibility criteria, the distribution of QS to the LLP license holder shall be based on the catch history of the vessel on which the LLP license is based and shall be on a fishery-by-fishery basis. The underlying principle of this program is one history per vessel:

In cases where the fishing privileges (i.e. moratorium qualification or LLP license) of an LLP qualifying (i.e. GQP, EQP, RPP and Amendment 10 combination) vessel have been transferred, the distribution of QS to the LLP shall be based on the aggregate catch histories of (1) the vessel on which LLP license was based up to the date of transfer, and (2) the vessel owned or controlled by the LLP license holder and identified by the license holder as having been operated under the fishing privileges of the LLP qualifying

vessel after the date of transfer. Only one catch history per LLP license. The only catch histories that may be credited by transfer under this suboption are the individual catch histories of vessels that generate a valid permanent fully transferable LLP license.

- Qualifying Periods for determination of the QS Distribution: The periods for each stock are detailed below:
    - Opilio (EBS snow crab): the 4 seasons with the greatest total legal landings between 1996 - 2000 (5 seasons)
    - Bristol Bay red king crab: the 4 seasons with the greatest total legal landings between 1996 - 2000 (5 seasons)
    - Bairdi (EBS *C. bairdi*): the 4 seasons with the greatest total legal landings between 1991/92 - 1996 (6 seasons)
    - Pribilof red and blue king crab: the 4 seasons with the greatest total legal landings between 1994 - 1998 (5 seasons)
    - St. Matthew blue king crab: the 4 seasons with the greatest total legal landings between 1994 - 1998 (5 seasons)
    - Golden king crab (based on biological seasons)[4]: 1996/97 - 2000/01 (all 5 seasons)
    - Adak red king crab - west of 179° West long.: the 3 seasons with the greatest total legal landings between 1992/1993 – 1995/1996 (4 seasons)

3.4.2.2 Categories of QS/ IFQ

Sector Categories: Owner QS are designated as either catcher vessel QS or CP QS, depending on whether the vessel that created the privilege processed the qualifying landings on board. This shall confer the right to harvest and process crab aboard a catcher processor in accordance with Section 3.4.2.

Regional Categories: QS/IFQs for the CV sector may be assigned to the following regional categories[5]:

North Region - All areas on the Bering Sea north of 56° 20' N. Latitude.

South Region - All areas not included in the North Region.

Western and Eastern regions - Regional categories for deliveries of Aleutian Islands golden king crab are split into a "Western" (west of 174° West long.) and "Eastern" (east of 174° West long.) area. Fifty percent of the Western AI IPQ golden king crab QS shall be processed in the Western AI region.

Further description of regional share designation can be found in Section 3.4.2.2.

QS Class Categories: The corresponding annual allocations, which are expressed in pounds, are referred to as individual fishing quota (IFQ) are calculated using the TAC. The size of each annual IFQ allocation is based on the amount of QS held in relation to the QS pool in a program fishery — a person holding 1% of the QS pool receives IFQ to harvest 1 % of the annual TAC in the fishery. IFQ TACs do not include pounds that have been set aside for the CDQ program. All crab that is sold or kept for personal use, and all deadloss is debited against the IFQ account of the allocation holder. Legal discards, however, are not counted against an IFQ holder's account.[6]

4 There is no prohibition against sorting crab at the rail, and it is common practice to discard females or sub-legal sized crab immediately after the pot is brought on board. While not debited from an individual account, discard mortality is estimated from observer data and factored into the total removals necessary for stock assessments.

5 Regional categorization does not apply to Tanner crab, C. bairdi fishery. Additionally, in the Western Aleutian Island (Adak) golden king crab fishery, the designation is based on an east/west line to accommodate a different distribution of activity in that fishery.

6 There is no prohibition against sorting crab at the rail, and it is common practice to discard females or sub-legal sized crab immediately after the pot is brought on board. While not debited from an individual account, discard mortality is estimated from observer data and factored into the total removals necessary for stock assessments.

Catcher vessel owner IFQ are issued in two processor delivery classes Class A IFQ and Class B IFQ. Crab harvested using Class A IFQ must be delivered to a processor holding unused individual processing quota (IPQ). In addition, Class A IFQ are subject to regional share designations, whereby harvests are required to be delivered within an identified region.[7] The delivery restrictions of Class A IFQ are intended to add stability to the processing sector by protecting processor investment in program fisheries and to preserve the historic distribution of landings and processing between regions.

Crab harvested using Class B IFQ can be delivered to any processor that is a registered crab receiver (except a CP) regardless of whether the processor holds unused IPQ. In addition, Class B IFQ are not regionally designated. The absence of delivery restrictions on a portion of the catch is intended to provide harvesters with additional market leverage for negotiating prices for landings of crab.

The determination of whether and how much Class B versus Class A catcher vessel owner IFQ a person receives is determined by their association with processor quota share (PQS) holdings. If a person holds (or has equity in) both IPQ and IFQ, than that person will be issued Class A IFQ only for the amount of IFQ equal to the amount of IPQ held by that person. Any remaining IFQ held by that person will be issued as Class A and Class B IFQ in a ratio so that the total Class A and Class B IFQ issued in that crab QS fishery is issued as 90% Class A IFQ and 10% Class B IFQ. Consequently, Class B IFQ are allocated to a harvester only to the extent that the QS held by the harvester exceeds the amount of PQS held by that harvester and its affiliates.

If a CVO QS holder has no affiliation with PQS, they are issued Class A and Class B IFQ in a 90:10 ratio, respectively. The absence of an affiliation with a holder of processing shares is established by a QS holder filing an annual affidavit identifying any PQS holdings or affiliations with PQS holders.

3.4.2.3 Transferring and Leasing QS/IFQ

Transfer of QS/ IFQ: QS and IFQ are transferrable under the program, subject to limits on the amount of shares a person may own or use. Persons eligible to receive QS/IFQs by transfer must be either:

1. A US citizen who has spent 150 days of sea time, defined as participating in any of the U.S. commercial fisheries in a harvesting capacity.
2. Entities that have a U.S. citizen with 20% or more ownership and at least 150 days of sea time and, and the corporation is at least 75% U.S. owned.

Initial recipients of harvesting QS are grandfathered in.

CDQ organizations are exempt from the restriction for the 150 days of sea time requirement Initial recipients of QS and CDQ groups are exempt from these eligibility criteria. The A/B share component of QS will be linked for purposes of transfers.

Amendment 28 permitted IFQ transfers have been allowed post-delivery to remedy a harvest overage.
Leasing of QS/ IFQ: Leasing of QS is equivalent to the sale of IFQs without the accompanying QS. Leasing is defined as the use of IFQ on a vessel in which the owner of the underlying QS holds less than a 10% ownership interest and on which the underlying QS holder is not present.

Leasing QS is allowed with no restrictions during the first five years after program implementation. IFQ may be leased (i.e., transferred) after a delivery to cover any potential overages, provided that the IFQ account of the person conducting the lease has a positive balance before starting a fishing trip and at least a zero balance by June 30, the end of the crab fishing year.

[7] The EBT and WBT Tanner crab QS, and a portion of the WAG golden king crab QS, are considered undesignated because they do not carry a regional landing designation.

3.4.2.4 QS Ownership Caps

Individual use caps are imposed on the use and holdings of harvest shares by any person in order to prevent excessive consolidation of shares under the program.[8] Different caps apply to owner share holdings and C share holdings. Separate and distinct QS ownership caps apply to all harvesting QS categories pertaining to a given crab fishery with the following provisions:

1. Initial issuees that exceed the ownership cap are grandfathered at their current level as of June 10, 2002; including transfers by contract entered into as of that date.
2. Apply individually and collectively to all QS holders in each crab fishery;
3. A person may not hold QS in excess of the amount specified as follows:
    - 1.0% of the total QS pool for Bristol Bay red king crab.
    - 1.0% of the total QS pool for Opilio crab.
    - 1.0% of the total QS pool for Eastern Bairdi crab.
    - 1.0% of the total QS pool for Western Bairdi crab.
    - 2.0% of the total QS pool for Pribilof red and blue king crab.
    - 2.0% of the total QS pool for St. Matthew blue king crab.
    - 10% of the total QS pool for Eastern Aleutian Islands golden king crab
    - 10% of the total QS pool for Western Aleutian Islands golden king crab
    - 10% of the total QS pool for Western Aleutian Islands red king crab west of 179º West longitude.

Any CR Program holdings by CDQ groups, who each represent the interests of one or more BSAI communities, are subject to higher caps. A "grandfather" provision exempted persons who received an initial allocation of QS in excess of the cap. The following ownership caps shall apply to CDQ ownership of crab QS:

- **Bristol Bay red king crab: 5%**
- **Bering Sea opilio crab: 5%**
- **Eastern Bering Sea bairdi crab 5%**
- **Western Bering Sea bairdi crab 5%**
- **Pribilof red and blue king crab 10%**
- **St. Matthew blue king crab 10%**
- **Aleutian Islands golden king crab 20%**
- **Western Aleutian Islands red king crab 20%**
- **Western Aleutian Islands golden king crab 20%**

The Council shall apply the individual and collective rule for calculation of the CDQ ownership caps, under which the holder of an interest in an entity will be credited with holdings in proportion to its interest in the entity.

To protect independent vessel owners and processors that are not vertically integrated, processor quota share (PQS) holdings are also limited by caps on vertical integration.

PQS shareholders have a cap of 5% with grandfathering of initial allocations as of June 10, 2002, including transfers by contract entered into as of that date. Additionally, vertical integration ownership caps on processors shall be implemented using both the individual and collective rule using 10% minimum ownership standards for inclusion in calculating the cap. PQS ownership caps are at the company level. The 5 percent cap on QS holdings by processors shall exempt only the primary corporate

[8] In other catch share programs (e.g. the halibut sablefish IFQ program) individual use caps are called "QS use caps". They are also sometimes referred to as "ownership caps".

processing entity from more restrictive generally applicable caps on QS holdings. All individuals and subsidiaries will be subject to the general caps on QS holdings.

Processor Holdings of Harvest Shares (A/B Share Issue)

Crab harvester QS held by IPQ processors and persons affiliated with IPQ processors will only generate class A annual IFQ, so long as such QS is held by the IPQ processor or processor affiliate.

IPQ processors and affiliates will receive class A IFQ at the full poundage appropriate to their harvesters QS percentage.

Independent (non-affiliated) harvesters will receive class B IFQ pro rata, such that the full class B QS percentage is allocated to them in the aggregate.

"Affiliation" will be determined based on an annual affidavit submitted by each QS holder. A person will be considered affiliated, if an IPQ processor controls delivery of a QS holder's IFQ.

3.4.2.5 Catcher Processor Elements

CPs shall be granted CP QS in the same manner as catcher vessels. CP QS represents a revocable privilege to harvest and process a certain percentage of the crab species TAC.

Allowance for CPs:

- CPs are allowed to purchase additional PQS from shore based processors as well as PQS from other CPs as long as the crab is processed within 3 miles of shore in the designated region.
- CPs may sell unprocessed crab to any processor
- Only CPs that both caught and processed crab onboard their qualifying vessels in any BSAI crab fishery during 1998 or 1999 will be eligible for any CP QS in any IFQ or Coop program.
- CP-QS initially issued to a CP shall not be regionally or community designated.
- The CP sector is capped at the aggregate level of initial sector-wide allocation.
    A. The CP sector-wide cap applies only to CP shares and not to the use or ownership of processing shares by CPs.
    B. CP shares cannot be created by combining the processing privilege of PQS or IPQs with the harvest privilege of Class A QS or IFQs.
    C. The CP sector-wide cap applies only to CP shares and not to the use or ownership of CV harvest shares by CPs.
- CPs shall be allowed to sell CP/QS as separate Catcher Vessel QS and PQS. The shares shall be regionally designated when sold (both shares to same region).
- Processing shares allocated to CPs would be regionally designated based on the historic area of processing. State records of processing activity should be adequate for determining the location of processing activity.

CP versus floating processor definition: A CP must be defined for purposes of applying the restriction on deliveries of B shares to CPs. In a share based program, definition of this sector can be problematic because vessels used as CPs have also been used as floating processors. The Council clarified that for purposes of implementing this provision, a vessel that takes deliveries of crab harvested with Class B shares would be considered a floating processor for the duration of the season and would be prohibited from operating as a CP during that season. Likewise, a vessel that operates as a CP during a season would be prohibited from taking delivery of crab harvested with Class B shares during that season.

Conversion to CP Shares.

1. This amendment authorizes:
    A. an eligible entity holding PQS to elect on an annual basis to work together with other entities holding PQS and affiliated with such eligible entity through common ownership

to combine any CV QS for the Northern Region with their processor quota shares and to exchange them for newly created CP owner QS for the Northern Region; and

B. an eligible entity holding CV QS to elect on an annual basis to work together with other entities holding CV QS and affiliated with such eligible entity through common ownership to combine any processor quota shares for the Northern Region with their CV QS and to exchange them for newly created CP owner QS for the Northern Region.

2. Eligibility and Limitations.

A. The authority provided in paragraph (1)(A) shall

i. (I) apply only to an entity which was initially awarded both CP owner QS, and PQS under the plan (in combination with the PQS of its commonly owned affiliates) of less than 7 % of the BSAI PQS; or

(II) apply only to an entity which was initially awarded both catcher/processor owner quota shares under the plan and processor quota shares under section 417(a) of the Coast Guard and Maritime Transportation Act of 2006 (Public Law 109–241;120 Stat. 546);

ii. be limited to PQS initially awarded to such entities and their commonly owned affiliates under the plan or section 417(a) of that Act; and

iii. shall not exceed 1 million pounds per entity during any calendar year.

B. The authority provided in paragraph (1)(B) shall

i. apply only to an entity which was initially awarded both CP owner QS, and PQS under the plan (in combination with the PQS of its commonly owned affiliates) of more than 7 % of the BSAI PQS;

ii. be limited to CV QS initially awarded to such entity and its commonly owned affiliates; and

iii. shall not exceed 1 million pounds per entity during any calendar year.

3. Exchange Rate. The entities referred to in paragraph (1) shall receive under the amendment 1 unit of newly created CP owner QS in exchange for 1 unit of CV owner QS and 0.9 units of PQS.

4. Area of Validity. Each unit of newly created CP owner QS under this subsection shall only be valid for the Northern Region.

3.4.2.6 Crew Quota Shares and Allocation

To protect captains' historical interests in the program fisheries, a portion of the initial allocation of QS were issued to eligible captains and made available for transfer to active captains and crew.

1. Percentage to Captain:

An initial allocation of 3% of the annual TAC for each crab fishery included in the rationalization program shall be awarded to qualified captains as C shares and allocated as IFQ to holders of C share QS. These shares were issued at the species level, as with owner QS.

2. Eligibility

A qualified captain is determined on a fishery by fishery basis by:

1. having at least one landing in 3 of the qualifying years used by the vessels and

2. having recent participation in the fishery as defined by at least one landing per season in the fishery in two of the last three seasons prior to June 10, 2002.

3. For recency in the Adak red king, Pribilof, St. Matthew, and bairdi fisheries a qualified captain must have at least one landing per season in the opilio, BBRKC, or AI golden crab fisheries in two of the last three seasons prior to June 10, 2002 (operators of vessels under 60 feet are exempt from this requirement for the Pribilof red and blue king crab fishery).

A captain is defined as the individual named on the Commercial Fishery Entry Permit.

For captains who died from fishing-related incidents, recency requirements shall be waived and the allocation shall be made to the estate of that captain. All ownership, use, and transfer requirements would apply to C shares awarded to the estate.

3. Qualification period

As with vessels.

4. Distribution per Catcher Vessel Owner

1. C share QS based on landings (personal catch history based on ADF&G fish tickets) using harvest share calculation rule.

Regionalization and Class A/B Designation: C shares shall be a separate class of shares not subject to the Class A share delivery requirements.

Starting with the 2018-2019 crab fishing year and each year thereafter, C share QS will yield IFQ only if the individual holding that C share QS:

a. Has participated as crew in at least one delivery of crab in a crab fishery included in the rationalization program during the three preceding crab fishing years; or
b. Was an initial recipient of C share QS and participated as crew in at least 30 days of fishing in a commercial fishery managed by the State of Alaska or in a federal commercial fishery in that portion of the U.S. Exclusive Economic Zone off Alaska during the three preceding crab fishing years.

5. Transferability criteria

C QS may be purchased only by persons who are:

a. US citizens who have had at least 150 days of sea time in any of the US commercial fisheries in a harvesting capacity and
b. active participants

An "active participant" is defined by participation as captain or crew in at least one delivery in a crab fishery included in the rationalization program in the last 365 days as evidenced by ADF&G fish ticket, affidavit from the vessel owner, or evidence from other verifiable sources.

Between [*May 1, 2015*] and [*May 1, 2019*], C share QS may be acquired by an individual who is a U. S. citizen with at least 150 days of sea time as part of a harvesting crew in any U.S. commercial fishery, and who either:

a. Received an initial allocation of C share QS; or
b. Participated in at least one delivery of crab in a crab fishery included in the rationalization program in any three of the five crab fishing years starting on July 1, 2000, through June 30, 2005.

C share leasing

a. C share IFQ are leasable.

b. IFQ may be leased (i.e., transferred) after a delivery to cover any potential overages, provided that the IFQ account of the person conducting the lease has a positive balance

before starting a fishing trip and at least a zero balance by June 30, the end of the crab fishing year.

6. Captain/Crew on Board requirements
    a. Holders of captain QS or qualified lease recipients are required to be onboard vessel when harvesting IFQ.
    b. C share QS ownership caps for each species are :
    c. the same as the vessel use caps for each species C share ownership caps are calculated based on the C QS pool (i.e. Section 3.4.2.4). Initial allocations shall be grandfathered.
    d. Use caps on IFQs harvested on any given vessel shall not include C shares in the calculation.
7. CP Captains

    Captains with CP history shall receive CP C share QS at initial issuance. CP C shares shall carry a harvest and processing privilege.

    CP C shares may be harvested and processed on CPs or harvested on CVs and delivered to shore based processors.

8. Cooperatives

    C share holders shall be eligible to join cooperatives.

    C shares shall be included in the IFQ fee program.

9. Revocation of C share QS:

    All of an individual's C share QS will be subject to revocation after June 30, 2019, unless the C share QS holder:

    a. Has participated as crew in at least one delivery of crab in a crab fishery included in the rationalization program during the four preceding crab fishing years; or
    b. Was an initial recipient of C share QS and participated as crew in at least 30 days of fishing in a commercial fishery managed by the State of Alaska or in a federal commercial fishery in that portion of the U.S. Exclusive Economic Zone off Alaska during the four preceding crab fishing years.

3.4.2.7 Other Harvester Provisions

Catch Accounting:

- Catch accounting under IFQs - All landings including deadloss will be counted against IFQs. Options for treatment of incidental catch are as follows:
- Discards of incidentally caught crab will be allowed
- Request ADF&G & BOF & BOF/NPFMC Joint Protocol Committee to address concerns of discard, highgrading, incidental catch and need for bycatch reduction and improved retention in season with monitoring to coincide with implementation of a CR program.

Use caps for vessels not participating in a cooperative:

Use caps on IFQs harvested on any given vessel are provided for those vessels not participating in a voluntary cooperative are as follows:

Two times the ownership cap:

- 2.0% for BS Opilio crab
- 2.0% Bristol Bay red king crab

- 2.0% Eastern BS bairdi crab
- 2.0% Western BS bairdi crab
- 4.0% for Pribilof red and blue king crab
- 4.0% for St. Matthew blue king crab
- 20% for Eastern Aleutian Islands golden king crab
- 20% for Western Aleutian Islands golden king crab
- 20% for Western Aleutian Islands red king crab west of 179° West longitude

If vessel's historical activity (of which is the basis for an allocation) is in excess of the vessel use cap, that vessel would be grandfathered with respect to that allocation.

Loan program for crab QS:

A low-interest rate loan program consistent with MSA provisions, for skipper and crew purchases of QS, shall be established for QS purchases by captains and crew members using up to 25% of the Crab IFQ fee program funds collected. These funds can be used to purchase A, B, or C shares.

Loan funds shall be accessible by active participants only.

Any A or B shares purchased under the loan program shall be subject to any use and leasing restrictions applicable to C shares (during the period of the loan).

National Marine Fisheries Service (NOAA Fisheries) is directed to explore options for obtaining seed money for the program in the amount of $250,000 to be available at commencement of the program to leverage additional loan funds.

Overage provisions for the harvesting sector:

Allowances for overages during last trip: Overages up to 3% will be forfeited. Overages above 3% results in a violation and forfeiture of all overage.

3.4.3 Processing Sector Elements

The program also created processing quota shares (PQS), which are allocated to processors and are analogous to the QS allocated to harvesters. Processor shares shall be considered a privilege and not a property right. PQS are a revocable privilege to receive deliveries of a fixed percentage of the annual TAC from a program fishery.

3.4.3.1 Eligible Processors

Processors (including catcher-processors) eligible to receive an initial allocation of processing quota shares (PQs) are defined as follows:

A U.S. corporation or partnership (not individual facilities) that processed crab during 1998 or 1999, for any crab fishery included in the IFQ program.

Hardship provisions for processors that did not process crab in 1998 or 1999 but meet the following provisions:

1. A processor (not Catcher/Processor) that processed opilio crab in each season between 1988 and 1997 and
2. Invested significant capital in the processing platform after 1995, will be determined to be a qualified processor.
3. Significant capital is defined as a direct investment in processing equipment and processing vessel improvements in excess of $1 million.

3.4.3.2 Categories of Processing Quota Shares

Crab fishery categories: Processing quota shares shall be issued for the same crab species identified in Section 3.4.2.

Regional categories: Processing quota shares may be categorized into the following regions (see Regionalization Elements for a description of regions)[9]:

- Northern Region - All areas on the Bering Sea north of 56º 20' N. latitude
- Southern Region - All areas not in the Northern region
- Western and Eastern regions - Regional categories for deliveries of Aleutian Islands golden king crab are split into a "Western" (west of 174° West longitude) and "Eastern" (east of 174° West longitude) area. Fifty percent of the Western AI IPQ golden king crab QS shall be processed in the Western AI region.

3.4.3.3 Initial Allocation of Processing Quota Shares

a. Processing quota shares shall be initially issued to Eligible Processors based on three-year average processing history[10] for each fishery, determined by the buyer of record listed on ADF&G fish tickets, as follows:
    a. 1997 - 1999 for Bristol Bay red king crab
    b. 1996 - 1998 for Pribilof red and blue king crab,
    c. 1996 - 1998 for St. Matthew blue crab
    d. 1997 - 1999 for opilio crab
    e. Eastern and Western BS bairdi crab based on 50/50 combination of processing history for BBRKC and opilio
    f. 1996/97 - 1999/00 seasons for golden king crab
    g. The qualifying years for issuance of IPQ in the Adak red king crab fishery west of 179° West longitude will be based on Western Aleutian Islands golden king crab IPQ
b. If the buyer can be determined, by NMFS using the State of Alaska Commercial Operators Annual Report, fish tax records, or evidence of direct payment to fishermen, to be an entity other than the entity on the fish ticket, then the IPQ shall be issued to that buyer.

3.4.3.4 Issuance of IPQs Versus Open Delivery

Catcher vessel QS/IFQs are categorized into Class A and Class B shares. Purchases of crab caught with Class A shares would count against IPQs while purchases of crab caught with Class B shares would not. Crab caught with Class B shares may be purchased by any processor on an open delivery basis. Thus, IPQs will be issued for a portion of the season's TAC for each species, with the remainder available to provide open delivery processing as a means to enhance price competition.

3.4.3.5 Cap on the Amount of IPQ

The amount of IPQ in any year shall not exceed the percentage of the TAC for crab as follows:

a. Opilio: IPQ percentage times a TAC (after CDQ allocations) of 175 million pounds.
b. Bristol Bay red king crab: IPQ percentage times a TAC (after CDQ allocations) of 20 million pounds.

IFQ (that would have been A shares but for the cap) issued in excess of IPQ limit shall be subject to regional landing requirements.

[9] Regional categorization does not apply to Tanner crab, *C. bairdi* fishery. Additionally, in the Western Aleutian Island (Adak) golden king crab fishery, the designation is based on an east/west line to accommodate a different distribution of activity in that fishery.

[10] The three-year average shall be the three-year aggregate pounds purchased by each Eligible Processor in a fishery divided by the three-year aggregate pounds purchased by all Eligible Processors in that fishery.

3.4.3.6 Transferability of Processing Shares

Provisions for transferability include the following:

1. Processing quota shares and IPQs would be freely transferable, including leasing. IPQ may be leased (i.e., transferred) after receipt of a delivery to cover any potential overages, provided that the IPQ account of the person conducting the lease has a zero or positive balance by June 30, the end of the crab fishing year.
2. IPQs may be used by any facility of the eligible processor (without transferring or leasing).
3. Processing quota shares and IPQs categorized for one region cannot be transferred to a processor for use in a different region, .

New processors may enter the fishery by purchasing IPQ or by purchasing Class B or Class C Share crab or by processing CDQ crab.

3.4.3.7 PQS Ownership and Use Caps

No ownership to exceed 30% of the total PQS pool on a fishery by fishery basis with initial issues grandfathered. A cutoff date of June 10, 2002 was established for the processor shares ownership cap grandfather provision - The ownership cap on processing shares to prevent persons from acquiring shares in excess of specific caps would be applied as of June 10, 2002. This cutoff date would prevent persons from acquiring interests in processing history in excess of the specified cap after the cutoff date.

PQS ownership caps for non-CDQ group persons should be applied using the individual and collective rule using 10% minimum ownership standards for inclusion in calculating the cap. PQS ownership caps are at the company level. PQS ownership caps for CDQ groups should be applied only using the individual and collective rule.

Custom Processing Cap Exemption: Custom processing will be exempt from use caps in the following regions and fisheries:

- North region of the Bering Sea *C. opilio* fishery;
- Western Aleutian Islands golden king crab fishery West designated or Undesignated shares processed in the West region;
- Western Aleutian Islands red king crab fishery;
- Eastern Aleutian Islands golden king crab fishery;
- St. Matthew Island blue king crab fishery;
- Pribilof Islands red and blue king crab fishery;
- Eastern Bering Sea *C. bairdi* fishery; and
- Western Bering Sea *C. bairdi* fishery.

Definition of custom processing exemption: Physical processing of IPQ crab held by a person who is not affiliated with the owner of the facility at which those IPQ crab are processed. IPQ custom processed at a facility owned by an entity does not count toward the cap of the entity (i.e., only processor share holdings count toward an entity's cap).

Locations qualified for the exemption: Custom processing will qualify for the exemption from IPQ use caps, provided that processing is undertaken in the applicable fishery and region at a shore plant, or a floating processor that is moored at a dock or docking facilities (e.g., dolphins, permanent mooring buoy) in a harbor in a community that is a first or second class city or a home rule city, except for the community of Atka, where a floating processor may anchor at any location, provided that it is within the municipal boundary.

Facility cap: Outside of the West region, no facility may process more than 60 percent of EAI golden king crab and WAI red king crab.

Provisions to protect interests of the community of origin: In the event that processing shares currently or formerly subject to a right of first refusal are transferred from the initial recipient, custom processing of those shares in the community of origin will not be counted toward cap of the processing plant (the shares would only count toward the cap of the share holder).

Northern Region opilio cap: In the Northern Region annual use caps will be at 60% for the opilio crab fishery unless subject to a custom processing cap exemption.

3.4.3.8 Other Processor Provisions

The crab processing caps enacted by Section 211(c)(2(A) of the AFA would be terminated.

3.4.4 Regionalization Elements

3.4.4.1 'Cool Down' Period

A cooling-off period of 2 years shall be established during which PQS earned in a community may not be used outside that community. The Cool down period is an artifact of the original regionalization elements and is no longer applicable to the rationalization program. Information detailed below is retained to provide historical context.

The following elements were applicable during a cool down period:

- Methods to determine the shares associated with a community were the same method used for allocating processing quota as established by the Council.
- Community shall be defined as the boundaries of the Borough or, if no Borough exists, the first class or second class city, as defined by applicable state statute. A community must have at least 3 percent of the initial PQS allocation in any fishery based on history in the community to require continued use of the IPQs in the community during the cool down period.
- 10% of the IPQs, on a fishery by fishery basis, may leave a community on annual basis, or up to 500,000 pounds, whichever is less. The amount that can leave will be implemented on a pro rata basis to all PQS holders in a community.

3.4.4.2 Regional Delivery Requirements

Most Class A harvesting shares and processing quota share are subject to regional share designations, whereby harvested crab is required to be delivered within an identified region. These delivery restrictions are intended to add stability to the processing sector by protecting processor investment in program fisheries and to preserve the historic distribution of landings and processing between regions.

Assignment of regional delivery requirements:

QS/IFQs for the CV sector may be assigned to regional categories. The following regions are identified:

> Northern Region - All areas on the Bering Sea north of 56º 20' N. latitude. (This region includes the Pribilof islands and all other Bering Sea Islands lying to the north. The region also includes all communities on Bristol Bay including Port Heiden but excludes Port Moller and all communities lying westward of Port Moller.)
>
> Southern Region - All areas not in the Northern Region.
>
> Western and Eastern regions - Regional categories for deliveries of Aleutian Islands golden king crab are split into a "Western" (west of 174° West longitude) and "Eastern" (east of 174° West longitude) area. Fifty percent of the Western AI IPQ golden king crab QS shall be processed in the Western AI region.

In the harvesting sector, only Class A CV IFQ are categorized by region (which applies to point of delivery and not point of harvest). In the processing sector, processing of quota shares and IPQs are

categorized by region. Once assigned to a region, processing and/or harvesting quota shares cannot be reassigned to a different region.

Categorization will be based on all historical landings. Any remaining mismatch of harvesting and processing shares within the region shall be addressed using the following criteria:

1. The base years for determining processing shares and the base period for determining the share assigned to each region shall be the same.
2. If the cumulative harvester quota associated with each region differs from the total regional share, by species, the harvester share, by species, shall be adjusted, up or down, in the following manner:
    a. The adjustment shall apply only to harvesters with share in both regions.
    b. The adjustment shall be made on a pro rata basis to each harvester, so that the total share among those harvesters, by region, equals the total share assigned to each region.
3. The adjustment shall only be on shares that carry a regional designation; Class B and Class C quota would be excluded from the adjustment.

Regionalization of the Western Aleutian Islands golden king crab fishery: The Western Aleutians Islands golden king crab fishery is regionalized by designation of 50 percent of A shares (and corresponding processor shares) as west shares and by the remaining 50 percent of A shares (and corresponding processor shares) being undesignated. Individual processing share allocations would be made with the 50 percent west shares to participants with processing facilities in the west. If the allocations of processors with facilities in the west does not equal 50 percent, the remaining west allocation could be allocated on a pro rated basis to participants without facilities in the west. These remaining west shares could be pro rated so that each shareholder with west facilities would get the same portion of its initial allocation as west shares.

For harvesters of Western Aleutians Islands golden king crab, individual harvesters share allocations would be made with each harvester with west history allocated west shares. If the allocations of vessels with west history exceed 50 percent of the fishery, share allocations would be pro rated so that each shareholder with west history receives the same portion of its allocation as west shares.

Regionalization of the Western Aleutian Islands red king crab fishery: The processor share allocation in the Western Aleutian Islands red king crab fishery would be based on the historical landings in the Western Aleutian Islands golden king crab fishery. No landings in the golden king crab fishery were in the North during the qualifying years. The Western Aleutian Islands red king crab fishery would therefore be entirely South. The South designation will be made despite the landing of a portion of the harvests in the Western Aleutian Islands red king crab fishery in the North region during the qualifying years for vessels.

Regionalization of the Eastern and Western *C. bairdi* crab fishery: There shall be no regional designation of the bairdi fishery shares. The bairdi fishery shall be allocated according to the original distribution of the BBRKC and shall not be subject to the regionalization provisions of the Council CR Program.

Application of Regional Delivery Requirements: The following provisions apply to the delivery and processing of crab with IFQs or IPQs that are categorized by region:

A. Crab harvested with catcher vessel IFQs categorized for a region must be delivered for processing within the designated region, unless an exemption is approved.
B. Crab purchased with IPQs categorized for a region must be processed within the designated region, unless an exemption is approved.

Regional delivery exemption for Western AI golden king crab: A Western AI l Golden King Crab Regional Delivery Exemption may apply. NMFS will approve a request to exempt West designated IFQ and IPQ from the requirement to deliver and process WAG west of 174° W. longitude for a crab season, if all Eligible Contract Signatories request the exemption in writing for that season. Eligible Contract Signatories are —

a. QS holders: Any person that holds in excess of 20 percent of the West designated Western AI golden king crab QS at the time the contract was signed, or their authorized representative.

b. PQS holders: Any person that holds in excess of 20 percent of the West designated Western AI golden king crab PQS at the time the contract was signed, or their authorized representative.

c. Municipalities: the City of Adak and the City of Atka, or their authorized representatives.

Regional Delivery Exemption for North or South designations: IFQ holders, IPQ holders, and affected community representatives may apply to NMFS for an exemption from the requirements that crab harvested with regionally designated IFQ be delivered and processed in the designated region. An exemption could be granted for regionally designated IFQ and IPQ in the following fisheries: Bristol Bay red king crab, Bering Sea *C. opilio*, Eastern Aleutian Islands golden king crab, Western Aleutian Islands red king crab, Saint Matthew Island blue king crab, and Pribilof Islands red and blue king crab.

If IFQ holders and IPQ holders wish to request an exemption to regional delivery requirements, they must work with the affected community representatives to establish a framework agreement and submit an application to NMFS before the start of a crab fishing season. The framework agreement would define the steps that the parties would take to avoid seeking an exemption during the fishery, the circumstances under which the parties would apply for an exemption, the actions the parties would take to mitigate the effects of the exemption, and the compensation, if any, that any party would provide to any other party.

In the event that circumstances occur that prevent deliveries of regionally designated IFQ, then the IFQ holders, IPQ holders, and affected community representatives would enter into an exemption contract and apply to NMFS for an exemption. The application must specify the amount of IFQ and IPQ that are subject to the exemption. The exemption would be effective the day after NMFS receives the application.

3.4.4.3 Community Purchase and Right of First Refusal (ROFR)

The CR Program provides CDQ groups or community groups representing qualified communities a right of first refusal (ROFR) to purchase processing shares that are based on history from the community which are being proposed to be sold for processing outside the boundaries of the community of original processing history. Qualified communities are those with at least three percent of the initial PQS allocation in any BSAI crab fishery based on history of processing in the community**,** except for those communities that receive a direct allocation of any crab species (currently only Adak). The terms and application of ROFR are in accordance with the provisions below.

Entity Granted the ROFR: The ROFR shall be established by a contract entered into prior to the initial allocation of PQS which will contain all of the terms specified by Amendments 18 and 19 to the FMP. The contract will be between the recipient of the initial allocation of the PQS and:

1. the CDQ group in CDQ communities
2. the entity identified by the community in non-CDQ communities.

In non-CDQ communities, the community must designate the entity that will represent the community at least 90 days prior to the deadline for submission of applications for initial allocations of PQS.

Beginning on January 12, 2016, all ROFR contracts must contain all of the following terms:

Right of First Refusal Contract Terms:

A. The ROFR) will apply to sales of the following processing shares:

    1. PQS and
    2. IPQs, if more than 20 percent of a PQS holder's community based IPQs (on a fishery by fishery basis) have been processed outside the community currently associated with the right by another company in 3 of the preceding 5 years.

B. All terms of any ROFR and contract entered into related to the ROFR will be enforced through civil contract law

C. Any ROFR contract must be on the same terms and conditions of the underlying agreement and will include all processing shares and other goods included in that agreement, or to any subset of those assets, as otherwise agreed to by the PQS holder and the community entity.

D. Intra-company transfers within a region are exempt from ROFR. To be exempt from the ROFR, IPQs must be used by the same company.

E. Any sale of PQS for continued use in the community with which the PQS is associated will be exempt from the ROFR. A sale will be considered to be for use in the community associated with the PQS if the purchaser contracts with the community to:

    1. use at least 80 percent of the annual IPQ allocation in the community for 2 of the following 5 years (on a fishery by fishery basis), and
    2. grant the community a ROFR on the PQS subject to the same terms and conditions required of the processor selling the PQS.

F. A community group or CDQ group can waive any ROFR.

G. The ROFR will be exercised by the CDQ group or community group by providing the seller within 90 days of receipt of a copy of the contract for sale of the processing shares:

    1. notice of the intent to exercise and
    2. earnest money in the amount of 10 percent of the contract amount or $500,000, whichever is less.

    The CDQ group or community group must perform under the terms of the ROFR contract within the longer of:

    1. 150 days of receipt of the sales contract or
    2. in the time specified in the sales contract.

H. If a ROFR is triggered by a sale subject to the right and the CDQ group or community group associated with the ROFR does not exercise its right, a new ROFR contract between the buyer and the CDQ group or community group named by the buyer must be signed at the time of transfer. The buyer can name as the new right holder either the CDQ group or community group previously associated with the right or a new CDQ group or community group. The CDQ group or community group named by the buyer to receive the new ROFR must be an existing CDQ group or community group that was eligible to hold a ROFR at the time of the implementation of the CR Program in the region in which the IPQ must be landed.

I. Any due diligence review conducted related to the exercise of a ROFR will be undertaken by a third party bound by a confidentiality agreement that protects any proprietary information from being released or made public.

J. The PQS or IPQ holder must notify the CDQ group or community group that holds the ROFR of the transfer of IPQ or PQS that are subject to the right. A PQS/IPQ holder must provide this notice to the right-holding CDQ group or community group for all transfers of PQS or IPQ

subject to a ROFR regardless of whether the PQS/IPQ holder believes the right applies to the transfer.

K. Annually, the PQS holder must provide the CDQ group or community group that holds the ROFR with the location of the use of IPQ that are subject to the ROFR, and whether the IPQ subject to the ROFR were used by the PQS holder.

GOA First Right of Refusal: For communities with at least three percent of the initial PQS allocation of any BSAI crab fishery based on history in the community that are in the area on the Gulf of Alaska north of 56º20'N latitude, groups representing qualified communities will have a first right of refusal to purchase processing quota shares which are being proposed to be transferred from unqualified communities in the identified Gulf of Alaska area. The entity granted the right of first refusal and terms and method of establishing the right of first refusal will the same as specified in the general right of first refusal.

Community Purchase Option: Allow for a community organization in those communities that have at least 3 percent of the initial PQS allocation of any BSAI crab fishery based on history in the community to be exempted from the restriction for the 150 days of sea time requirement.

Identification of Community Groups and Oversight: For CDQ communities, CDQ groups would be the entity eligible to exercise any right of first refusal or purchase shares on behalf of the community. Ownership and management of harvest and processing shares by CDQ groups will be subject to CDQ regulations.

For non-CDQ communities, the entity eligible to exercise the right of first refusal or purchase shares on behalf of a community will be identified by the qualified city or borough, except if a qualified city is in a borough, in which case the qualified city and borough must agree on the entity. Ownership and management of harvest and processing shares by community entities in non-CDQ communities will be subject to rules established by the halibut and sablefish community purchase program.

Right of First Refusal is Non-assignable: The community right of first refusal is not assignable by the community group granted the right.

Fisheries Exempt from the Community Right of First Refusal: The *C. bairdi* Western Aleutian golden king crab and Adak red king crab fisheries are exempt from the right of first refusal.

3.4.5 Binding Arbitration System

The arbitration system serves several important purposes in the program, including dissemination of market information to facilitate negotiations, the coordination of matching Class A IFQ held by harvesters to IPQ held by processors, and a binding arbitration process to resolve terms of delivery.

3.4.5.1 Elements of Binding Arbitration

The Council adopts the following elements for a system of binding arbitration to resolve failed price negotiations.

1. The Standard for Arbitration

   The primary role of the arbitrator shall be to establish a price that preserves the historical division of revenues in the fisheries while considering relevant factors including the following:

   a. Current ex vessel prices (including prices for Class A, Class B, and Class C shares recognizing the different nature of the different share classes)
   b. Consumer and wholesale product prices for the processing sector and the participants in the arbitration (recognizing the impact of sales to affiliates on wholesale pricing)
   c. Innovations and developments of the different sectors and the participants in the arbitration (including new product forms)

d. Efficiency and productivity of the different sectors (recognizing the limitations on efficiency and productivity arising out of the management program structure)
e. Quality (including quality standards of markets served by the fishery and recognizing the influence of harvest strategies on the quality of landings)
f. The interest of maintaining financially healthy and stable harvesting and processing sectors
g. Safety
h. Timing and location of deliveries
i. Reasonable underages to avoid penalties for overharvesting quota and reasonable deadloss

2. Market Report

An independent market analyst selected by the mutual agreement of the sectors will present to both sectors and all designated arbitrators an analysis of the market for products of that fishery. The Market Report is based on a survey of the market for crab products produced by the fishery and shall include only publicly available data and information.

A Market Report is not required for a crab fishery if that crab fishery is not open for fishing. QS and PQS holders must establish a contract with the Market Analyst to produce a Market Report in the event that a crab fishery that was not anticipated to open does subsequently open for fishing.

QS and PQS holders can choose to mutually agree to the timing of the Market Report and any subsequent interim or supplemental reports. The market analyst can issue interim or supplemental reports for each fishery if the QS and PQS holders mutually agree to those terms.

3. Selection of the Arbitrator(s) and Market Analyst

The market analyst and arbitrator(s) will be selected by mutual agreement of the PQS holders and the QS holders. PQS holders collectively must agree and QS holders collectively must agree. Processors may participate collectively in the selection process. The details of the selection will be decided at a later time.

4. Shares subject to binding arbitration

This binding arbitration system shall address price disputes between holders of delivery restricted IFQ (including Class A IFQ and Class C IFQ when subject to delivery restrictions) and holders of IPQ. Binding arbitration does not apply to the negotiation of price for deliveries under the class B IFQ and Class C IFQ when not subject to delivery restrictions. C share holders, however, may elect to participate in the arbitration process prior to delivery restrictions taking effect.

5. Shares of processor affiliates

Participation of processor affiliates in binding arbitration as IFQ holders will be determined by any applicable rules governing anti-trust. Any parties eligible for collective bargaining under the Fishermen's Cooperative Marketing Act of 1934 (FCMA) will be eligible to participate collectively as a member of that FCMA co-op in binding arbitration. No antitrust exemption should be made to enable processor affiliated IFQ holders to participate in arbitration.

6. Payment of the arbitration and market analysis

The payment for the market analysis and the arbitrators will be shared by the two sectors. Cost shall be shared by all participants in all fisheries.

For shared costs, the payment of those costs shall be advanced by IPQ holders. The IPQ holders will collect the IFQ holders' portion of the shared costs by adding a pro rated surcharge to all deliveries of Class A crab.

7. Quality dispute resolution

   In cases where the fisherman and the processor cannot come to agreement on quality and thus price for crab, two mechanisms are suggested for resolving the price dispute-after the processor has processed the crab (to avoid waste from dumping the load at sea): (1) In cases where fishermen and processors have agreed to a formula based price, the two parties would take their normal shares of the price, after the disputed load is sold. (2) This type of dispute would most likely apply in cases where fishermen desire to stay with fixed dockside prices and there is disagreement on quality and therefore price. These cases could be referred to an independent quality specialist firm. The two parties in dispute would decide which firm to hire.

8. Data used in arbitration

   Under any arbitration structure, the arbitrator must have access to comprehensive product information from the fishery (including first wholesale prices and any information necessary to verify those prices).

   Subject to limitations of antitrust laws and the need for proprietary confidentiality, all parties to an arbitration shall have access only to information provided to the arbitrator(s) or panel for that arbitration directly by the parties to that arbitration. Access to information by a harvester participating in an arbitration will be limited to information submitted by itself and the processor. All participants to an arbitration shall sign a confidentiality agreement stating they will not disclose any information received from the arbitrator.

   Data collected in the data collection program may be used to verify the accuracy of data provided to the arbitrator(s) in an arbitration proceeding. Any data verification will be undertaken only if the confidentiality protections of the data collection program will not be compromised.

9. Enforcement of the Arbitration Decision

   The decision of the arbitrator will be enforced by civil damages.

10. Oversight and administration of the Binding Arbitration system.

    Oversight and administration of the binding arbitration should be conducted in a manner similar to the AFA cooperative administration and oversight. System reporting requirements and administrative rules should be developed in conjunction with the Council and NOAA Fisheries after selection of the preferred program.

The structure for the system of Binding Arbitration system shall be as described below:

3.4.5.2 Last best offer binding arbitration

The Last Best Offer Model provides a mechanism to resolve failed price and delivery negotiations efficiently in a short period before the opening of the season. The Model includes the following specific characteristics:

1. Processor-by-processor. Processors will participate individually and not collectively, except in the choice of the market analyst and the arbitrator/arbitration panel.
2. Processor-affiliated shares. Participation of processor-affiliated shares will be limited by the current rules governing antitrust matters.
3. Arbitration standard. The standard for the arbitrator is the historic division of revenues between harvesters and processors in the aggregate (across the entire sectors), based on arm's-length first wholesale prices and ex-vessel prices (Option 4 under "Standard for Arbitration" in the staff analysis). The arbitrator shall consider several factors including those specified in the staff analysis, such as current ex vessel prices for both A, B and C Shares, innovations, efficiency, safety, delivery location and timing, etc.

4. Opt-in. An IFQ holder may opt in to any contract resulting from a completed arbitration for an IPQ holder with available IPQ by giving notice to the IPQ holder of the intent to opt in, specifying the amount of IFQ shares involved, and acceptance of all terms of the contract. Once exercised, an Opt-in is binding on both the IPQ holder and the IFQ holder.
5. Performance Disputes. Performance and enforcement disputes (e.g., quality, delivery time, etc.) initially will be settled through normal commercial contract dispute remedies. If those procedures are unsuccessful, the dispute will be submitted for arbitration before the arbitrator(s). If those procedures are unsuccessful and in cases where time is of the essence, the dispute will be submitted for arbitration before the arbitrator(s). The costs of arbitration shall be paid from the fees collected, although the arbitrator(s) will have the right to assign fees to any party for frivolous or strategic complaints.
6. Lengthy Season Approach. For a lengthy season, an IPQ holder and an IFQ holder (or group of IFQ holders) may agree to revise the entire time schedule below and could agree to arbitration(s) during the season. That approach may also be arbitrated pre-season if the holders cannot agree.

3.4.5.3 Process

1. Negotiations and Voluntary Share Matching

   At any time prior to the season opening date, any IFQ holders may negotiate with any IPQ holder on price and delivery terms for that season (price/price formula; time of delivery; place of delivery, etc.). If agreement is reached, a binding contract will result for those IFQ and IPQ shares. IPQ holders will always act individually and never collectively, except in the choice of the market analyst (which may occur at any time pre-season) and the arbitrator/arbitration panel for which all IFQ and IPQ holders will consult and agree.

2. Required Share-Matching and Arbitration

   Beginning 5 days after the issuance of IFQ and IPQ by NMFS, IFQ holders may match up IFQ shares not already subject to contracts with any IPQ shares not under contract, either collectively as part of an FCMA cooperative or as individual IFQ holders (the offered IFQ shares must be a substantial amount of the IFQ holder(s)' uncontracted shares). The IPQ holder must accept all proposed matches up to its non-contracted IPQ share amount. All IFQ holders "matched" with an IPQ holder will jointly choose an arbitrator with that IPQ holder. The matched share holders are committed to the arbitration once the arbitrator is chosen (if the parties wish, the arbitrator may initially act as a mediator to reach an agreement quickly). Arbitration must begin no later than 15 days after the issuance of IFQ and IPQ by NMFS.

3. Data

   The Arbitrator will gather relevant data independently and from the parties to determine the historical distribution of first wholesale crab product revenues (at Free on Board point of production in Alaska) between harvesters and processors in the aggregate (across the entire sectors). For a vertically integrated IPQ holder (and in other situations in which a back-calculation is needed), the arbitrator will work with that IPQ holder and the IFQ holders to determine a method for back-calculating an accurate first wholesale price for that processor. The Arbitrator will receive a pre-season market report from the market analyst and may gather additional data on the market and on completed arbitrations. The Arbitrator will also receive and consider all data submitted by the IFQ holders and the IPQ holder. The Arbitrator will not have subpoena power.

4. Arbitration Decisions

   Arbitration will be based on a "last best offer" system, with the Arbitrator choosing one of the last best offers made by the parties. The Arbitrator will work with the IPQ and IFQ holders to

determine the matters that must be included in the offer (e.g. price, delivery time & place, etc.) and will set the date on which "last best offers" must be submitted. The last best offers may also include a price over a specified time period, a method for smoothing prices over a season, and an advance price paid at the time of delivery.

If several groups or individual IFQ Holders have "matched" with that IPQ holder, each of them may make a last best offer. Prior to submission of the last-best offers, the Arbitrator may meet with parties, schedule joint meetings, or take any actions aimed at reaching agreement. The Arbitrator will notify the IPQ holder and the IFQ holders of the Arbitration Decision no later than 10 days before the season opening date. The Arbitration Decision may be on a formula or ex-vessel price basis. The Arbitration Decision will result in a contract for the IPQ holder and the IFQ holders who participated in arbitration with that IPQ holder.

5. Post-Arbitration Opt-In

   Any IFQ holder with shares not under contract may opt in to any contract resulting from an Arbitration Decision for an IPQ holder with IPQ that is not under contract, on all of the same contract conditions (price, time of delivery, etc.). If there is a dispute regarding whether the "opt in" offer is consistent with the contract, that dispute may be decided by the arbitrator who will decide only whether the Opt-in is consistent with the contract.

6. Non-Binding Price Arbitration

   There will be a single annual fleet-wide arbitration to establish a non-binding formula under which a fraction of the weighted average first wholesale prices for the crab products from each fishery may be used to set an ex-vessel price. The formula is to be based on the historical distribution of first wholesale revenues between fishermen and processors, taking into consideration the size of the harvest in each year. The formula shall also include identification of various factors such as product form, delivery time and delivery location. The non-binding arbitration shall be based upon the Standard for Arbitration set out in the February 2003 Council motion, and stated under the elements of binding arbitration. As a part of this process, the arbitrator will review all of the arbitration decisions for the previous season and select the highest arbitrated prices for a minimum of at least 7% of the market share of the PQS. This provision allows for the aggregation of up to 3 arbitration findings that collectively equal a minimum of 7 percent of the PQS, to be considered for the highest price for purposes of this provision. If arbitration findings are aggregated with two or more entities, then the lesser of the arbitrated prices of the aggregated entities included to attain the 7 percent minimum market share of PQS shall be considered for purposes of developing the benchmark price. The arbitrator in the non-binding arbitration shall not be an arbitrator in the last best offer binding arbitration(s). This formula shall inform price negotiations between the parties, as well as the Last Best Offer arbitration in the event of failed price negotiations.

   A Non-Binding Price Formula is not required for a crab fishery if that crab fishery is not open for fishing. PQS and QS holders must establish a contract with the Formula Arbitrator to produce a Non-Binding Price Formula in the event that a crab fishery that was not anticipated to open does subsequently open for fishing. IFQ and IPQ holders can choose to mutually agree to the timing of the Non-Binding Price Formula.

7. Public Disclosure of Arbitration Results

   The result of each arbitration will be announced as it occurs to the processors and harvesters in that arbitration and non-vertically integrated harvesters that have not committed to a processor.

Other Procedures, Policies, and Decisions.

IFQ and IPQ holders, Market Analyst(s), Formula Arbitrator(s), Contract Arbitrator(s), and the Third-party Data Provider may establish procedures, policies, and make administrative decisions concerning the administration of the arbitration system as described in this section, provided those procedures, policies, and administrative decisions are not otherwise inconsistent with any other requirement contained in the arbitration system.

3.4.6 Cooperatives

The program allows harvesters to form voluntary cooperatives associated with one or more processors holding PQS. Cooperatives may be formed through contractual agreements among fishermen who wish to join into a cooperative associated with one or more processors holding processor history for one or more species of crab. Fleet consolidation within this cooperative may occur either by internal history leasing and vessel retirement or by history trading within the original cooperative or to a different cooperative. A cooperative agreement would be filed annually with the Secretary of Commerce, after review by the Council, before a cooperative's catch history would be set aside for their exclusive use.

The cooperative model elements are detailed below:

- Exemption from use caps: Cooperative members would not be subject to either the individual or vessel use caps, which would apply to IFQ holders that are not cooperative members.
- Application of ownership caps: To effectively limit ownership, the number of shares (IFQs and QS) that each cooperative member could bring to a cooperative would be subject to the ownership caps (with initial allocations grandfathered).
- IFQ allocations to cooperatives: The annual allocations of IFQs of cooperative members would be made to the cooperative, with use of those shares governed by the cooperative agreement.
- Leasing: Leasing among cooperative members would be unlimited. For IFQ holders that are not cooperative members, leasing would be allowed for the first 5 years of the program.
- Inter-cooperative transfers: Transfers between cooperatives would be undertaken by the members individually, subject to ownership caps. Requiring the inter-cooperative transfers to occur through members is necessary for the application of the ownership caps.
- Four entities are required for a cooperative: The requirement for four owners to create a cooperative would require four unique entities to form a cooperative. Independent entities must be less than 10 percent common ownership without common control (similar to the AFA common ownership standard used to implement ownership caps). Vessels are not restricted to deliver to a particular plant or processing company.
- Monitoring and enforcement at the cooperative level: The monitoring and enforcement of harvest allocations would be at the cooperative level (rather than the individual level). Cooperative members would be jointly and severally liable for the actions of the cooperative.
- Duration of Cooperative agreements: A harvester quota shareholder may exit the cooperative at any time after one season. One season shall mean the season established by the Alaska Board of Fisheries for the fishery associated with the quota shares held by the harvester. New processors entering the fishery may associate with cooperatives.

3.4.7 Community Development Quota and Adak Allocations

The CR Program made changes in the BSAI crab allocations under the Community Development Quota (CDQ) program. The changes included the following modifications:

CDQ Program Allocation: Expand existing program to all crab fisheries approved under the rationalization program with the exception of the Western AI golden king crab. Increase the CDQ Program allocation for all species of crab to 10% of the TAC. These changes in the CDQ allocations are

intended to further facilitate fishing activity and economic development in rural Western Alaska communities.

Norton Sound red king crab: The increase of CDQ allocations does not apply to the Norton Sound red king crab fishery. The Norton Sound fishery was excluded from the CDQ allocation increase because its currently regulated under a super exclusive permit program that prohibits its participants from participating in any of the other BSAI crab fisheries. The Norton Sound permit rules are for the benefit local, small vessel participants in that fishery.

Onshore delivery: A minimum of 25% of the total CDQ allocation must be delivered on shore.

Adak Allocation: For the Western Aleutian Islands golden king crab fishery, the percentage of resource not utilized (i.e., the difference between the actual catch and GHL, up to 10%) during the base period is allocated to the community of Adak. In any year that sufficient processing exists at that location, the percentage of the difference between the GHL and actual catch, that was not harvested in these 4 years is not to exceed 10%).

> Criteria for Selection of Community Entity to Receive Shares: A non-profit entity representing the community of Adak, with a board of directors elected by the community (residents of Adak) in a manner similar to the CDQ program. The shares given to this entity may be held in trust in the interim by the Aleut Enterprise Corporation and administered by it.
>
> A set of use procedures, investment policies and procedures, auditing procedures, and a city or state oversight mechanism will be developed. Funds collected under the allocation will be placed in a separate trust until the above procedures and a plan for utilizing the funds for fisheries related purposes are fully developed. Funds will be held in trust for a maximum of 2 years, after which the Council will reassess the allocation for further action.
>
> Performance standards for management of the allocation to facilitate oversight of the allocation and assess whether it achieves the goals. Use CDQ type management and oversight to provide assurance that the Council's goals are met. Continued receipt of the allocation will be contingent upon an implementation review conducted by the State of Alaska to ensure that the benefits derived from the allocation accrue to the community and achieve the goals of the fisheries development plan.

3.4.8 Observer Requirements

Observer requirements will be deferred to the Alaska Board of Fisheries.

3.4.9 Sideboards

AFA vessel sideboards: Eliminate harvester sideboard caps.

Non-AFA vessel sideboards: Non-AFA vessels that qualify for QS in the rationalized opilio crab fisheries would be limited to their GOA groundfish catch history excluding sablefish. The sideboards would be based on the history of vessels subject to the caps, applied in aggregate, on an area specific basis, and apply jointly to both the vessel and the license.

Vessels with less than 750,000 lbs total opilio history during the qualifying years and more than 680MT of total cod history during the qualifying years would be exempt from the GOA Pacific cod sideboard cap.

Vessels with less than 50MT total groundfish landings in the qualifying period would be prohibited from participating in the GOA Pacific cod fishery.

Vessels with less than 0.22% of total Bering Sea opilio catch history from 1996 through 2000 and 20 or more deliveries of pollock harvested in the GOA from 1996 through 2000 would be exempt from the

GOA pollock sideboard cap. The percent is of the total Bering Sea C. opilio catch history, including both qualified and unqualified catch history from non-AFA crab vessels.

NMFS will remove non-AFA Pacific cod sideboard limits for hook-and-line catcher/processors in the Central GOA, Western GOA, or both if all eligible participants in a regulatory area sign an affidavit requesting that NMFS remove the sideboard limit. The eligible participants are the holders of LLP licenses with hook-and-line, catcher/processor, and Pacific cod endorsements and do not include owners and operators of sideboarded vessels that do not meet these LLP license requirements. All eligible participants must submit to NMFS, and NMFS must receive, a completed affidavit by May 19, 2016 . If the required participants do not agree to the sideboard removal by that deadline, the CR Program GOA sideboard limits will remain in effect and will not be removed.

Sideboards will expire on rationalization of the Gulf of Alaska.

3.4.10 Economic Data Collection Program

The CR Program includes a mandatory economic data collection program that requires owners or leaseholders of catcher vessels, catcher/processors, shoreside crab processors, and stationary floating crab processors, as well as PQS holders that purchase crab deliveries in the BSAI crab fisheries to submit an economic data report (EDR) on an annual basis. The purpose of the EDR is to collect cost, revenue, ownership, and employment data to provide the Council and NMFS with the information necessary to study the impacts of the CR Program. Participation is mandatory.

Purpose: This data collection effort is required to address the Council's original problem statement for the CR Program. That problem statement requires a structure that achieves "equity between the harvesting and processing sectors" and "…economic stability for harvesters, processors and coastal communities." The Council revised the data collection program in 2012 and 2021 to improve the quality of data collected and eliminate redundancies with other collections of data. The data collected is intended to aid the Council and NMFS in assessing the efficacy of the CR Program and to determine its relative impact on fishery participants and communities.

Administration of Collection: The EDR is administered by NMFS through contracts with Pacific States Marine Fisheries Commission (PSMFC), an independent third-party data collection agent. Each owner or leaseholder of the BSAI crab fishing industry must fill out the appropriate EDR form annually. The data collected is specific to the crab fisheries in the CR Program and includes information on costs of fishing and processing, revenues for harvesters and processors, and employment data.

Use of data: Data will be supplied to NMFS, Council staff, and any other authorized users according to statutory and regulatory data confidentiality requirements. The collected data may assist with the development of amendments to the CR Program, through program reviews or could be used to analyze the economic and social impacts on industry, regions, and localities. EDR data are also used extensively in preparation of the annual Crab SAFE Economic Status Report, which is submitted to the Council annually.

Verification of Data: The third-party data collection agent will verify the data in a manner that assures accuracy of the information supplied by private parties. The data collection agent may review and request for the owner or leaseholder to provide copies of additional data.

Duration: The data collection program will continue through the life of the CR Program.

Failure to Submit Forms: Participation in the data collection program is mandatory. Should a submitter fail to submit the appropriate EDR to PSMFC by the deadline, the infraction will be referred to the Office of Law Enforcement.

Enforcement of Data Requirements: The Council endorses the approach to enforcing the data requirements developed by the staff and the Data Collection Committee, which determined that because it is unlikely that the economic data will be used for in-season management, it is anticipated that persons

submitting the data will have an opportunity to correct omissions and errors[11] before any enforcement action would be taken. Giving the person submitting data a chance to correct problems is considered important because of the complexities associated with generating these data. Only if the agency and the person submitting the data cannot reach a solution would the NMFS Office of Law Enforcement be contacted. The intent of this program is to ensure that accurate data are collected without being overly burdensome on industry for unintended errors.

3.4.11 Federal Cost Recovery

Cost recovery funds are to be collected in accordance with the current cost recovery program, which allows for the collection of actual costs up to 3 percent of ex vessel gross revenues. The Council provided that costs would be paid in equal shares by the harvesting and processing sectors (on all landings including landings of crab harvested with Class B IFQs). CPs would pay the entire 3 percent since CPs participate in both sectors. A loan program for share purchases would be established with up to 25 percent of the fees collected. The motion authorized the collection of up to 133 percent of actual costs of management under the new program, which would provide for 100 percent of management costs after allocation of up to 25 percent of the cost recovery to the loan program. NMFS will assign no more than the minimum amount of fees required to aid in loan financing. No fees would be assigned for loan financing unless required.

3.5 Category 2 Framework Management Measures

3.5.1 District, Subdistrict, and Section Boundaries

The FMP authorizes the State to adjust district, subdistrict, and section boundaries on the basis of any of the following criteria: (1) if the area contains a reasonably distinct stock of crab that requires a separate GHL estimate to avoid possible overharvest, (2) if the stock requires a different size limit from other stocks in the registration area, (3) if different timing of molting and breeding requires a different fishing season, (4) if estimates of fishing effort are needed preseason so that overharvest can be prevented, or (5) if part of an area is relatively unutilized and unexplored, and if creation of a new district, subdistrict, or section will encourage exploration and utilization.

3.5.2 Total Allowable Catch and Guideline Harvest Level

The FMP authorizes the State to set preseason TACs and GHLs under State regulations. Seasons or areas are closed when the TAC or GHL is reached. TACs are set for the crab fisheries under the CR Program: *C. opilio*, *C. bairdi*, Bristol Bay red king crab, St. Matthews blue king crab, Pribilof Islands red and blue king crab, Aleutian Islands golden king crab, Western Aleutian lslands red king crab, Pribilof Islands golden king crab and Norton Sound red king crab. ADF&G may close a fishery with a TAC before or after the TAC/GHL is achieved based on current in-season information (Section 3.5.8). TACs for each fishery will be reported in the Council's annual Stock Assessment and Fishery Evaluation (SAFE) Report, along with the OFLs and ABC/ACLs.

The State will take into account the following factors, to the extent information is available, in developing harvest strategies or setting TACs and GHLs: (1) whether the ACL for that stock was exceeded in the previous year; (2) stock status relative to the OFL and ACL; (3) estimates of exploitable biomass; (4) estimates of recruitment; (5) estimates of thresholds; (6) market and other economic considerations; (7) additional uncertainty; and (8) any additional factors pertaining to the health and status of the stock or the marine ecosystem. Additional uncertainty includes (1) management uncertainty (i.e., uncertainty in the ability of managers to constrain catch so the ACL is not exceeded, and uncertainty in quantifying the true catch amount) and (2) scientific uncertainty identified and not already accounted for in the ABC (i.e.,

[11] The intent of the program is to have enforcement actions only triggered by the willful and intentional submission of incorrect data or noncompliance with the requirements to submit data.

uncertainty in bycatch mortality, estimates of trends and absolute estimates of size composition, shell-condition, molt status, reproductive condition, spatial distribution, bycatch of non-target crab stocks, environmental conditions, fishery performance, fleet behavior, and the quality and amount of data available for these variables).

The State will establish the annual TAC for each crab stock at a level sufficiently below the ACL so that the sum of the catch[12] and the State's assessment of additional uncertainty do not exceed the ACL. The State may establish the annual TACs below such a level to account for the other factors identified above. If an ACL is exceeded, the State will implement accountability measures in the fishing season following the overage to account for the overage through a downward adjustment to the TAC for that species by an amount sufficient to remedy the biological consequences of the overage.

3.5.3 Registration Areas

This FMP adopts existing State registration areas within the BSAI fishery management unit. The management unit historically has been divided by the State into four king crab registration areas: Bering Sea, Bristol Bay, Adak, and Dutch Harbor and one Tanner crab registration area Westward. Kodiak, South Peninsula and Chignik are also part of the State's Westward registration area but not part of the management unit in this FMP.

Registration areas may be further divided into fishing districts, subdistricts, and sections for purposes of management and reporting, although Tanner crab districts and subdistricts correspond most closely to king crab registration areas in regards to size (see Appendix E). Registration areas are characterized by relatively homogeneous established fisheries on stocks of crab that have insignificant transfer of adults between areas. These stocks tend to be fished by the same general class of boats from year to year, with seasons varying somewhat from area to area because of natural causes such as differences in timing of molting and breeding. Geographic remoteness from processing plants and support facilities may further characterize some areas. State regulations require vessels to register for fishing in these areas, and may require vessels to register for specific fishing districts within a registration area. Registration requirements allow estimation of fishing effort and the rate at which the resource will be harvested.

King crab registration areas within the management unit are designated as either exclusive or nonexclusive. Vessels can register for any one exclusive area and are not restricted in their choice, but cannot fish in any other exclusive area during the registration year. They can, however, fish any or all other nonexclusive areas. Fishermen often consider potential harvest, proposed prices, and distances between the fishing grounds and processing facilities when making their selection of an exclusive area. Historically, on a statewide basis exclusive registration areas are relatively small with the exception of Bristol Bay, contain known concentrations of crab, are adjacent to shore, and have well developed fisheries. Nonexclusive registration areas are usually quite large, have developing fisheries, and may contain some sections that are both underutilized and unexplored. The Norton Sound registration area has been designated as a superexclusive area by Federal law.

The use of exclusive area designations can aid in dispersing fishing effort while still allowing the majority of the fleet the opportunity to harvest the majority of the crab. Exclusive registration areas can help provide economic stability to coastal communities or to segments of the industry dependent on an individual registration area's crab stocks, particularly if the character of the fishing fleet and the related industry participants depending upon the registration area's potential production would not allow movement to another registration area. This is particularly advantageous to the less mobile vessels if the area in which they fish is not the most profitable area for the more mobile vessels. This will not necessarily provide greater stability for the less mobile vessels because as fishery conditions change from

[12] As used here, the term "catch" refers to all sources of fishing mortality included in the ACL for a given stock. Thus, for a stock with a total catch ACL, "catch" includes each of the three catch components (non-directed fishery discard losses, directed fishery removals, and directed fishery discard losses). For a stock with a retained catch ACL, "catch" includes only the directed fishery removals.

year to year, the mobile vessels can change the area(s) in which they fish. However, on the average, fewer mobile vessels will fish in the less profitable areas if fishing in multiple areas is restricted. The removal of exclusive area regulations could place extreme economic pressure on smaller or older vessels unable to respond with fishing mobility (Katz and Bledsoe 1977).

Although exclusive registration areas can reallocate catch among different size vessels, it is not always clear which way the allocation effects will go and, therefore, each situation must be studied carefully (Larson, 1984). The specification of registration area, both exclusive and nonexclusive, may be important to attainment of the economic and social objectives of this FMP.

Any designation of an area or district as exclusive must be supported by a written finding by the State that considers all of the following factors to the extent information is available:

1. The extent to which the designation will facilitate proper management of the fishery,
2. The extent to which such designation will help provide vessels with a reasonable opportunity to participate in the fishery,
3. The extent to which such designation will help to avoid sudden economic dislocation. Established processing facilities and fishing fleets within a registration area may provide economic stability for the labor force and affected communities and may be destroyed or adversely affected by an in-season influx of mobile processing plants and additional fishing power,
4. The extent to which the designation will encourage efficient use of vessels and gear,
5. The extent to which the economic benefits conferred by the designation will be offset by economic costs and inefficiencies, and
6. The extent to which other management measures could yield the results desired from the designation.

The following are examples of situations in which the designation or maintenance of the exclusive registration area might be appropriate:

1. The existence of differences in seasons between registration areas that could promote peak harvest rates only at the beginning of each season. Vessels capable of moving rapidly between areas could fish the season opening of more than one area, thereby creating an adverse impact on the vessels that planned on or were capable of fishing just one area for the entire season.
2. The occurrence of ex vessel price settlements at different times in different registration areas, causing concentration of fishing and processing effort in registration areas that have completed price settlements.
3. Historic profitable utilization of the crab resource of an area by a fleet that could not be used to fish in more distant areas, and by processors heavily dependent for their supplies of crab upon the activities of that fleet.
4. Crab populations that vary in availability or on a seasonal basis may trigger effort shifts between registration areas to maximize the economic returns for a single segment of the overall fishing and processing effort. This provides a significant advantage for mobile processing units and larger vessels capable of operating in a wide range of sea conditions, but which may not in any particular area be as efficient as the less mobile harvesting and processing units that they displace.
5. The crab fishing fleet has experienced rapid growth and advanced in fishing efficiency. There is, therefore, an increasing potential for overharvest of a particular stock, especially during normal fluctuations in crab populations. Situations may exist where, in the absence of limitations, the number of vessels registering for an area or district may possess a one-trip cargo capacity that

exceeds the amount of crab that can be safely taken from that area. The absence of flexibility to modify registration areas in this instance could result in either no fishing or in an overharvest.

6. Registration areas historically fished by small vessels require a longer period of fishing time to harvest crab resources because they cannot fish in bad weather and have limited carrying capacity. Relatively low production levels of inshore fishing grounds combined with inshore migration of king crab stocks over a very long season provide the smaller vessels opportunity to maximize their production capabilities. Larger vessels designed primarily for areas of greater fishing power can adversely affect the economics of established fleets, processing facilities, labor forces, and community dependence on production from the local resource, while failing to maximize utilization of smaller crab stocks.
7. Since fleet capabilities have developed in response to demands within registration areas, they may vary significantly with regard to the volume of fishing gear (pot units) used, the ability to transport quantities of pot gear, and the severity of the weather in which they can fish. These factors and others can place a fleet comprised of mostly small vessels at a distinct disadvantage.
8. Some registration areas contain several discrete harvestable stocks of crab, which become available to the fishery at different periods during the season. These registration areas tend to develop fleets with less fishing power and also less overhead costs. The best yield from this type of fishery is usually attained by avoiding pulse fisheries, which harvest high volume from the immediately available stocks and tend to overharvest some stocks and underharvest others.

3.5.4 Harvest Limitations for AFA vessels

The Council may provide crab harvesting sideboard recommendations to the Board of Fisheries for each king and Tanner crab species. The State of Alaska, through the Board of Fisheries, may issue regulations, as described within Category 2 and 3 of this FMP, to establish an allowable harvest percentage of the GHL by AFA eligible vessels in any BSAI crab fishery, and to govern the in-season management of any sideboard harvest levels established for AFA eligible vessels.

3.5.5 Pot Limits

This FMP authorizes the State to use pot limits to attain the biological conservation objective and the economic and social objective of this FMP. In establishing pot limits, the State shall consider, within constraints of available information, the following: (1) total vessel effort relative to TAC/GHL, (2) probable concentrations of pots by area, (3) potential for conflict with other fisheries, (4) potential for handling mortality of target or nontarget species, (5) adverse effects on vessel safety including hazards to navigation, (6) enforceability of pot limits, and (7) analysis of effects on industry.

Pot limits must be designed in a nondiscriminatory manner. For example, pot limits that are a function of vessel size can be developed which affect large and small vessels equally. Historic data on pot registration and LOA could be used for developing pot limit regulations.

Only special types of situations warrant the use of pot limits. There are at least two such cases. First, because the deployment of excessive amounts of gear may result in high amounts of wastage due to pots lost to advancing ice cover, pot limits may be a useful measure to attain the biological conservation objective. Second, it may not be possible to satisfy conservation concerns in a fishery using excessive amounts of gear to catch a relatively small guideline harvest from a depressed stock. Lacking ability to regulate the total number of pots placed on the grounds, it would otherwise be necessary to prohibit the fishery from ever opening. A limited but highly valuable fishery would be foregone. In this instance, prohibition of the fishery would satisfy biological conservation concerns, but the economic and social objective would not be satisfied. Rather, a pot limit would provide a mechanism to attain the economic and social objective within biological conservation constraints.

3.5.6 Sex Restrictions

Unless a surplus is determined to be available, female crabs cannot be taken. The surplus would be dependent on the number of crabs above the threshold amount used in the spawning stock calculation of OY. Most west coast crab fisheries take only male crab, a restriction that is assumed to contribute to maximum reproductive potential. The data base to support or reject an extensive harvest of female king or Tanner crab is poor.

Harvesting female king crab has not been an issue in past management of the king and Tanner crab fisheries. While management philosophy endorses a limited fishery for females in years of high abundance, industry has shown little interest. Not only are females considerably smaller than males of the same age, but the proportion of recoverable meat is much less than that of males of the same size. When a surplus of crabs is determined, this plan authorizes experimental harvest and processing of females by a State permit if fishermen provide accurate documentation of harvest rates and location, and processing and marketing results are made available to the management agency.

3.5.7 Minimum Size Limits

The FMP authorizes the State to adjust size limits under State regulations. In establishing minimum size limits, the State can consider, within constraints of available information, the following: (1) size at maturity (physiological, functional, or morphometric), (2) protection of reproductive capability, (3) market and other economic considerations, (4) natural and discard mortality rates, (5) growth rates, and (6) yield per recruit.

Typically, biological considerations such as (1), (2), and (4)-(6) are used to establish minimum legal size limits to ensure that conservation needs are served. Generally, preference for larger crabs based upon market and other economic considerations is achieved through processor/harvester agreements. If minimum size limits are proposed to be changed, an analysis with appropriate documentation will be presented.

Minimum size limits are commonly used in managing crab fisheries, and are important in meeting both the biological conservation and economic and social objectives of this FMP. The use of the estimated average size of maturity is intended to allow crabs to mate at least once before being subjected to harvest. Evidence available for red king crab suggests that recently matured males may not enter into mating activity until one or two years after attaining maturity, while studies on Tanner crab suggest that this period of delay does not exist. Thus, minimum size limits may be set at various intervals above the average size of maturity depending on a species life history pattern. In developing fisheries with insufficient information, there may be no size limit set.

Prior to the use of legal minimum size limits, minimum size of crabs landed was probably dictated by industry economic conditions, and to a large extent economics continues to play an important role. The legal minimum size limit for the Tanner crab species *C. opilio* has been 3.1”, based on information on size of maturity and reproductive behavior. However, the average minimum size of crab landed since the inception of the domestic fishery has been in the range of 4.0” to 4.5”. This reflects the desire for larger crabs by the processing sector. In March 2011, the Board approved a new minimum size limit harvest strategy for *C. baridi* effective for the 2011/12 fishery. Prior to this change, the minimum legal size limit was 5.5” throughout the Bering Sea District. The minimum size limit for the fishery to the east of 166oW is now 4.8” and that to the west is 4.4”. The average minimum size retained tends to be larger, thus the processing sector’s preference for larger crab is accommodated by the industry, rather than through regulation.

Minimum size limit regulations interact closely with Total allowable catch (TAC) regulations (see Section 3.5.2). The minimum commercial size limit has been determined for each area by using the size when 50 percent of the male population is sexually mature and adding the estimated dimensional growth of males up to a two-year period. This normally would give each male the opportunity to reproduce at

least once before becoming vulnerable to the fishery. The minimum size limit serves to determine the portion of the total male stock that is subjected to exploitation. The TAC for a given season and area is established by applying an exploitation rate to the commercial fraction of the males defined as legal by the minimum size limit in effect.

3.5.8 Fishing Seasons

Fishing seasons are used to protect king and Tanner crabs during the molting and mating portions of their life cycle. Normally the fisheries have been closed during these sensitive periods to protect crab from mortality caused by handling and stress when shells are soft, and to maximize meat recovery by delaying harvest until the shells have filled out. Fisheries conducted during sensitive biological periods have been, and should be in the future, carefully designed to prevent any irreparable damage to the stocks.

Closed seasons have been set to maximize the reproductive potential of the king and Tanner crab populations based on one or more of the following conditions:

1. Protection of any breeding population of male crab that may form dense schools prior to and during annual migrations into shallow water breeding grounds. Such migrations have been described for red king crab and could possibly occur with other crabs.
2. Consideration of molting periods so that the shells have hardened enough to permit handling with minimal damage or mortality.
3. Protection of the population during sensitive soft-shell periods.
4. Consideration of increasing product quality.
5. Minimization of bycatch.

At times, seasons have been set that conflict with some of the preceding conditions. Such openings historically have been based on one or more of the following considerations:

1. Provision for an exploratory fishery.
2. Compensation for particularly adverse environmental conditions, such as sea ice covering the fishing grounds.

The biologically sensitive period in the life cycle of both king and Tanner crabs within the management unit is generally from late winter to early summer. Part of the Tanner crab fishery has occurred during the mating period, although the timing of seasons for individual stocks may vary. Very little information is available on the sensitive period for golden king crab. The information that is available for golden king crab indicates that mating, molting, and hatching occur throughout the year and a sensitive period cannot be defined. Crab harvests frequently occur over a short period of time. Therefore, there is an opportunity to look beyond strictly biological conditions when setting season openings.

Within biological constraints, the open fishing season has been set:

1. To minimize the amount of deadloss. Deadloss has been found to increase if crabs are in soft-shell condition, if they are held for long time periods, if holding tanks are contaminated with fresh or warm water, or if crabs are handled too often.
2. To produce the best possible product quality.
3. To minimize fishing during severe weather conditions.
4. To minimize the cost of industry operations.
5. To coordinate the king and Tanner crab fisheries with other fisheries that are making demands on the same harvesting, processing, and transportation systems. Seasons can be timed relative to one

another to spread fishing effort, prevent gear saturation, and allow maximum participation in the fisheries by all elements of the crab fleets, and

6. To reduce the cost of enforcement and management before, during, and after an open season, as affected by the timing and area of different king and Tanner crab seasons, and as affected by seasons for other resources.

King and Tanner crab seasons may be combined to minimize handling mortality, to maximize efficiency, and to reduce unnecessary administrative and enforcement burdens. Seasons may also be combined when a given species is taken primarily as an incidental catch; for example, *C. bairdi* are taken incidental to the red king crab fishery in Adak. Such considerations are secondary, however, to optimal utilization of each species. Specification of fishing seasons is important in achieving biological conservation, economic and social, vessel safety, and gear conflict objectives of this FMP.

3.5.9 Closed Waters

Subsistence fisheries in the BSAI area have been protected by closing to commercial fishing those waters fished in the subsistence fishery. The FMP recognizes State regulations that prohibit commercial fishing for king crab in waters within 10 miles of mean lower low water around St. Lawrence, King and Little Diomede Islands. The FMP also recognizes the following State closure to protect the Norton Sound subsistence king crab fishery:

All waters of the Norton Sound Section enclosed by a line from 65°23' N. lat., 167° W. long. to 64°15' N. lat., 167° W. long. to 64°15' N. lat., 162° W. long. to 63°27' N. lat., 162° W. long. are closed to the taking of king crab for commercial purposes during the summer season, currently August 1 to September 3. According to current State regulations, the State may reduce, by small increments, the closed waters to no less than 3 miles from mean lower low tide to allow the commercial king crab fishery to efficiently obtain the allowable harvest of red king crab.

The State may designate new closed waters areas or expand or reduce existing State closed waters areas. In making such changes, the State shall consider appropriate factors to the extent data are available on: (1) the need to protect subsistence fisheries, (2) the need to protect critical habitat for target or non-target species, (3) the prevention of conflict between harvesting of species, and (4) the creation of navigational hazard.

3.5.10 In-season Adjustments

The FMP authorizes the State to make in-season adjustments to GHLs and to fishing period lengths and to close areas under State regulations. In making such in-season adjustments, the State shall consider appropriate factors to the extent in-season data is available on: (1) overall fishing effort, (2) catch per unit of effort and rate of harvest, (3) relative abundance of king or Tanner crab, (4) achievement of GHLs, (5) proportion of soft-shelled crabs and rate of deadloss, (6) general information on stock condition, (7) timeliness and accuracy of catch reporting, (8) adequacy of subsistence harvests, and (9) other factors that affect ability to meet objectives of the FMP.

After registration areas are opened, seasons set, minimum sizes, and TACs established preseason, events can occur in-season which would disrupt the management scheme and resultant economic benefits to the nation. When a preseason prediction proves to be incorrect or when an unanticipated event occurs which affects preseason predictions, compensatory in-season adjustments must be made to keep the management system on track toward the biological and economic objectives of this FMP. In-season adjustments and analysis will be conducted within the constraints of this FMP.

All in-season adjustments must be recorded and justified in writing. These justifications are attached to the emergency order and will be made available for review to the public, the State, the NMFS, and other regulatory agencies.

The State monitors the condition of king and Tanner crab stocks through such data and information as are practically available, both preseason and in-season. When the State, in close communication with the NMFS, finds that continued fishing effort would jeopardize the viability of king or Tanner crab stocks within a registration area, or continued fishing would be counter to the goal and objectives established by this FMP, the registration area or a portion of the registration area is closed by emergency order. In determining whether to close a registration area, the State shall consider all appropriate factors to the extent there is information available on such factors. Factors to be considered for king and Tanner crabs include:

1. The effect of overall fishing effort within the registration area.

   Large amounts of effort, vessels, and pots are often concentrated on crab aggregations. In extreme cases, high amounts of gear loss because of entanglement, and propeller contact result in wastage and unknown levels of harvest. In these limited areas, high levels of sorting of females and resultant mortality, and high levels of handling and sorting of nonmarketable crab because of soft-shell conditions result in wasted product and non-quantified harvests to the crab stocks. In-season data concerning these practices can result in emergency closures of limited areas where these conditions occur, resulting in a more orderly fishery, reduced gear loss, less wastage, and the ability to meet the biological conservation objective, as well as other objectives identified in this FMP. This provision also addresses the ability of the ADF&G to close a registration area when the projected harvest equals or exceeds the TAC/GHL established for the registration area.

2. Catch per unit of effort and rate of harvest.

   In addition to using CPUE to provide estimates when preseason TAC/GHLs are to be attained, these data are also analyzed in-season to check survey accuracy used to establish stock abundance levels and TACs/GHLs. Often the effort expended in surveys is limited, particularly when compared to the sampling power of the commercial fleet. However, standardization of effort of the commercial fleet is always a limiting factor in interpreting in-season data. If in-season data analysis suggests stocks are significantly higher or lower than indicated by survey, TACs/GHLs may be adjusted in-season using the new in-season estimates. Exploitation rates are generally not changed in-season, unless the estimates of stock levels using in-season data are so different from preseason estimates that different exploitation rates are necessary.

   In cases where annual survey data are either unavailable, or unreliable, in-season data are relied on heavily. Such provisions are essential for prevention of overfishing and adherence to the biological conservation objective of this FMP. To the degree exploitation rates are established to meet economic and social objectives, this provision could be used to maximize economic benefits as well.

3. Relative abundance of king or Tanner crab within the area in comparison with preseason expectations.

   Relative abundance is usually established by comparison of current in-season data with trends established over time within the current season or comparison with previous year's CPUE data. In certain cases, survey data may be obtained during an open fishery. These relative abundance data of king and Tanner crab stocks would be applied immediately to adjustment of TACs/GHLs as stated previously under item 2. This factor is usually considered as additional analysis of the data obtained or established under factors 1 and 2 previously discussed.

4. Such TACs/GHLs as may be promulgated by State regulations.

   The primary use of in-season emergency order authority is when an established TAC is reached and the fishery is to be closed within current State regulations established within the framework procedures listed in this FMP. The midpoint of the TAC is usually targeted except in cases where

in-season data and analysis, or other provisions discussed in this section, require closure either before or after obtaining the established TAC, or below or above the range associated with the GHL.

5. The proportion of soft shell king or Tanner crab being handled and proportion of deadloss.

   This factor is paramount to ensure product quality and prevention of unnecessary wastage. When deliveries of crab require significant levels of discard because of deadloss or unmarketable crab, a portion or all of a registration area may be closed to further harvest. Such closures are issued when sorting is of sufficient magnitude, at sea or at the unloading site, to have significant impacts on product quality or significant wastage. Rates of discard will vary; fixed rates are generally not established because factors modifying such decisions include the availability of non-molting crab within the registration area and the degree of alternative areas available to fish that have low rates of soft shell crab or molting crab. Even though local areas of high molting may occur, often other areas are available for harvest, and economic forces cause the fleet to move to those areas with acceptable handling mortality and deadloss associated with the harvest. The ability of managers to consider these factors without rigidly establishing formulas for issuing closures provides for continued fishing when the biological or economic consequences will be minimal, even though short periods of high sorting in local areas may occur. Such flexibility allows the State to meet the biological conservation objective, as well as the economic and social objective established in this FMP.

6. General information on the condition of the king or Tanner crab stocks within the area.

   This factor, in addition to including the soft-shell or molting conditions discussed previously, includes the salability of the product. Discard of large amounts of old shell crab that have no market value but are capable of mating and assisting in reproduction is one of the factors considered. In cases where diseases or parasites affect product quality, emergency order closures of portions of a stock could benefit the industry significantly, while allowing continued harvest of portions of the stock that have high quality crab. Low yields from newly molted crab are also a factor which may be considered when wastage levels are high in comparison to the economic value of the harvest. Use of this factor primarily addresses the economic and social objective established by this FMP.

7. Timeliness and accuracy of catch reporting by buyers, fishermen, or vessel operators within the registration area to the extent that such timeliness or accuracy may reasonably be expected to affect proper management.

   Management of a commercial fishery depends upon appropriate and timely data. In that in-season closure decisions almost always result in short-term loss of income for the participating commercial fleet and the processing industry, even though these closures will in the long run ensure long-term economic viability of these same participants, the temptation to underreport or misreport is obvious. Without accurate data, the management process breaks down. Therefore, the State may close a fishery if the timeliness and accuracy of catch reporting is inadequate. Only with this provision does the State have the ability to ensure compliance with reporting requirements and retain the ability to accurately regulate the fishery within the objectives established by this FMP. This factor is used in justifying emergency action only when misreporting is of such magnitude as to jeopardize the management process.

8. Adequacy of subsistence harvests within the registration area.

   If a crab stock has been customarily or traditionally used for subsistence diminishes so that all consumptive uses of that stock cannot be accommodated, State law requires that in most areas of Alaska, subsistence uses have a priority over other uses. Emergency order authority would be used if subsistence fisheries requirements are not being met by established regulations by the

State. Emergency order authority would close commercial fisheries to ensure that subsistence harvests would be achieved without jeopardizing conservation concerns established in the biological conservation objective of this FMP.

3.6 Category 3 Management Measures Deferred to State

3.6.1 Gear Placement and Removal

The FMP defers gear placement and removal requirements to the State. Placement of unbaited gear, with doors secured open, on the fishing grounds before and after a season has been allowed within certain limits. Such early placement or late removal has been justified in light of (1) its lack of biological impacts, (2) enforcement problems and costs borne by the public and the industry, (3) lack of potential gear conflict, (4) the unavailability of loading or unloading facilities and gear storage areas, (5) vessel safety, (6) increasing the competitiveness of smaller vessels, and (7) decreasing fishing costs.

Because of regulations which allow gear placement on the grounds prior to, and immediately following a season, some highly competitive crab fisheries grew out of the need to provide additional time to haul gear to and from the fishing grounds because of limited storage and loading and unloading facilities available to the entire fleet.

3.6.2 Gear Storage

The FMP defers gear storage requirements to the State. Crab pots are generally stored on land or in designated storage areas at sea. Storage in a nonfishing condition in ice-free water areas of low crab abundance also has been justified in light of: (1) expected biological impacts; (2) the potential enforcement costs to the public; (3) the costs to vessel owners of storage on land; (4) the availability of other land and sea storage areas; and (5) the possibility that it would lead to gear conflict.

3.6.3 Gear Modifications

The FMP defers design specifications required for commercial crab pots and ring nets to the State. Pots and ring nets are the specified legal commercial gear for capturing crab in the BSAI area (Section 3.3.1). Multiple pots attached to a ground line are currently allowed by the State in the brown (golden) king crab fisheries. Various devices may be added to pots to prevent capture of other species; to minimize king crab bycatch, the State currently requires tunnel-eye heights to not exceed 3 inches in pots fishing for *C. bairdi* or *C. opilio* in the Bering Sea. Escape mechanisms may be incorporated or mesh size adjusted to allow female and sublegal male crab to escape; the State currently specifies escape rings or mesh panels in regulation for pots used in the BSAI *C. bairdi*, *C. opilio*, and brown (golden) king crab fisheries, in the Bristol Bay king crab fishery, and in the Pribilof District king crab fishery. State regulations also currently require incorporation of biodegradable twine as an escape mechanism on all pots which will terminate a pot's catching and holding ability in case the pot is lost.

3.6.4 Bycatch Limits

The FMP defers the right to implement bycatch limits of other species of crab in the crab fisheries managed under this FMP to the State. Often, regulation of bycatch in the directed fishery involves no, or limited, allocation because the same fishermen participate in both fisheries.

3.6.5 Reporting Requirements

Other than the Federal logbook requirements referenced in Section 3.3.1, assuming that all vessels participating in the fishery are licensed and registered with the State, only State reporting requirements are required by this FMP. Therefore, reporting requirements shall be deferred to the State.

Reporting of crab catches by individual vessel operators was required as early as 1941. Current State requirements (5 AAC 39.130) include: reporting the company or individual that purchased the catch; the

full name and signature of the permit holder; the vessel that landed it with its license plate number; the type of gear used; the amount of gear (number of pots, pot lifts); the weight and number of crab landed including deadloss; the dates of landing and capture; and the location of capture. Processing companies are required to report this information for each landing purchased, and vessel operators are required to provide information to the processor at the time of sale. All reports (fish tickets) are confidential. Reporting requirements ensure adequate information and efficient management and enforcement. The State of Alaska obtains timely information through its current reporting requirements for all vessels participating in the fishery. Additional information is currently available from the State of Alaska shellfish observer program. The price paid for crab is also important information for managing the fisheries and is included on fish tickets but is currently not required information by the State because it is not always available at the time the fish tickets are prepared.

As the commercial Alaskan king and Tanner crab fisheries have grown over recent years, so has our knowledge of these species. Information gained through scientific surveys, research, and fishermen's observations have all led to a better understanding of the biology, environmental requirements, and behavior of the crab stocks. Since fishery managers monitor harvest rates in-season to determine areas of greatest fishing effort, thereby preventing overharvest of individual crab stocks, the current State catch and processing report requirements are an important component in achieving the biological conservation, economic and social, and research and management objectives of this FMP.

Information collected through the State Crab Observer Program (Section 3.6.7) and from industry reports constitutes the standardized bycatch reporting methodology for the crab directed fisheries. The standardized reporting methodology means established, consistent procedures used to collect, record, and report catch and bycatch in the fisheries. Industry members report catch and bycatch through eLandings reports and logbooks. From the information collected through observer and industry reports, management action can be informed pre or post-season in order to mitigate adverse impacts to the extent practicable. The Council will recommend changes to regulations when necessary, on the basis of such information.

3.6.6 Vessel Tank Inspections

The FMP defers tank inspection requirements to the State. Vessel tank, or live-hold and freezer, inspections usually are required before the opening of a king or Tanner crab fishing season to meet the legal requirements for the State's landing laws, provide effort information, and provide for a fair start to the fishery. The State normally considers the following factors when determining whether inspections should be required: (1) enforcement requirements, (2) the ability of the vessels to move easily between the fishing grounds and the location of inspection centers, (3) the time necessary for the vessels to transport their gear from storage areas to fishing grounds, (4) the fuel consumption that the inspection requirement will cause, and (5) the equity of allowing all participants to start the fishery at substantially the same time.

3.6.7 State Observer Requirements

The FMP defers the State Observer requirements to the State. The State may place observers aboard crab fishing and/or processing vessels when the State finds that observers provide the only practical mechanism to obtain essential biological and management data or when observers provide the only effective means to enforce regulations. Observers provide data on the amount and type of bycatch occurring in each observed fishery and estimates of bycatch by species, sex, size, and shell-age/shell-hardness for each observed fishery are currently provided in annual reports by ADF&G.

The State currently requires onboard observers on all catcher/processor or floating-processor vessels processing king or Tanner crab and on all vessels participating in the Aleutian Islands red or brown (golden) king crab fisheries. The State currently may require observers on selected catcher vessels taking red or blue king crab in the Norton Sound section, if ADF&G provides funding for the observer presence.

The State may also require onboard observers in other crab fisheries (e.g., the Pribilof Islands Korean hair crab *Erimacrus isenbeckii* fishery) to, in part, monitor bycatch of king or Tanner crab.

3.6.8 Other

As previously noted, the State government is not limited to only the management measures described in this FMP. However, implementation of other management measures not described in the FMP must be consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law, and may occur only after consultation with the Council. This management measure provides for an expanded scope of Federal review. Other management measures that the State may wish to implement are subject to the review and appeals procedures described in Sections 3.8 and 3.9 of this FMP.

3.7 Procedures for FMP Implementation

Implementation of this FMP requires an annual area management report discussing the current biological and economic status of the fisheries, GHL ranges, and support for different management decisions or changes in harvest strategies as outlined in Section 3.5.2. The Board currently receives proposals for king and/or Tanner crab regulation changes every third year, although the schedule may be modified if necessary. Management decision-making for king and Tanner crab stocks currently follows a relatively predictable schedule. The procedure for managing the fishery and how it encompasses research and fishing input is described in detail in Otto (1985) and Otto (1986) with respect to king crabs, and for this FMP, are illustrated in Figure 3-3. The precise scheduling of the various stages of this procedure may vary slightly from year to year.

The Secretary (through the Council and the National Marine Fisheries Service (NMFS) Alaska Regional Office) and the State have established the following protocol which describes the roles of the Federal and State governments:

1. The Council will develop an FMP (and future amendments) to govern management of king and Tanner crab fisheries in the EEZ of the BSAI, prescribing objectives and any management measures found by the Secretary to be necessary for effective management. The State will promulgate regulations applicable to all vessels registered with the State governing the fisheries in the EEZ that are consistent with the FMP, Magnuson-Stevens Act, and other applicable Federal law. The FMP contains three types of management measures: (1) specific Federal management measures that require an FMP amendment to change, (2) framework type management measures, with criteria set out in the FMP that the State must follow when implementing changes in State regulations, and (3) measures that are neither rigidly specified nor frameworked in the FMP, and which may be freely adopted or modified by the State, subject to an appeals process or other Federal law (see Section 3.9).
2. Representatives from the Council, NMFS, and NOAA General Counsel will participate in the State's development of regulations for management of king and Tanner crabs in the BSAI area, including direct participation in the Board meeting for the purpose of assisting the State in determining the extent to which proposed management measures are consistent with the FMP, Magnuson-Stevens Act, and other applicable Federal law. However, these representatives will not vote on the various management measures. The Secretary will review measures adopted by the State to determine if they are consistent with the FMP, the Magnuson-Stevens Act and its national standards in accordance with Sections 3.8 and 3.9.
3. The Secretary will issue Federal regulations to supersede in the EEZ any State laws that are inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law. The Secretary will consider only those appeals asserting that a State law is inconsistent with the Magnuson-Stevens Act, the FMP, or other applicable Federal law (see Section 3.8).

4. The Alaska Department of Fish and Game (ADF&G) will have responsibility for developing the information upon which to base State fishing regulations, with continued assistance from NMFS. In carrying out this responsibility, ADF&G will consult actively with the NMFS (Alaska Regional Office and Northwest and Alaska Fisheries Center), NOAA General Counsel, the plan team, and other fishery management or research agencies in order to prevent duplication of effort and assure consistency with the Magnuson-Stevens Act, the FMP, and other applicable Federal law.
5. The FMP provides that the Commissioner of ADF&G, or his designee, after consultation with the NMFS Regional Administrator, or his designee, may open or close seasons or areas by means of emergency orders (EO) authorized under State regulations. Interested persons may appeal these actions to the Secretary for a determination that the emergency orders are consistent with the Magnuson-Stevens Act, the FMP, and other applicable Federal law. If the Secretary determines that the State action is inconsistent with the above, the Secretary will issue a Federal regulation to supersede the State EO in the EEZ (see Section 3.9).
6. A special means of access to the BSAI king and Tanner crab regulatory process for nonresidents of Alaska will be provided through an advisory committee. This Pacific Northwest Crab Industry Advisory Committee (PNCIAC) shall be sanctioned by and operate under the auspices of the Council. This is necessary because State law does not provide for the formation of a Board advisory committee located outside the State. This PNCIAC shall be recognized by the State as occupying the same consultative role on preseason and in-season management measures as all other existing State of Alaska Fish and Game Advisory Committees, no more and no less. The Council shall establish general guidelines and membership qualifications for the advisory group which shall be substantially similar to those guidelines established by the State pertaining to existing advisory committees. Within this framework the advisory committee shall establish its own by-laws and rules of procedure.
7. The PNCIAC shall be industry funded, but may request staff support from the Council, NMFS, and ADF&G as needed. The PNCIAC shall meet at appropriate times and places throughout the year to review and advise the State and the Council on crab management issues, stock status information, and biological and economic analyses relating to the BSAI king and Tanner crab fisheries. In addition, the PNCIAC shall report to the Council on any relevant crab management issue by filing reports as appropriate. The Council will also review reports as appropriate from other crab advisory committees that normally report to the Board. The PNCIAC shall review and advise the State on proposed preseason management measures. During the fishing season, the PNCIAC, on the same basis as any other Board advisory committee, shall monitor ADF&G reports and data, may recommend to ADF&G the need for in-season adjustments, and may advise on decisions relating to in-season adjustments and "emergency-type" actions. The PNCIAC may request review of any relevant matter to the Crab Interim Action Committee (discussed below) and may bring petitions and appeals in its own name pursuant to Sections 3.8 and 3.9 of this FMP, as may any other Board advisory committee.
8. A Crab Interim Action Committee (CIAC) shall be established by the Council for the purpose of providing oversight of this FMP and to provide for Council review of management measures and other relevant matters. The CIAC shall be composed of the following members:

   Regional Administrator, NMFS, or his designee
   Commissioner, ADF&G, or his designee
   Director, Washington State Department of Fisheries, or his designee

   There are three types of review the CIAC may engage in:

   A. Category 1 Appeals of a Preseason Management Decision

In accordance with Section 3.8 of the FMP, any appeal of a preseason management decision that is rejected by the Board and subsequently appealed to the Secretary will be reviewed by the CIAC prior to the appeal being reviewed by the Secretary. The CIAC will have no authority to grant or reject the appeal, but shall comment upon the appeal for the benefit of the Secretary.

B. Category 2 Appeals of an In-season Management Decision

In accordance with Section 3.9 of the FMP, the Secretary will, to the extent possible when reviewing any appeal of an in-season management decision, communicate with the CIAC in advance of making his decision whether to grant or reject the appeal in order to solicit the CIAC's comments on the management decision at issue.

C. Category 3 Other

This category includes preseason management measures, in-season adjustments, and other matters relative to this FMP that fishery participants believe warrant Council action or attention, and which fall outside the Council's normal schedule for reviewing the FMP. The CIAC will not review any management decision or action that is concurrently being reviewed through the appeals process as outlined in Sections 3.8 and 3.9. Such requests for review shall clearly identify the management measures to be reviewed and shall contain a concise statement of the reason(s) for the request.

The CIAC shall function similarly to the Council's Interim Action Committee. The CIAC shall consider each request for review to determine whether the management measure(s) or other relevant matter(s) is consistent with this FMP (including compliance with framework criteria), the Magnuson-Stevens Act, and other Federal law. Following its review, the CIAC will comment on the appeal in the case of Category 1 and 2 reviews; may determine no action is necessary on the Category 3 request; or, for any of the Categories, recommend the issue to the Council for full Council consideration. In all cases, the CIAC shall issue its findings in writing.

9. The State will provide written explanations of the reasons for its decisions concerning management of crab fisheries. For emergency orders, the current EO written justification provided by the State meets this requirement.
10. An annual area management report to the Board discussing current biological and economic status of the fisheries, GHL ranges, and support for different management decisions or changes in harvest strategies will be prepared by the State (ADF&G lead agency), with NMFS and crab plan team input incorporated as appropriate. This report will be available for public comment and presented to the Council on an annual basis. GHLs will be revised when new information is available. Such information will be made available to the public.
11. Federal enforcement agents (NOAA) and the U.S. Coast Guard (DOT) shall work in cooperation with the State to enforce king and Tanner crab regulations in the BSAI area.

Figure 3-3 *A Placeholder for a Figure detailing the Annual cycle of management decision making for king and Tanner crab stocks and its interaction with fisheries and resource assessment. Regulatory proposals are addressed every three years by the Alaska Board of Fisheries. This figure will be added prior to the Secretarial review draft.*

3.8 Procedure for Council/Secretary of Commerce Participation

Prior to the Board Meeting

Commencing on the date the Secretary approves this FMP, and until the next regularly scheduled Board meeting concerning crab regulations, any member of the public may appeal any existing regulation to the

State[13] and, if unsuccessful, to the Secretary, and any Alaska Statute to the Secretary, in accordance with the procedure set forth below. Secretarial review is limited to whether the challenged statute or regulation is consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law.

At the Board Meeting

Before the annual Board meeting, the public has an opportunity to petition the State for new regulations or repeal of existing regulations. Copies of all proposals will be available to the public and to NMFS and the Council. Representatives of NMFS, NOAA's Office of General Counsel, and the Council will meet with the State and will participate in the State's discussions and deliberations for the purpose of assisting the State in determining the extent to which proposed management measures fall within the scope of the FMP, the Magnuson-Stevens Act, and other applicable Federal Law. However, these representatives will not vote on the various management measures.

After the Board Meeting

After the meeting, the procedure for review of the resulting crab regulations follows two paths:

First, under the State Administrative Procedure Act an interested person may petition the Board for the adoption or repeal of a regulation. A member of the public who objects to a crab regulation must first appeal through this procedure and must receive an adverse ruling which will be reviewed by the CIAC prior to the appeal being reviewed by the Secretary. The CIAC will have no authority to grant or reject the appeal, but shall comment upon the appeal for the benefit of the Secretary. An appeal to the Board is not limited to a challenge that the proposed regulation is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law. The Secretary will, however, consider only challenges to regulations alleging that the new regulations are inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law. The Secretary will not respond to comments that merely object to a regulation or state that an alternate regulation is better unless the interested person ties the objection to the appropriate standard of review. This will allow the Secretary to disregard frivolous comments and to encourage interested persons to participate fully in the State procedures before seeking Secretarial intervention. Nothing in this FMP is intended to limit any opportunity under the State Administrative Procedure Act for an interested person to seek judicial review of regulations.

The second path of review will be a Secretarial review of the measures adopted by the Board. During this review, the Secretary will review any measure adopted by the Board for consistency with the FMP, the Magnuson-Stevens Act, and other applicable Federal law. The Secretary will also consider comments submitted by the Council on any measure adopted by the State during the 20 days after the end of the Board meeting. The Secretary may hold an informal hearing, if time permits, to gather further information concerning the regulations under review. The Secretary will consider only comments on whether the new regulations are consistent with the FMP, the Magnuson-Stevens Act and other applicable Federal law.

If, as a result of its own review, or its review of comments received, or as a result of an appeal of an adverse decision in the State appeal process, the Secretary makes a preliminary determination that a regulation is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, then the Secretary will:

1. publish in the Federal Register a proposed rule that is consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law, together with the reasons for the rule, and request comments for 30 days, and
2. provide actual notice of the proposed rule to the Council and the Commissioner of ADF&G. The State will have 20 days to request an informal hearing.

[13] Current Board policy limits petitions to the subject of conservation emergencies.

If, after reviewing public comments and any information obtained in an informal hearing, the Secretary decides that the State regulations in question are consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law, the Secretary will publish in the Federal Register a withdrawal of the proposed rule, and so notify the State and the Council.

If the State withdraws the regulation or states that it will not implement the regulation in question, the Secretary will publish in the Federal Register a withdrawal of the proposed rule. The State may choose to withdraw its rule as a result of its own appeals procedure or because of the review procedure set up under this FMP.

If, after reviewing public comments and any information obtained in an informal hearing, the Secretary decides that the regulations in question are inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, the Secretary will publish in the Federal Register a final rule that supersedes the State regulation in the EEZ. Such rules are Federal regulations, which will comply with Federal rulemaking procedures and be enforced as Federal law.

If preseason changes are made at a Board meeting which takes place later in the year than anticipated here, or if there is not time to follow the procedure described in this section so that any final Federal rule that may be necessary can be effected in a timely fashion, the Secretary will notify the Council and the Commissioner of ADF&G that he will use an expedited review procedure, possibly including deletion of the requirement for initial appeal to the State, and explain what the procedure is. In the expedited review, the Secretary will provide for comment by the Council (or a committee of the Council) and the Commissioner of ADF&G if at all possible. However, if necessary, the Secretary can immediately publish in the Federal Register an interim final rule that supersedes in the EEZ any State regulation that the Secretary finds is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, and ask for comments on the interim final rule.

3.9 Procedure for Appeal

For the purposes of this section, an in-season appeal is an appeal of any action by the State, other than an action taken by the State that NMFS had already reviewed in the process described above. It includes an appeal of an action of the Board, of the ADF&G, or of the State legislature. The in-season appeal process is limited similarly to the preseason review process, in that the Secretary will only consider appeals that the State regulation is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law. For example, where State in-season, discretionary action is alleged to violate a Magnuson-Stevens Act National Standard, a management measure fixed in the FMP, or fails to follow the criteria set forth in the FMP for a decision under a frameworked management measure, an appeal to the Secretary would be appropriate. The Secretary will not consider appeals that merely state that the appellant does not like the regulation or prefers another. The latter argument is to be presented to the State.

If a person believes that an in-season action of the State is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, the person must, within 10 days of the issuance of the in-season action, submit to the Secretary in writing a description of the action in question and the reasons that it is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law. The Secretary will immediately provide a copy of the appeal to the CIAC and the Commissioner of ADF&G. The Secretary will, to the extent possible when reviewing any appeal of an in-season management decision, communicate with the CIAC in advance of making his decision whether to grant or reject the appeal in order to solicit the CIAC's and the Commissioner's comments on the management decision at issue. If time permits, he will allow them 5 days for comment on the appeal. If the Secretary determines that there is not sufficient time available for this review, he will seek comments by telephone from the Commissioner of ADF&G and from the Council.

State crab regulations grant certain rights to appeal in-season area closures. An interested person may wish to pursue State appeal procedures along with the procedure described here. If, after review of the appeal and any comments from the Commissioner of ADF&G and the Council, the Secretary determines that the challenged action is consistent with the FMP, the Magnuson-Stevens Act, and other applicable Federal law, he will so notify the appellant, the Commissioner of ADF&G, and the Council.

If, after review of the appeal and any comments of the Commissioner of ADF&G and the Council, the Secretary finds that the in-season action is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, and that for good cause he must immediately issue Federal regulations that supersede State regulations in the EEZ, he will publish in the Federal Register the necessary final Federal rule and request comments on the rule.

If, after review of the appeal and the comments of the Commissioner of ADF&G and the Council, the Secretary makes a preliminary determination that the action is inconsistent with the FMP, the Magnuson-Stevens Act, or other applicable Federal law, but that Federal regulations that supersede the State regulation in the EEZ need not be implemented immediately, he will follow the procedure for preseason actions (see Section 3.8). That is, he will publish a proposed rule in the Federal Register and request comment, provide the State with an opportunity for an informal adjudicatory hearing, and either withdraw the proposed rule or publish a final rule that supersedes the State rule in the EEZ. This would be a Federal action and would comply with Federal rulemaking procedures.

4 Description of Stocks and Fishery

4.1 History of the Fishery

Historical exploitation of crab fisheries in the BSAI has been occurring since the early 1930s. A brief summary of exploitation, including foreign fishing, on the resource is detailed below.

The red king crab resource in the eastern Bering Sea was exploited by Japan in the 1930s and small amounts of Tanner crab were harvested beginning in 1953 (Zahn 1970, Otto 1981). The king crab fishery in the BSAI area underwent rapid development. After a short lived, small-scale American fishery in the late 1940s and 1950s, the Japanese reentered the fishery in 1953 and the Soviet Union entered the fishery in 1958. During 1964, the United States arranged bilateral agreements with Japan and the U.S.S.R. The foreign fisheries were gradually supplanted by an entirely American fishery which has had more than enough capacity to harvest and process the total resource since the late 1960s. Foreign fisheries for king crabs ceased in 1974 and those for Tanner crabs ceased in 1980.

Prior to Alaska statehood, the U.S. Bureau of Commercial Fisheries managed the crab fishery off Alaska. The Bureau established a minimum size limit, prohibited retention of soft shell and female crabs, and prohibited the use of tangle nets and set a minimum size for trawl nets. After achieving statehood, regulatory authority was vested in the Board with management responsibility assigned to the ADF&G. The Board adopted the Bureau's regulatory regime and added a registration system designed to protect local fleets and enhance management ability. By 1960, due to the expansion of the fishery, the State enacted landing laws which prohibited the sale or transportation within State waters of migratory fish and shellfish taken on the high seas unless they were taken in accordance with State regulations. In 1970, the Board reacted to a rapid decline in the Kodiak king crab fishery by establishing a quota system, which was designed to allow a significant portion of the recruit class to be held over for the next year. This quota system was intended to moderate extreme fluctuations in harvest levels associated with the previous recruits-only fishery, and to enhance the reproductive potential of the stocks. In 1975, the Board modified the catch quota system to GHLs, which were expressed as a range instead of a point estimate. This gave the State greater flexibility in selecting the most opportune point at which to close individual fisheries since more weight could be given to data collected during the course of the fishing season.

The domestic Tanner crab fishery in the BSAI area underwent rapid development in the 1970's. Both *C. bairdi* and *C. opilio* are harvested in the Bering Sea and *C. bairdi* is harvested in the waters off the Aleutian Islands. The first reported catch of *C. bairdi* within the management unit was 17,900 pounds taken incidental to the Bering Sea king crab fishery in 1968. *C. bairdi* soon became a target species, and by 1976 approximately 22.9 million pounds were landed from the BSAI area.

The BSAI crab fisheries have fluctuated drastically since the 1970s, and many are in a depressed state currently. As of 2023, *C. opilio*, PIBKC, and SMBKC are in rebuilding plans due to biomass falling below the minimum stock size threshold (MSST), more details of the rebuilding plans can be found in Section 3.2.2. In 2021, four crab fisheries of the of the 10 crab stocks and 11 fisheries managed under the BSAI King and Tanner crab FMP, were open to targeted fishing and were actively prosecuted, including the *C. opilio* fishery, both Eastern and Western AIGKC, and the Western Bering Sea *C. bairdi* (WBT) and PIGKC fisheries. ADF&G closed the BBRKC fishery for the 2021/22 and 2022/23 seasons, given low numbers of mature females in the population. Both the Eastern Bering Sea Tanner (EBT) and SMBKC fisheries were closed to targeted fishing by ADF&G for the 2016/17 and subsequent crab seasons; in October, 2018, the Council declared the SMBKC fishery to be overfished and adopted a rebuilding plan in June, 2020. The NSRKC fishery was declared open by ADF&G for the 2021 season, however, the principal buyer of commercial NSRKC landings continued its suspension of purchasing from the fishery that began in 2020, and the fishery did not operate during 2021 (Nichols et. al., 2022). The PIBKC stock has been designated overfished, and the combined PIBKC and PIRKC fishery has been closed, since 1999. To date, there has been no stock survey for WAIRKC and therefore no basis for stock status determinations, and the fishery has been closed since 2003/2004. For the most recent 2022 biomass, TAC and retained catch values see Section 4.2. Updated information surrounding stock status, retained catch, revenue, and other fishery statistics the SAFE and economic SAFE provide the most updated information.

4.2 Stocks

There are 10 federally managed stocks in BSAI area (Table 4-1). In most cases, these stocks are geographically separable on the basis of distribution and differing biological characteristics and interchange with adjacent groups is limited to oceanographic transport of planktonic larvae. In some cases, however, stocks are merely defined by existing regulatory boundaries either for statistical purposes or because pertinent information is lacking. A map showing the general location of BSAI crab fisheries is shown in Figure 4-1. Additional information about the BSAI registration areas can be found in Appendix E.

Table 4-1 Stocks of king and Tanner crab in the BSAI area.

Aleutian Islands golden king crab	Probably separated from Bering Sea stocks by an area of sparse king crab abundance north of Unimak Pass. There may be various distinct biological groups in the area (see Otto and Cummiskey 1985, Somerton and Otto 1986).
Aleutian Islands red king crab	One or several distinct groups that are geographically separated by deep water trenches in passes between islands and from Bering Sea stocks by an area of sparse king crab abundance north of Unimak Pass.
Bristol Bay red king crab	A distinct biological group (see Otto et al. 1989). Blue and golden king crab also occur here in low abundance but are not separately managed.
Pribilof District blue king crab	A distinct biological and geographic group (see Otto and Cummiskey 1990, Somerton and MacIntosh 1983a, 1983b).
Pribilof District red king crab	A distinct biological and geographic group.
Pribilof District golden king crab	Probably two biological groups (Pribilof and Zhemchug Canyons) that are not entirely geographically distinct from each other or from golden king crab found in Bristol Bay or the Northern District (see Otto and Cummiskey 1985, Somerton and Otto 1986).
St. Matthew Section blue king crab	A distinct biological and geographic group (see Otto and Cummiskey 1990, Somerton and MacIntosh 1983a, 1983b).
Norton Sound Section red king crab	A distinct biological and geographic group (see Powell et al. 1983, Otto et al. 1989).
Bering Sea District *C. bairdi*	Probably distinct from group(s) in Aleutian Islands. Probably consists of two groups (east and west) that differ biologically (see Somerton 1981).
Bering Sea District *C. opilio*	Considered as distinct because species is almost absent from Aleutians. Gradations in biological characteristics over their geographical range. Probably continuous with populations found in Soviet waters.

Figure 4-1 *A placeholder for a figure detailing the general location of crab fishing activity in the BSAI. This figure will be added prior to the Secretarial review draft.*

The boundary of the management unit extends to the outer limit of the EEZ, and the seaward boundary of the registration areas, district, and subdistricts is fixed by state regulations. Alaska's registration areas can be found at https://www.adfg.alaska.gov/index.cfm?adfg=CommercialByFisheryshellfish.shellfishmaps. BSAI crab stocks in the Bering Sea are managed by the State of Alaska through a federal BSAI king and Tanner crab fishery management plan (FMP). Under the FMP, management measures fall into three categories: (1) those that are fixed in the FMP under Council control, (2) those that are frame worked so the State can change following criteria outlined in the FMP, and (3) those measures under complete discretion of the State. The State requires vessels to register with the state by obtaining licenses and permits, and register for each fishery and each area. Observers requirements are delegated to the State of Alaska. The most up to date information regarding fishing seasons and fishery closures is reported by ADF&G. In-season management is delegated to ADF&G, and decision-making is based on preseason specification of TAC. Area management biologists may issue emergency orders closing fisheries, but final decisions are made by the Commissioner or his designee.

Many of the federally managed stocks are managed on the crab fishing year (1-July to 30-June) rather than the calendar year. Table 4-2 details the current seasons for crab, recognizing that setting season dates is delegated by the State of Alaska, and are subject to change. The 10 federally managed crab fisheries are currently prosecuted using mesh covered pots.

Table 4-2 Fishing seasons for king and Tanner crab stocks in the BSAI area (second seasons for larger crabs are also possible by State emergency order (EO).

	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
C. bairdi	POT										POT	
C. opilio	POT										POT	
Blue king crab	POT										POT	
Golden king crab	POT									POT		
Red king crab	POT										POT	

Source: Alaska Department of Fish and Game Commercial Shellfish Regulations

4.2.1 Status of Stocks

The following sections summarize the status of the various crab stocks of commercial importance in the BSAI. More detailed assessments and current estimates of biomass and acceptable biological catches can be found in the Stock Assessment and Fishery Evaluation (SAFE) report, that is produced by the Crab plan team (available at https://www.npfmc.org/fisheries/bsai-crab/). The information in this section comes from the 2022/2023 SAFE reports. The report consists of the status of stocks report and shellfish observer program report, a summary of the NMFS survey of BSAI crab stocks, and a list of recently published literature pertinent to BSAI crab management, stock condition, fishery resource size, fishing effort, catch statistics, current biological and economic status of the fisheries, guideline harvest levels and ranges, and harvest strategies. The SAFE report contains further details on fishery statistics, resource assessment surveys, and the analytical techniques applied to the assessment of the various species.

4.2.1.1 Eastern Bering Sea snow crab

Snow crab (*Chionoecetes opilio*) are distributed on the continental shelf of the Bering Sea, Chukchi Sea, and in the western Atlantic Ocean as far south as Maine. In the Bering Sea, snow crab are distributed widely over the shelf and are common at depths less than ~200 meters. The eastern Bering Sea population within U.S. waters is managed as a single stock; however, the distribution of the population may extend into Russian waters to an unknown degree.

The fishery is managed for TAC with sex restrictions (males only). The minimum legal size for snow crab is 78 mm (3.1 inches), the fishery has generally harvests crabs over 4 inches in carapace width. The fishery is prosecuted using pots with mesh covering. Several modifications to pot gear have been introduced to reduce bycatch mortality in snow crab. In the 2001 season the escapement provisions for undersized crab was increased. Area swept estimates of abundance for the EBS snow crab stock are obtained through the NMFS annual bottom trawl surveys. A length-based analysis, developed by the Alaska Fisheries Science Center, incorporates survey and commercial catch and observer data into more precise abundance estimates. Abundance estimates generated by this model are used to set TAC. The ADF&G harvest strategy since 2000 sets harvest rate based on estimated mature biomass.

Retained catches of snow crab increased from relatively low levels in the early 1980s to historical highs in the early and mid-1990s. The stock was declared overfished in 1999. Retained catches slowly increased after 1999 as the stock rebuilt. However, in 2021 the stock was declared overfished following the collapse of snow crab in the 2020/2021 season. Given the fishery closures in 2022/2023, no vessels have participated in the fishery. When the fishery is open, vessel participation is reported in the SAFE and Economic SAFE. Recent mature male biomass and harvest specifications can be found in Table 4-3.

Table 4-3 EBS snow crab mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

EBS snow crab Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	26.7	71.6	20.40	20.4
2021/2022	41.2	5.6	2.5	2.5
2022/2023	55	7.7	0	0

4.2.1.2 Bristol Bay red king crab

Three discrete stocks of red king crab are actively managed in the BSAI region: Bristol Bay, Norton Sound, and Adak stocks. Red king crab stocks are managed separately to accommodate different life histories and fishery characteristics. The commercial harvest of Bristol Bay red king crab (BBRKC) dates to the 1930s, and shifted to a domestic fishery in the 1970s. The fishery is managed for a TAC coupled with restrictions for sex (males only), a minimum size for legal retention (6.5-in carapace width; 135-mm carapace length is used a proxy for 6.5-in carapace width in the assessment), and season (no fishing during mating/molting periods). Area swept estimates of abundance for the Bristol Bay red king crab stock are obtained through the NMFS annual bottom trawl surveys. A length-based analysis, developed by the ADF&G, incorporates survey and commercial catch and observer data into more precise abundance estimates. Abundance estimates generated by this model are used to set TAC.

The harvest strategy allows a maximum harvest rate of 15% of mature-sized (≥120 mm CL) males, but also incorporates a maximum harvest rate of 50% of legal males and thresholds of 8.4 million mature-sized (≥90 mm CL) females and 6.6 kt of effective spawning biomass (ESB) to prosecute a fishery. Harvest specification are set on a crab year, rather than a calendar year basis. Specifications for BBRKC are typically set in the fall.

Retained catch in the fishery peaked in 1980 at 58.9 kt but harvests dropped sharply in the early 1980s, and population abundance has remained at relatively low levels over the last four decades compared to those seen in the 1970s. In 2021/22 and 2022/23 the state of Alaska declared the fishery closed due to low levels of mature female abundance failed to meet the states criterion for opening the fishery. Given the fishery closures in 2021/2022 and 2022/2023, no vessels have participated in the fishery. When the fishery is open, vessel participation is reported in the SAFE and Economic SAFE. Recent mature male biomass and harvest specifications can be found in Table 4-4.

Table 4-4 BBRKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

BBRKC Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	13.96	1.61	1.20	1.26
2021/2022	16.64	1.78	0	0
2022/2023	16.95	2.43	0	0

4.2.1.3 Eastern Bering Sea Tanner crab

Fisheries have historically taken place for Tanner crab throughout their range in Alaska, but currently only the fishery in the EBS is managed under the FMP. The Bering Sea District of Tanner crab Registration Area J includes all waters of the Bering Sea north of Cape Sarichef at 54° 36'N and east of the U.S.-Russia Maritime Boundary Line of 1991. This district is divided into the Eastern and Western Subdistricts at 173°W.

In March 2011, the Alaska Board of Fisheries (BOF) approved a new minimum size limit harvest strategy for Tanner crab effective for the 2011/12 fishery. The regulations established different minimum size limits east and west of 166°W. The minimum size limit for the fishery to the east of 166°W is now 4.8 in. (122 mm CW) and that to the west is 4.4" (112 mm CW), where the size measurement includes the lateral

spines. the state of Alaska's harvest control rules used to determine TAC generally incorporate minimum industry-preferred sizes that are larger than the legal minimums. In 2015, the minimum preferred harvest size used to compute TAC for the area east of 166°W longitude was changed from 140 mm CW (5.5 inches; including the lateral spines) to 127 mm CW (5.0 inches), the preferred size used to compute TAC for the area west of 166°W longitude (Stockhausen, 2022).

The Tanner crab fishery has undergone substantial fluctuations since the opening of the domestic fishery, resulting in several fishery closures. EBS Tanner crab was declared overfished in 1999 and in 2010, resulting in rebuilding plans both times per MSA requirements. Since then, the stock's mature biomass. The fishery was open for 2021/22, with a TAC of 499 t, for the area west of 166°W longitude, leading to a retained catch of 494 t. Recent mature male biomass and harvest specifications can be found in Table 4-5. In 2021/22 vessel participation dropped below 50 vessels for the first time since 2004 (Nichols et. al., 2022).

Table 4-5 EBS Tanner crab mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

EBS Tanner Crab Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained catch
2020/2021	56.34	16.9	1.07	0.66
2021/2022	62.05	21.7	0.50	0.49
2022/2023	47.58	24.6	0.91	0.91

4.2.1.4 Pribilof Island red king crab

The Pribilof Islands red king crab fishery began in 1973 as bycatch during the blue king crab fishery. In 1993 and 1994 the red king crab fishery was open to directed fishing. From 1995 through 1998, combined GHLs or TACs were used for the Pribilof Islands red and blue king crab fishery. Declines in crab abundance of both red and blue king crab stocks from 1996 to 1998 resulted in poor fishery performance with annual harvests below the GHLs. The Pribilof red king crab fishery has been closed since 1999 due to uncertainty in estimated red king crab abundance and concerns for bycatch mortality of blue king crab, which is overfished and severely depressed. Fishery closures near the Pribilof Islands have resulted in low bycatch, and recent bycatch has been well below the OFL, ranging from 1.0 to 17.0 t from 2012/13 to 2020/21. Given the fishery closures, no vessels have participated in the fishery. Recent mature male biomass and harvest specifications can be found in Table 4-6.

Table 4-6 PIRKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

PIRKC Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	6.43	0.65	0	0
2021/2022	6.43	0.65	0	0
2022/2023	3.88	0.51	0	0

4.2.1.5 Pribilof Island blue king crab

The Pribilof Islands blue king crab fishery began in 1973, with peak landings of 4,990 t (11.0 million lb) during the 1980/81 season. A steep decline in landings occurred after the 1980/81 season. Directed fishery harvest from 1984/85 until 1987/88 was annually less than 454 t (1.0 million lb) with low CPUE. The fishery was closed from 1988/89 through 1994/95 fishing seasons. The fishery reopened for the 1995/96 to 1998/99 seasons. Fishery harvests during this period ranged from 589 to 1,134 t (1.3 to 2.5 million lb). The fishery closed again for the 1999/00 season due to declining stock abundance and has remained closed to the present. The stock was declared overfished in 2002.

Abundance estimates for the Pribilof Islands blue king crab stock are obtained through the NMFS annual bottom trawl surveys using an area-swept method. To prevent continued overfishing, ADF&G also implements closure areas for the commercial crab fisheries to reduce the blue king crab bycatch. NMFS has implemented procedures to account for blue king crab bycatch in the groundfish fisheries and to take action to prevent overfishing. Given the fishery closures, no vessels have participated in the fishery. Recent mature male biomass and harvest specifications can be found in Table 4-7

Table 4-7 PIBKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

PIBKC Status and Catch Specifications (t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	181	0.87	0	0
2021/2022	180	0.87	0	0
2022/2023	180	0.87	0	0

4.2.1.6 Norton Sound red king crab

The Norton Sound red king crab (NSRKC) stock supports three fisheries: summer commercial, winter commercial, and subsistence. The summer commercial fishery, which accounts for most of the catch, reached a peak in the late 1970s. Retained catches since 1982 have been below 0.227 thousand t, averaging 0.136 thousand t, including several low years in the 1990s. The commercial fishery has maintained sustainable retained catch levels. In Norton Sound, a legal crab is defined as ≥ 4 3/4- inch carapace width (CW) (Menard et al. 2009), which is approximately equivalent to ≥ 104 mm carapace length (CL). In 2005 and 2006, commercial buyers, specifically Norton Sound Economic Development Corporation (NSEDC), accepted only legal crab of ≥ 5 inch CW. This preference became permanent in 2008. Participation in the summer fishery has varied, with 27 vessels participating in 2022, and 8 permit holders for the winter 2022 fishery.

Surveys of this populations are not regularly conducted, and abundance is not estimated each year. Consequently, aside from years when surveys are conducted, fisheries for these stocks are generally managed based on catch history and in-season catch performance monitoring. Recent mature male biomass and harvest specifications can be found in Table 4-8.

Table 4-8 NSRKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

NSRKC Status and Catch Specifications (t)				
	MMB	ABC	TAC	Retained Catch
2020	1.66	0.09	0.08	Conf.
2021	2.29	0.16	0.14	0.003
2022	2.42	0.18	0.15	0.15

4.2.1.7 Saint Matthew Island blue king crab

The St. Matthew Island Section for blue king crab is within Area Q , which is the Northern District of the Bering Sea king crab registration area and includes the waters north of Cape Newenham (58°39’ N. lat.) and south of Cape Romanzof (61°49’ N. lat.). The SMBKC fishery developed subsequent to baseline ecological studies associated with oil exploration (Otto 1990). Ten U.S. vessels harvested 545 t (1.202 million pounds) in 1977, and harvests peaked in 1983 when 164 vessels landed 4,288 t (9.454 million pounds) (Fitch et al. 2012). Harvest was fairly stable from 1986/87 to 1990/91. Harvest increased to a mean catch of 1,496 t (3.298 million lb) during the 1991/92 to 1998/99 seasons until the fishery was declared overfished and closed in 1999 when the stock size estimate was below the MSST. In 2008/09 and 2009/10, the stock was declared rebuilt in 2009. The fishery re-opened in 2009/10 after a 10-year

closure, closed in 2013/14 due to declining trawl-survey biomass, and opened from 2014/15 to 2015/16 with a TAC of 300 t (0.655 million lb). But fishery performance was relatively poor with retained catches and has remained closed since 2016/17. The stock declined below the minimum stock size threshold in 2018 and was declared overfished. A rebuilding plan was implemented in October 2020. Given the fishery closures, no vessels have participated in the fishery.

Male crab measuring ≥ 105 mm CL are considered mature, whereas 120 mm CL is considered a proxy for the legal size of 5.5 in carapace width, including spines. However, given the fishery closure starting in 2015/16, no crab have been retained. Abundance estimates for the St. Matthew blue king crab stock are obtained through the NMFS annual bottom trawl surveys using an area-swept method. ADF&G applied catch-survey analysis to St. Matthew Island and Pribilof Islands blue king crab stock beginning in 1996. It is particularly suited for blue king crabs that occupy untrawlable areas. Recent mature male biomass and harvest specifications can be found in Table 4-9.

Table 4-9 SMBKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

SMBKC Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	1.14	0.08	0	0
2021/2022	1.18	0.08	0	0
2022/2023	1.31	0.11	0	0

4.2.1.8 Aleutian Island golden king crab

The Aleutian Islands golden king crab fishery was restructured beginning in 1996/97 to replace the Adak and Dutch Harbor areas with the newly created Aleutian Islands Registration Area O and golden king crab in the areas east and west of 174° W longitude were managed separately as two stocks (ADF&G 2002). Hereafter, the east of 174° W longitude stock segment is referred to as EAG and the west of 174° W longitude stock segment is referred to as WAG. The size limit for golden king crab has been 6-inches (152.4 mm) CW for the entire Aleutian Islands Area since the 1985/86 season. A carapace length (CL) ≥136 mm is used to identify legal size males when CW measurements are not available.

Golden king crab may be commercially fished with king crab pots. Pots used to fish for golden king crab in the Aleutian Islands Area are longlined and, since 1996, each pot must have at least four escape rings of five and one-half inches minimum inside diameter installed on the vertical plane or at least one-third of one vertical surface of the pot composed of not less than nine-inch stretched mesh webbing to permit escapement of undersized golden king crab.

The directed fishery has been prosecuted annually since the 1981/82 season. Retained catch peaked in 1986/87, and averaged 5.398 kt (11.9 million lb) over the 1985/86-1989/90 seasons. The TAC has fluctuated since the opening of the fishery. At no point in historical fishery data has the stock been overfished or approaching overfishing. In 2022, five vessels participated in the fishery. Since 2019/20, the TACs have been based on the harvest strategy adopted by the Alaska Board of Fisheries in March 2019. Recent mature male biomass and harvest specifications can be found in

Table 4-10 AIGKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

AIGKC Status and Catch Specifications (1000t)				
	MMB	ABC	TAC	Retained Catch
2020/2021	16.21	3.6	2.99	3.52
2021/2022	12.59	3.4	2.69	3.06
2022/2023	13.6	2.8	2.29	2.37

4.2.1.9 Pribilof island golden king crab

Commercial fishing for golden king crab in the Pribilof District has been concentrated in the Pribilof Canyon. The domestic fishery developed in 1982/83, although some limited fishing occurred at least as early as 1981/82. The minimum legal size limit for Pribilof District golden king crab is 5.5-inches (140 mm) carapace width (CW), including spines. A carapace length (CL) ≥124 mm is used to identify legal-size males when CW measurements are not available.

Peak retained catch occurred in 1983/84 at 856,475 lb (388 t). The fishing season for this stock has been defined as a calendar year (as opposed to 1-July to 30-June crab fishing year) after 1983/84. Since then, participation in the fishery has been sporadic and annually retained catch has been variable: from there being none in the ten years that no vessels participated (1984, 1986, 1990–1992, 2006–2009, 2015, and 2016) to 341,908 lb (155 t) in 1995, when seven vessels made landings. A GHL was first established for the fishery in 1999 at 200,000 lb (91 t). No vessels participated in the directed fishery and no landings were made during 2006–2009 or 2015-2016. The 2003 and 2004 fisheries were closed by emergency order to manage the retained catch towards the GHL; the 2005 and 2010–2014, 2017-2019 fisheries were not closed by emergency order. Four vessels participated in both 2020 and 2021, harvesting 107,679 lb (48.8 t) and 34,216 lb (15.5 t), respectively. Three vessels participated in the 2022 fishery, though landings can not be reported due to confidentiality requirements.

The fishery is not rationalized and there is no state harvest strategy in regulation. There are no current survey biomass estimates for management of this stock. Recent harvest specifications can be found in Table 4-11

Table 4-11 PIGKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

PIGKC Status and Catch Specifications (t)				
	MMB	ABC	TAC	Retained Catch
2020	NA	70	59	48.8
2021	NA	70	59	15.5
2022	NA	70	59	Conf.

4.2.1.10 Western Aleutian Island red king crab

The domestic fishery has been prosecuted since 1960/61 and was opened every year through the 1995/96 crab fishing year. After 1995/96, the fishery was opened only occasionally. There was an exploratory fishery in 1998/99, three commissioner's permit fisheries in limited areas during 2000/01–2002/03 to allow for ADF&G-Industry surveys, and two commercial fisheries with a GHL of 227 t in 2002/03 and 2003/04 in the Petrel Bank area. The fishery has been closed since 2003/04. Given the fishery closures, no vessels have participated in the fishery.

There are no current survey biomass estimates for management of this stock. Recent harvest specifications can be found in Table 4-12.

Table 4-12 WAIRKC mature male biomass (MMB), allowable biological catch (ABC), and total allowable catch (TAC) from 2020/21-2022/23 based off the SAFE report.

WAIRKC Status and Catch Specifications (t)				
	MMB	ABC	TAC	Retained Catch
2020	NA	14	0	0
2021	NA	14	0	0
2022	NA	14	0	0
2023	NA	14	0	0

4.3 Habitat

The following sections describe the habitat of the BSAI management area, define essential fish habitat for each of the managed species, describe habitat areas of particular concern, and provide habitat conservation and enhancement recommendations.

4.3.1 Habitat Types

The Bering Sea covers almost 3 million km^2 and is unusual in having an extremely wide continental shelf, ranging from 500 km wide in the southeast region to over 800 km wide in the north (NRC 1996). The Bering Sea has certain characteristic features which make it different from other corresponding regions in higher latitudes (Table 4-13). The Bering Sea shelf is flat and relatively featureless, with the exception of three large and some small islands. Its gradient is 0.24 m /km sloping gradually to a depth of about 170 m at the shelf break. (Niebauer et al. 1995, Sharma 1977). The geography of the coastal area bordering the Bering Sea has been shaped by geologic forces, strong erosion of the Bering itself, and the subarctic climate.

The southern border of the Bering Sea is bounded by the Aleutian Islands, a chain of volcanic islands, many of which are still active. The islands extend more than 1,770 km and consist of more than 50 islands, in five groups, separating the Bering Sea from the North Pacific Ocean. The Aleutian and Shumagin Islands are low mountains with steep to moderate slopes and rolling topography. Plateaus and uplands occur in some places in the chain. Elevations of the islands range from sea level to nearly 1,524 m. A number of the islands have wave-derived terraces up to 183 m above sea level, and are bordered by lower sea cliffs from previous sea level stands. Broad and flat intertidal platforms derived from glacial period sea level changes surround some islands. Those islands with peaks higher than 914 m were heavily glaciated and include fjords extending up to 610 m into the sea.

The Pribilof Islands are five small islands in the Bering Sea that lie 322 km north of the Aleutian Island of Unalaska. St George Island is characterized by hills and ridges with steep cliffs rising up to 274 m. In contrast St. Paul Island has a rolling plateau with some extinct volcanic peaks. The islands of St. Matthew, Pinnacle and Hall are located north of the Pribilof Islands and about 324 km west of mainland Alaska. These islands have steep shorelines and volcanic ridges with volcanic cones rising up to 458 m (NRC 1996).

The waters of the Bering Sea can be partitioned (Kinder and Schumacher, 1981 a, b) during the summer by transition zones which separate four hydrographic domains. The hydrographic domains are distinguished by bottom depth and seasonal changes in their vertical density structure. During the winter this structure is absent or much less apparent under the ice. Maximum ice extent occurs in March or April and the seasonal ice advance and retreat in the Bering Sea on the average extends over a distance 920 km along 170EW (Konishi and Saito, 1974). Beginning in the nearshore area, the coastal domain includes waters less than 50 m in depth that due to tidal and wind mixing do not stratify seasonally. A frontal zone of transition separates the coastal domain from the middle shelf domain. In the middle shelf domain, over bottom depths of 50 to 100 m, seasonal stratification sets up during the ice-free season, and warmer, less

saline waters overlie colder and more saline bottom waters. This stratification persists until broken down by winter cooing and storms. A broad transition or frontal zone separates the middle shelf zone from the outer shelf domain. This latter domain, in water depths from 100 to 170-200 m, is characterized by well-mixed upper and lower layers separated by a complex intermediate layer containing fine density structure. In general, outer shelf waters intrude shoreward near the bottom, while middle shelf waters spread seaward above them. Beyond the outer shelf domain, the shelf break front separates shelf waters from the oceanic domain, with its more saline, less aerobic waters overlying the Bering Sea slope and deep basin.

Net circulation in the Bering Sea is generally sluggish. While there is a relatively strong current at the shelf break (about 0.10 m s-1), net flow over the shelf is weak at 0.01-0.03 m s-1 directed toward the northwest and parallel to the isobaths. However, moderate to strong tidal and wind-driven currents can be established over the shelf. Tidal current speed is about 0.3 m s-1 (Niebauer et al. 1995). The hydrography over the shelf is dominated by a system of three fronts, located approximately parallel to the 50 and 100-isobaths and the shelf break (Coachman, 1986). Nearshore coastal currents from the Gulf of Alaska shelf flow into the Bering Sea through Unimak Pass and then apparently continue northeastward along the Alaska Peninsula. Within the middle shelf domain (water depths from 50-100 m) currents are weak and variable, responding temporarily as wind driven pulses. In the outer shelf domain, a mean northwestward flow exists along the shelf edge and upper slope following depth contours.

With respect to the physiographic regimes and hydrographic domains of the Bering Sea, king crabs cross boundaries during seasonal and spawning migrations from one domain to another. Shelf dwellers, during the winter period king crabs move shoreward during the late winter and early spring and congregate on molting and spawning shoals. Crabs may occupy shoals from 50 to less than 20 fathoms at this time of year. *Chionoecetes* species also may make off-on shelf migrations for spawning and molting.

Table 4-13 Characteristic features of the eastern Bering Sea shelf ecosystem.

Characteristic features	Consequences
Physical features	
Large continental shelf	High standing stocks of biota
	High fish production
	Large food resources for mammals
High latitude area	Nutrient replenishment with seasonal turnover
	Environmental distribution limits for many species
	Large seasonal changes
	Seasonal presence of ice
	Accumulation of generations
Large occasional changes	Seasonally changing growth
	Seasonal migrations
	Possibility of large anomalies
Ice	Presence of ice-related mammals
	Migration of biota (in and out) caused by ice
	Limited production in winter
Cold bottom water	Outmigration of biota
	Higher mortalities and lower growth of benthic and demersal biota
	Accumulation of generations
High runoff	Low salinities (near coasts)
	High turbidities
	Presence of eurohaline faunas
Sluggish circulation	Local biological production
	Local pelagic spawning
Biological features	
High production and slow turnover	High standing stocks
Fewer species (than in lower latitudes)	Few species quantitatively very dominant
Large numbers of marine mammals and birds	High predation by apex predators
Pronounced seasonal migrations	Great local space and time changes of abundance
Fisheries resource features	
Pollock dominant semidemersal species	Flexible feeding and breeding habits, special environmental adaption
Yellowfin sole dominant demersal species	Abundant benthos food supply
Herring and capelin dominant pelagic species	Important forage species in the ecosystem
Abundant crab resources	Large, relatively shallow shelf
	Few predators on adults, special environmental adaption
Abundant marine mammals	Abundant food supply, no enemies, insignificant hunting
	Compete with man for fishery resources
Man-related features	
Fisheries development rather recent	Ecosystem in near-natural state, not yet fully adjusted to effects of extensive fishery
Little-inhabited coasts	Ample space for breeding colonies of mammals and birds
	Very limited local fisheries, no pollution

Source: Favorite and Laevastu, 1981

4.3.2 Essential Fish Habitat (EFH)

EFH is defined in the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." EFH for crab species is determined to be the general distribution of a species described by life stage. General distribution is a subset of a species' total population distribution and is identified as the distribution of 95 percent of the species population, for a particular life stage, if life history data are

available for the species. Where information is insufficient and a suitable proxy cannot be inferred, EFH is not described. General distribution is used to describe EFH for all stock conditions whether or not higher levels of information exist, because the available higher level data are not sufficiently comprehensive to account for changes in stock distribution (and thus habitat use) over time. EFH is described for FMP-managed species by life stage as general distribution using guidance from the EFH

EFH descriptions are interpretations of the best scientific information. In support of this information, a thorough review of FMP species is contained in Appendix D.

4.3.2.1 HAPCs

50 CFR 600.815(a)(8) provides guidance to the Councils in identifying habitat areas of particular concern (HAPCs). HAPCs are areas within EFH that are of particular ecological importance to the long-term sustainability of managed species, are of a rare type, or are especially susceptible to degradation or development. HAPCs are meant to provide for greater focus of conservation and management efforts.

In order to protect HAPCs, certain habitat protection areas and habitat conservation zones have been designated. A habitat protection area is an area of special, rare habitat features where fishing activities that may adversely affect the habitat are restricted. The following areas have been designated in the BSAI (Figure 4-2):

- Bowers Ridge Habitat Conservation Zone
- Aleutian Islands Habitat Conservation Areas
- Aleutian Islands Coral Habitat Protection Areas
- Alaska Seamount Habitat Protection Area
- Areas of Skate egg concentration

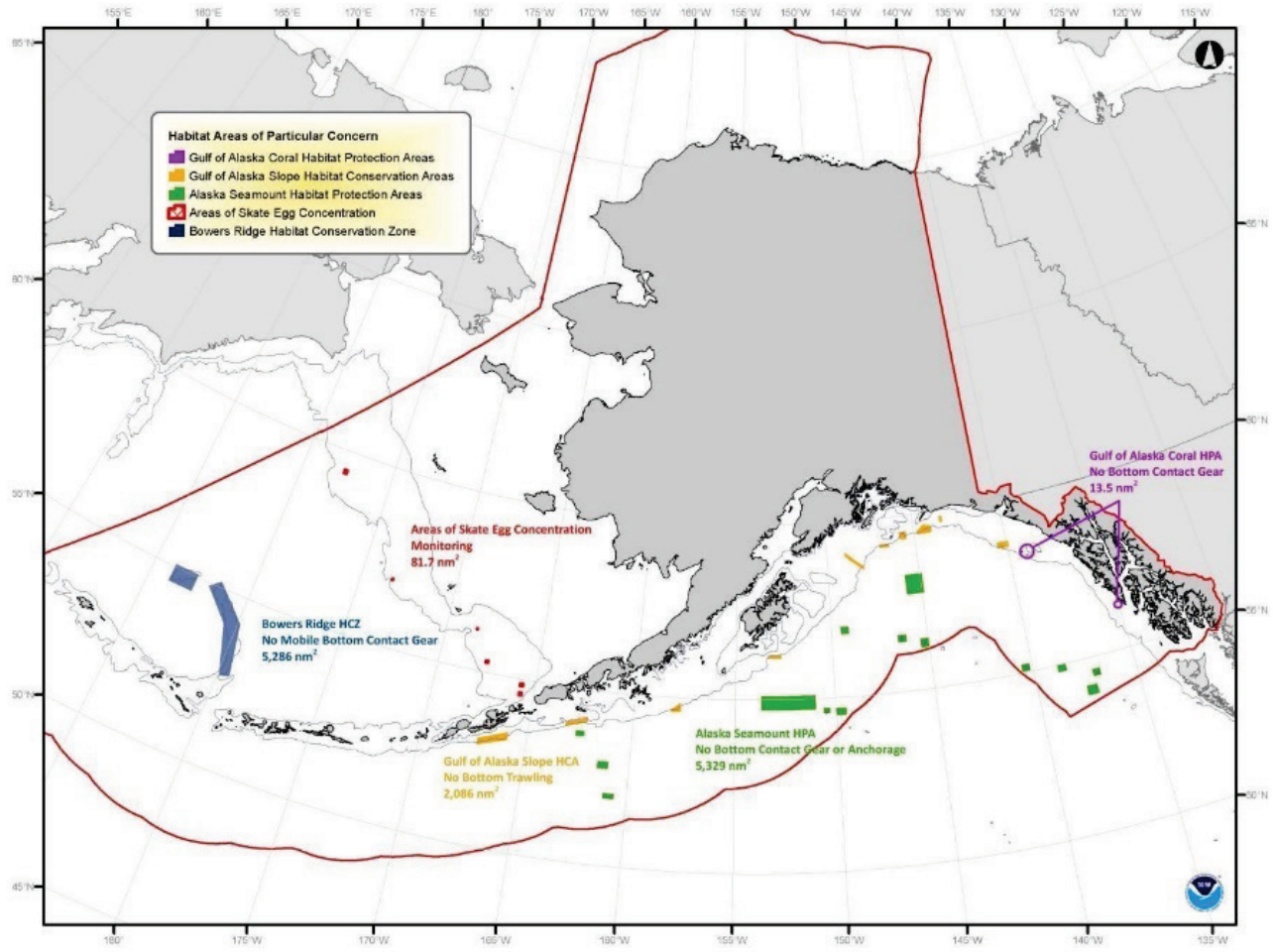

Figure 4-2: Map of Habitat Areas of Particular Concern in the EEZ off Alaska.

4.4 Fishing Activities Affecting the Stocks & Crab bycatch measures

The Bering Sea and Aleutian Islands management area is utilized primarily by commercial fisheries. The BSAI crab fisheries have been entirely domestic since 1991 (a history of exploitation is addressed in Section 4.1). The Council and the Alaska Board of Fisheries have adopted numerous regulations designed to protect habitat and minimize bycatch and bycatch mortality of crab taken incidentally in groundfish and scallop fisheries. An overview of these measures is provided below.

4.4.1 Closure Areas

Several areas of the Bering Sea have been closed to groundfish trawling and scallop dredging to reduce potential adverse impacts on the habitat for crab and other resources. Figure 4-3 details the conservation areas in the North Pacific, recognizing that all of the closed areas are not relevant to the BSAI crab fisheries.

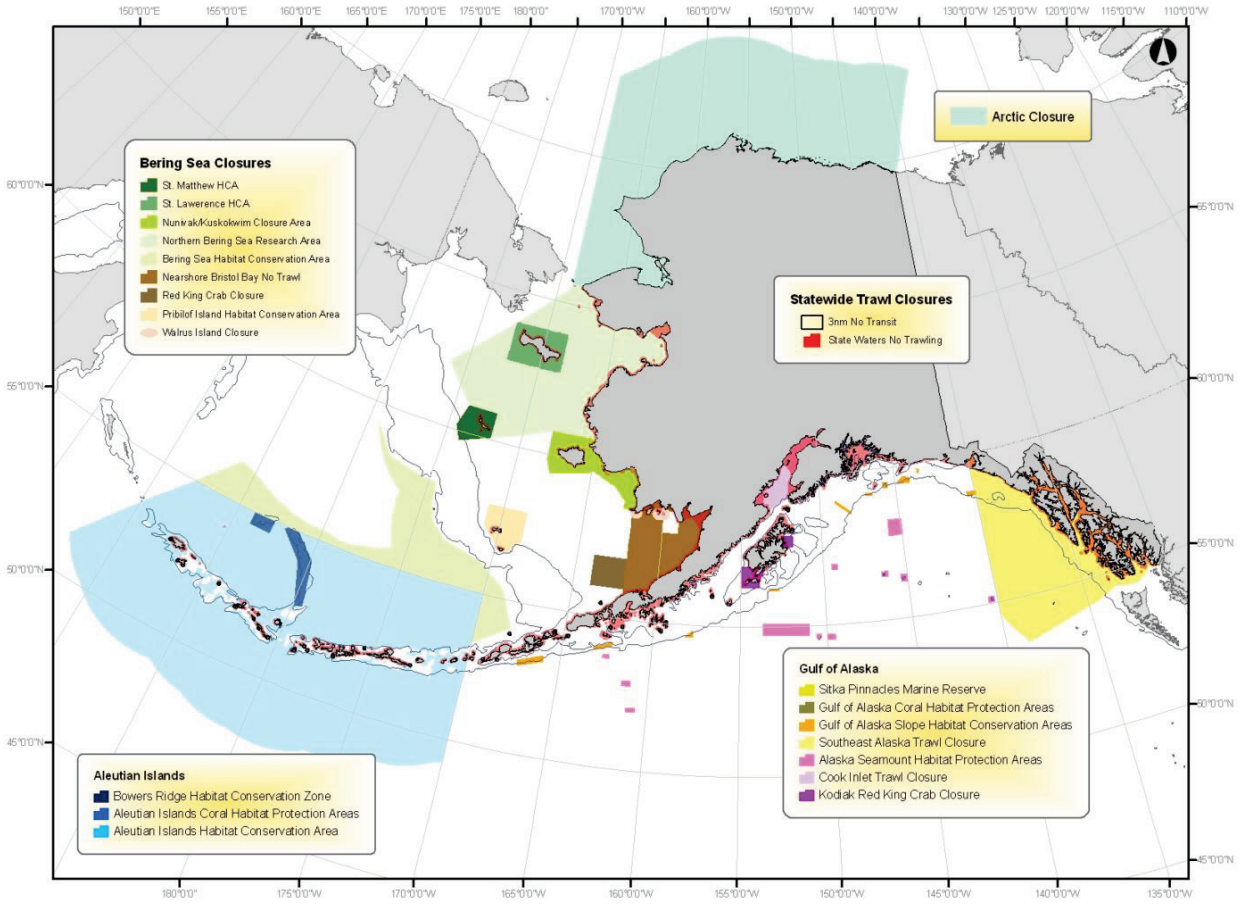

Figure 4-3 Map of conservation areas in the North Pacific. Please note that this figure does not wholistically represent all conservation areas in the North pacific.

Beginning in 1995, the Pribilof Islands Conservation Area (Figure 4-3) was closed to all trawling and dredging year-round to protect blue king crab habitat (NPFMC 1994b). Also beginning in 1995, the Red King Crab Savings Area was established as a year-round bottom trawl and dredge closure area (NPFMC 1995) (Figure 4-3). This area was known to have high densities of adult red king crab, and closure of the area greatly reduced bycatch of this species. To protect juvenile red king crab and critical rearing habitat (stalked ascidians and other living substrate), another year-round closure to all trawling was implemented for the nearshore waters of Bristol Bay. Specifically, the area east of 162° (i.e., all of Bristol Bay) is closed to trawling and dredging, with the exception of an area bounded by 159° to 160° W and 58° to 58°43' N that remains open to trawling during the period April 1 to June 15 each year.

4.4.2 Bycatch Limits

The Council has adopted numerous limits on the incidental capture of crabs taken in groundfish and scallop fisheries. A summary is provided below.

Prescribed bottom trawl fisheries in specific areas are closed when prohibited species catch (PSC) limits of *C. bairdi* Tanner crab, *C. opilio* crab, and red king crab are taken. Bycatch limitation zones for Tanner and red king crab PSC are shown in Figure 4-4. Crab PSC limits for groundfish trawl fisheries are based on crab abundance as shown Table 4-14. Updated PSC limits are found in the regulations.

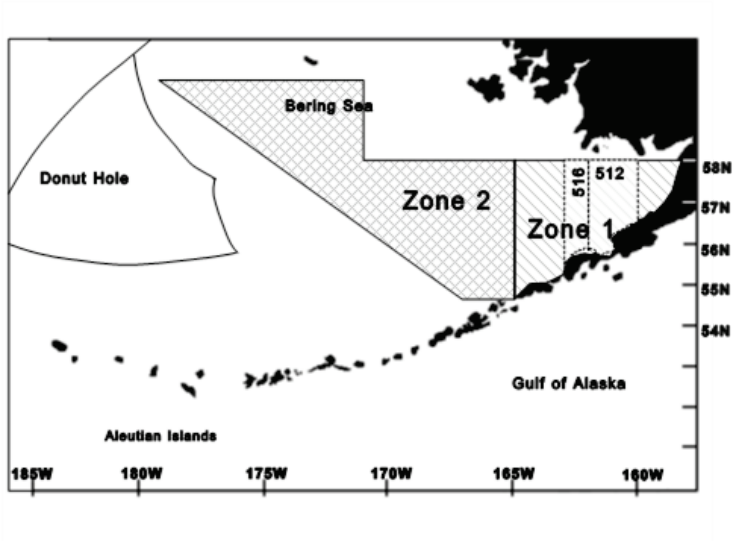

Figure 4-4 Bycatch limitation zones for Tanner and red king crab.

Table 4-14 Prohibited species catch (PSC) limits for red king crab and *C. bairdi* Tanner crab in Zone 1 and Zone 2

PSC limits for red king crab and *C. bairdi* Tanner crab			
Species	Zone	Crab abundance	PSC Limit (# of crab)
Red King crab	Zone 1	Below threshold or 14.5 million lbs of effective spawning biomass (ESB)	32,000
		Above threshold, but below 55 mil. Lbs of EBS	97,000
		Above 55,000 mil lbs. of EBS	197,000
C. bairdi	Zone 1	≤ 150 mil. crab	.5 % abundance – (20,000)
		150-270 mil. crab	730,000
		270-400 mil. crab	830,000
		>400 ,mil. crab	980,000
C. bairdi	Zone 2	≤170 mil. crab	1.2% abundance- (30,000)
		175-290 mil. crab	2,070,000
		290-400 mil. crab	2,520,000
		>400 mil. crab	2,970,000

Under Amendment 40, inthe BSAI Groundfish FMP, PSC limits for snow crab (*C. opilio*) taken in groundfish fisheries are based on total abundance of opilio crab as indicated by the NMFS standard trawl survey (NPFMC 1996). The snow crab PSC cap is set at 0.1133% of the Bering Sea snow crab abundance index, with a minimum PSC of 4.350 million snow crab and a maximum of 12.850 million snow crab. Snow crab taken within the C. opilio Bycatch Limitation Zone (COBLZ) (Figure 4-5) accrue towards the PSC limits established for individual trawl fisheries. An area closure for EBS snow crab is triggered if the groundfish trawl fisheries by target/sector reach their allocated PSC limit for the COBLZ. No measures limiting PSC are currently in place for any pelagic trawl and fixed gear fisheries, nor are there overall limits placed on bycatch of snow crab species outside of COBLZ.

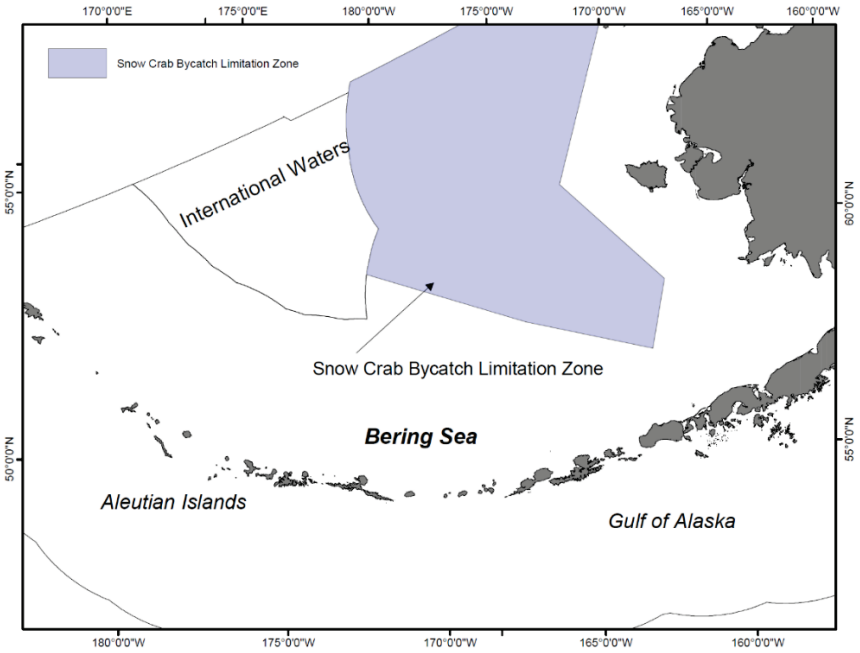

Figure 4-5 *C. opilio* bycatch limitation zone (COBLZ), labeled as the snow crab bycatch limitation zone

Crab bycatch limits have also been established for the Alaska scallop fisheries. Annual crab bycatch limits (CBLs) are specified for red king crab and Tanner crab species in each registration area or district thereof (Table 4-15). In Registration Area Q (the Bering Sea), the annual CBLs shall equal the following amounts:

1. The CBL of red king crab caught while conducting any fishery for scallops shall be within the range of 500 to 3,000 crab based on specific considerations.
2. The CBL of *C. opilio* Tanner crab caught while conducting any fishery for scallops is 0.003176 percent of the most recent estimate of *C. opilio* abundance in Registration Area Q.
3. The CBL of *C. bairdi* Tanner crab caught while conducting any fishery for scallops is 0.13542 percent of the most recent estimate of *C. bairdi* abundance in Registration Area Q.

In other Registration Areas (Gulf of Alaska and Aleutian Islands), CBLs will be based on the biological condition of each crab species, historical bycatch rates in the scallop fishery, and other socioeconomic considerations that are consistent with the goals and objectives of the FMP. Annual CBLs will be specified for the time period from July 1 through June 30 of the following year.

Table 4-15 Statewide crab bycatch limits (CBLs), in percent of the crab abundance estimate or number of crab

Scallop Registration Areas	Red King Crab	*C. bairdi*	*C. opilio*
Yakutat (D)			
District 16	NA	NA	NA
Remainder of Area D	NA	NA	NA
Prince William Sound (E)			
Eastern Section of outside District	NA	0.5%[a]	NA
Cook Inlet (H)			
Kamishak District	0.5%[a]	60 crabs[a]	NA
Outer/Easter/Barren Island Districts	NA	NA	NA
Kodiak (K)			
Shelikof District	0.5% or 1.0%	0.5% or 1.0%	NA
Northeast District	0.5% or 1.0%	0.5% or 1.0%	NA
Semidi District	Regulated inseason	Regulated inseason	NA
Alaska Peninsula (M)	0.5% or 1.0%	0.5% or 1.0%	NA
Bering Sea (Q)	500 crabs[a]	Three Tier Approach	Three Tier Approach
Dutch Harbor (O)	0.5% or 1.0%	0.5% or 1.0%	NA
Adak (R)	50[b]	10,000[b]	NA

NA= Not applicable

[a]Fixed CBL

[b]Bycatch limit set to allow scallop fleet adequate opportunity to explore and harvest scallop stocks while protecting the crab resource

4.5 Fishing Communities

This section contains overview of the fishing communities that depend on the commercial crab fisheries in the BSAI. Full community profiles can be found in Appendix C. The information cited in this section is drawn from the Annual community engagement and participation overview (ACEPO) report, *Fishing communities of Alaska engaged in federally managed fisheries* (Fey et. al., 2016), *Baseline Commercial Fishing Community profile updates: Akutan and Unalaska, Alaska* (Downs and Henry, 2023), and *Alaska community profiles* (Wise et. al., 2022). Appendix C details a summary of community profiles for many of the crab fishing-dependent communities. Updates to information surrounding crab-dependent communities can be found in the Annual Community and Participation Overview (ACEPO) report, the Economic SAFE, and at http://www.npfmc.org as available.

Traditionally, the dependence of BSAI coastal communities on the crab fisheries and fisheries affected by the crab fisheries has resulted from these communities being one or more of the following: 1) the home ports of vessels that participate in these fisheries; 2) the residence of participants in the harvesting or processing sectors of these fisheries; 3) the port of landings for these fisheries; 4) the location of processing plants; and 5) a service or transportation center for the fisheries. BSAI coastal communities are shown in Figure 4-6, please note that all the figure is not a comprehensive representation of Alaska communities.

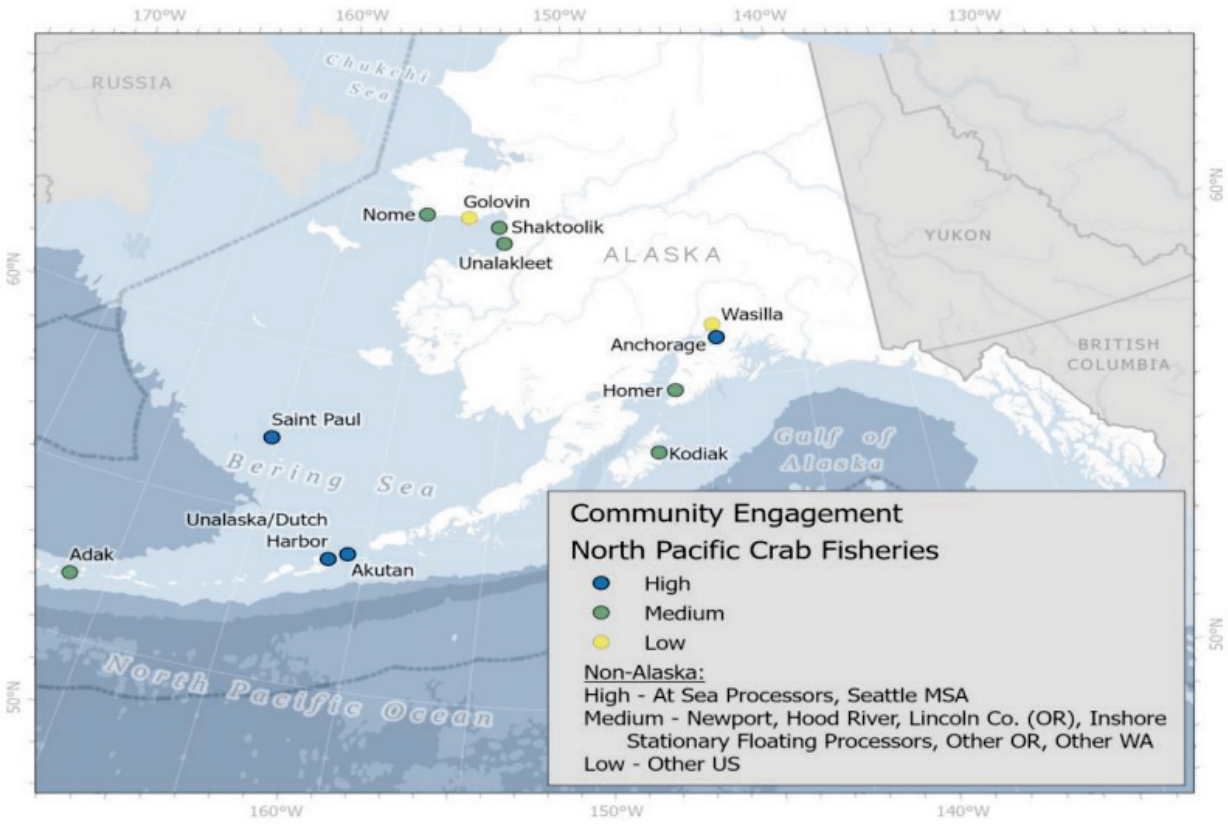

Figure 4-6: 2022 Community Engagement in the North Pacific Crab fisheries, ranked from low-high.
Source: 2023 ACEPO Report

In 2021, the FMP BSAI crab fisheries an active fleet of 67 catcher vessels and two catcher processors, and landed and processed at 15 processing facilities throughout the region. Commercial crab fisheries blossomed in the 1950s with the market of king crab fisheries in the Bering Sea, but today many of the stocks are in a depressed state. The declines in Bering Sea crab fisheries and the subsequent closures drastically affected fishermen as well as the social, cultural, and economic wellbeing of fishing communities, including economic dependence, social networks, food security, and identity. Of the 40 communities assessed in the ACEPO report from 2000-2021, only 14 had any FMP crab landings in their community while 36 had a resident who owned a vessel that participated in FMP crab fisheries.

The results if the commercial harvesting engagement principal components factor analysis (PCFA) from the 2023 ACEPO report, found that three communities were primarily engaging in crab harvesting: Seattle, Kodiak and Anchorage, ranked highest to lowest respectively. Similarly, the commercial processing engagement PCFA found that Akutan, Unalaska/Dutch harbor, King Cove, Nome, and St. Paul were most actively participating in crab processing from 2000-2021. A detailed summary of communities engaged in commercial crab fisheries can be found in Appendix C.

5 Relationship to Applicable Law and Other Fisheries

5.1 Magnuson-Stevens Act and Other Applicable Federal Law

The 10 National Standards of the Magnuson- Steens Fishery Conservation and Management Act are detailed below:

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 a manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.
5. Conservation and management measures shall, where practicable, promote 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 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 in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.
9. Conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.
10. Conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

5.2 State of Alaska Management Structure

Institutions: The State Organizational Act of 1959 provided for Alaska Statutes, Title 16, which deals with Alaska Fish and Game Resources. Article 1 provides for a Department of Fish and Game whose principal executive officer is the Commissioner of Fish and Game. The Commissioner is appointed by the Governor for 5 years. The Commercial Fisheries Division was established to manage all commercially harvested fish species in Alaska. The Division is headed by a director who supervises four regional supervisors. The regions are further separated into management areas. Area management biologists are responsible for collecting catch data and monitoring fisheries in their areas. A Subsistence Section within the Commissioner's Office was established to document subsistence needs and utilization and to make recommendations for developing regulations and management plans to ensure subsistence use preference.

The enforcement of fish and game laws and regulations is provided by ADF&G and the Alaska Department of Public Safety (ADPS). The fish and wildlife protection officers of the ADPS operate independently of the ADF&G, although communication between the two departments is maintained and activities are coordinated.

Jurisdiction: ADF&G asserts management authority over all migratory fish and shellfish species which enter and leave territorial waters of the State, including the migratory fish and shellfish taken from State waters which are indistinguishable, in most instances, from those taken from adjacent high seas areas. Regulations governing migratory fish and shellfish cover both areas and are enforced by the State's landing laws. These landing laws prohibit the sale or transportation within State waters of migratory fish and shellfish taken on the high seas unless they were taken in accordance with State regulations.

The Fisheries Regulatory Process: The Alaskan system has a seven-member Board, composed of fishermen and other businessmen appointed by the Governor, which considers both public and staff regulatory proposals in deciding on regulatory changes. The Board is required by law to meet or hold a hearing at least once a year in each of the following areas of the State in order to assure all people of the State ready access to the Board: (a) Upper Yukon-Kuskokwim-Arctic, (b) Western Alaska (including Kodiak), (c) South Central, (d) Prince William Sound (including Yakutat), and (e) Southeast. Since the late 1960s, the Board, and before it, the Board of Fish and Game, has usually held a minimum of two meetings annually to adopt changes in the fisheries regulations. The fall Board meeting, usually held in early December, considers proposals for changes in sport fishing regulations and in commercial and subsistence finfish regulations. A spring Board meeting, usually held in late March or early April, considers commercial and subsistence shellfish regulatory proposals. Regulations which may be adopted by the Board cover seasons and areas, methods and means of harvesting, quotas, and times and dates for issuing or transferring licenses and registrations.

Advisory committees, composed of people concerned about the fish and game resources of their locality, serve as local clearinghouses and sources of proposals for Board consideration. Following submission of advisory committees and public proposals, ADF&G staff members review the proposals and redraft the wording, when necessary, to conform to the style required. ADF&G also submits proposals for the Board's consideration.

In adopting new regulations, the Board follows Alaska's Administrative Procedure Act. This act has several requirements: At least 30 days prior to the adoption of new regulations, a notice giving the time and place of the adoption proceedings, reference to the authority under which the regulations are proposed, and a summary of the proposed action, must be published in a newspaper of general circulation and sent to all interested people who have asked to be informed of the proposals. During the proceedings, the public must be given an opportunity to testify on the proposed changes. If a new regulation is adopted, it must be submitted to the Lieutenant Governor through the Attorney General's office. Thirty days after being filed with the Lieutenant Governor, the new regulation becomes effective. Because of these requirements, new regulations usually do not become effective until about 2 months after being adopted by the Board. Regulatory flexibility is given to the Commissioner of Fish and Game and to his authorized designees to adjust seasons, areas, and weekly fishing periods by emergency order.

The requirements outlined in the preceding paragraph do not apply in the case of emergency regulations, which may be adopted if needed for the immediate preservation of public peace, health, safety, or general welfare. An emergency regulation remains in effect 120 days unless it is adopted as a permanent regulation through the procedure described above. Emergency regulations have the same force and effect as permanent regulations. The Board has delegated authority to the Commissioner to adopt emergency regulations where an emergency exists as described in AS 44.62.250.

Appeals to the Board of Fisheries

Reconsideration of issues during a meeting: During a Board meeting, any Board member may move to reconsider an issue regardless of how the member voted on the original issue. Board Policy #80-78-FB requires that the motion be made prior to the adjournment of the meeting, that the motion be supported with new evidence, unavailable at the time of the original vote, and that public notice be given as to when reconsideration will occur.

Petitions to the Board: Under Section AS 44.62.220, an interested person may petition the Board for the adoption or repeal of a regulation. Upon receipt of a petition requesting the adoption, amendment or repeal of a regulation, the Board shall, within 30 days, deny the petition in writing or schedule the matter for public hearing. The Board and the Board of Game adopted a Joint Board Petition Policy which limits the scope of petitions they are willing to act upon outside of the normal regulatory cycle. The Joint Board recognized that in rare instances extraordinary circumstances may require regulatory changes outside this process. Therefore, it is the policy of the Board and the Board of Game that petitions will only be accepted if the problem outlined in the petition results in a finding of emergency. In accordance with State policy (AS 44.62.270), emergencies will be held to a minimum and rarely found to exist. Alaska Statute 44.62.250 specifies that in order to adopt emergency regulations, the agency must find that it is necessary for the immediate preservation of the public peace, health, safety, or general welfare. If such a finding is made, the agency adopting the emergency regulation shall submit a copy to the Lieutenant Governor for filing and for publication in the AAlaska Administrative Register@. Notice of adoption shall be given within five days of the adoption. Failure to give notice within ten days automatically repeals the regulation. For fish and game regulations, the Boards determined that an emergency is an unforeseen, unexpected event that either threatens a fish or game resource, or an unforeseen, unexpected resource situation where a biologically allowable resource harvest would be precluded by delayed regulatory action and such delay would be significantly burdensome to the petitioners since the resource would be unavailable in the future.

In 1995, the Board of Fisheries modified its petition policy for category 2 measures in the BSAI king and Tanner crab FMP (see State Regulation 5 AAC 39.998). The Board of Fisheries recognizes that in rare instances, circumstances may require regulatory changes outside the process described in 5 AAC 96.625(b) - (d). Notwithstanding 5 AAC 96.625(f), a petition for a regulatory change may be submitted under this section and 5 AAC 96.625(a) for a Category 2 management measure in a Bering Sea/Aleutian Islands king or Tanner crab fishery described in the federal Fishery Management Plan (FMP) for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands. It is the policy of the Board of Fisheries that a petition submitted under this section will be denied and not scheduled for hearing unless the petition:

1. addresses a Category 2 management measure and is filed within 30 days from the date that the board adopted that Category 2 management measure;
2. presents an issue that is not solely allocative; and
3. presents new legal, biological, or management information that indicates the regulation may not be consistent with the federal FMP."

Appeals to the Commissioner of Fish and Game

Petitions: Board Policy #79-53-FB delegates authority to the Commissioner to adopt emergency regulations, during times of the year when the Board is not in session. The Commissioner may adopt, in accordance with the Administrative Procedure Act (AS 44.62), an emergency regulation where an emergency exists as described in AS 44.62.250. All emergency actions shall, to the full extent practicable, be consistent with Board intent. The Commissioner is further required to consult, if possible, with members of the Board to obtain their views.

In-season Management Actions: Within 5 days after the closure of any registration area, an individual holding a king or Tanner crab permit issued by the Commercial Fisheries Entry Commission or the owner of any vessel registered to that area may formally request the commissioner to reopen the area. The commissioner shall personally review pertinent information on the condition of crab within the area, and shall formally announce his decision within 14 days of the request. 5AAC 34.035(d), 35.035(d).

Judicial Review: The APA in Section 44.62.300 provides for court review of regulatory actions of the Board or commissioner. An interested person may get a judicial declaration on the validity of a regulation by bringing an action for declaratory relief. All actions are to be brought in the Superior Court. The court may declare the regulation invalid for a substantial failure to comply with required administrative procedures (AS 44.62.010-44.62.320) or, in the case of an emergency regulation or order of repeal, upon the grounds that the facts recited in the statement do not constitute an emergency under AS 44.62.250.

5.3 AFA sideboard restrictions

On October 21, 1998, the President signed into law the American Fisheries Act (AFA) which mandated sweeping changes to the conservation and management program for the pollock fishery of the BSAI and to a lesser extent, affected the management programs for the other groundfish fisheries of the BSAI the groundfish fisheries of the GOA, the king and Tanner crab fisheries of the BSAI, and the scallop fishery off Alaska. Sideboards in the CR Program (Section 3.4.9**.**) discourage spillover activity that former crab vessels may have had after the implementation of the program, in order to protect historical participants of other fisheries. In the development of the program, the Council included sideboards to protect harvesters in GOA groundfish fisheries from the potential for increased effort from former participants in the Bering Sea snow crab fisheries.

Revisions to the Crab Sideboards for the GOA Pacific Cod and Pollock Fishery to exempt some vessels that demonstrated historical participation in these non-crab fisheries occurred per Amendment 34 (76 FR 35772). Amendment 45 to the BSAI king and Tanner crab created, for a limited period, a regulatory process for NMFS to permanently remove Pacific cod sideboard limits, that are applicable to some participants in the Central GOA) and Western GOA hook-and-line catcher/processor sectors. This amendment was necessary after the Pacific cod sector splits changed impact of the sideboards on the former crab vessels (80 FR 28540). This action is necessary to provide participants in the Central and Western GOA hook-and-line catcher/processor sectors with an opportunity to cooperatively coordinate harvests of Pacific cod through private arrangement to the participants' mutual benefit, which would remove the need for sideboard limits in these regulatory areas.

5.4 Fishery Impact Statement

The Magnuson-Stevens Fishery and Conservation Management Act requires that a fishery management plan (FMP) include a fishery impact statement that assesses, specifies, and describes the likely effects of the FMP measures on participants in the fisheries and fishing communities affected by the FMP. The FMP has instituted a CR program in the crab fisheries. The most significant structural change resulting from this rationalization program is the allocation of the crab resource. This allocation is designed to eliminate the race for fish and allow for more efficient, safer crab fisheries. A detailed analysis of the effects of the FMP on the human environment, including fishery participants and fishing communities, was conducted in the *Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement* (NMFS 2004), incorporated herein by reference. The 2010 5-year CR program review, incorporated herein by reference, also detailed the subsequent impacts of implementation of the CR program.

Crab program reviews are initiated every 7 years, as required by MSA and documented in Section 3.4, and provide an assessment of performance metrics that better detail fishery performance and may provide insight into the potential effects to the fishery following implementation the rationalization program; although direct impacts are hard to quantify as several other variables occur concurrent to the ongoing fisheries. The most recent CR program review is scheduled for 2024. While there has not been a more recent EIS conducted, the recent CR program reviews provide a snapshot of current fishery performance metrics that align with the MSA requirements of a fishery impact statement.

Below is a summary finding of the impacts of implementing the CR program in the 2004 EIS, and the 2010 CR program review.

- Increased social and economic benefits through the promotion of privilege-based allocations to individuals, sectors, and communities. For this reason, it is likely to increase the commercial value generated from the crab fisheries.
- Removal of the time pressure associated with the race for fish would permit harvesters to reduce bycatch by fishing more selectively and allowing longer pot soaks, but with fewer pots[14] which allows gear to sort harvests. The removal of the time pressure should also allow participants to search longer for pots, reducing lost pots and associated mortality.
- The elimination of the race for fish resulted in more spatial dispersion, changes to processing patterns, and changes to temporal pressures on harvesting and processing resulting in longer seasons and slower fishing[14].
- The FMP's implementation of rationalization is also expected to increase consumer benefits and resulted in increased health and safety of participants such as: a more experienced crew, less fatigued crew, and weather-dependent fishery safety operations[14] .
- A major impact of the CR program was the immediate and significant consolidation of the number of vessels participating in the fisheries due to sidelining of less efficient vessels. Prior to implementation, many vessels fished to maintain historic interests in the crab fisheries [14].

The FMP has adopted a variety of management measures to promote the sustainability of the crab fisheries and dependent fishing communities.

1. Management measures to account for uncertainty ensure the sustainability of the managed species by maintaining a spawning stock biomass for the target species with the potential to produce sustained yields.
2. The transition to privilege-based management in the short term could disrupt stability, but in the long term, the stability of fisheries would be increased in comparison to a derby-style fishery.
3. Communities would also tend to experience an increase in economic stability as a result of built-in community protections resulting from privilege-based management programs.

In addition to Crab Program reviews, all Council amendment analyses contain a fishery impact section whereby the potential impacts to the fishery, fishing participants and fishing communities are assessed in detail. The Council also receives annual reports from the National Institute for Occupational Safety and Health (NIOSH) for updates on the status of health and safety for commercial fishing and seafood processing. The Coast Guard also provides frequent reports to the Council on the occupational safety of fishing vessels and safety of fishing participants.

[14] Notated in the 5 year CR Program Review (NPFMC, 2010)

6 References

This section contains references that may assist the reader in evaluating the FMP. Section 6.1 describes the sources of available data regarding the BSAI crab fisheries, including annually updated reference material. A list of the literature cited in the FMP is included in Section 6.

6.1 Sources of Available Data

Although every effort is made to keep the FMP updated with recent descriptions of the stocks and fisheries, the availability of new data far exceeds the ability of the North Pacific Fishery Management Council (Council) and National Marine Fisheries Service (NMFS) to amend the FMP. As a result, in some cases, it may be more expeditious to access the regularly updated reference material directly in order to gain a current picture of the status of the crab fisheries. The Council (Section 6.1.1), NMFS Alaska Fisheries Science Center (AFSC) (Section 6.1.2), and NMFS Alaska Region office (Section 6.1.3), and Alaska Department of Fish and Game (Section 6.1.4) each produce an abundance of reference material that is useful for understanding the crab fisheries. The sections below provide an overview of the types of reports and data available through the various organizations and their websites.

6.1.1 North Pacific Fishery Management Council

Stock Assessment and Fishery Evaluation Report

The Stock Assessment and Fishery Evaluation (SAFE) report is compiled annually by the BSAI Crab Plan Team, which is appointed by the Council. The sections are authored by AFSC and State of Alaska scientists. As part of the SAFE report, a volume assessing the Economic Status of the Crab Fisheries off Alaska is also prepared annually, as well as a volume on Ecosystem Considerations.

The SAFE report provides information on the historical catch trend; estimates of the maximum sustainable yield of the crab complex, as well as its component species groups; assessments on the stock condition of individual species groups; assessments of the impacts on the ecosystem of harvesting the crab complex at the current levels given the assessed condition of stocks, including consideration of rebuilding depressed stocks; and alternative harvest strategies and related effects on the component species groups.

The SAFE report updates the biological information base necessary for multispecies management. It also provides readers and reviewers with knowledge of the factual basis for (TAC decisions, and illustrates the manner in which new data and analyses are used to obtain individual species groups' estimates of acceptable biological catch and maximum sustainable yield.

Copies of the most recent SAFE reports are available online (see below), and by request from the North Pacific Fishery Management Council, 1007 W. 3rd Avenue, Suite 400, Anchorage, Alaska, 99501.

Much of the information produced by the Council can be accessed through its website, to be found at: https://www.npfmc.org/

The information available through the website includes the following.

- FMPs
- Meeting agendas, briefing materials, and reports: annual quota specifications, amendments to the FMPs or implementing regulations, and other current issues are all discussed at the five annual meetings of the Council, and published on the Council's eAgenda site. Meeting agendas, including briefing materials where possible, and newsletter summaries of the meeting are available on the website, as well as minutes from the meetings.

6.1.2 NMFS Alaska Fisheries Science Center

Much of the information produced by the AFSC can be accessed through its website, to be found at: http://www.afsc.noaa.gov/

The information available through the website includes the following.

- Species summaries: a summary of each crab species is available online, including AFSC research efforts addressing that species where applicable.
- Issue summaries: a summary of major fishery issues is also available, such as bycatch or fishery gear effects on habitat.
- Research efforts: a summary of the research efforts for each of the major AFSC divisions is provided on the website.
- Groundfish Observer Program: the homepage describes the history of the program and the sampling manuals that describe, among other things, the list of species identified by observers.
- Survey reports: the crab stock assessments are based in part on the independent research surveys that are conducted annually, biennially, and triennially in the management areas. Reports of the surveys are made available as NMFS-AFSC National Oceanic and Atmospheric Administration (NOAA) Technical Memoranda, and are available on the website; the data maps and data sets are also accessible.
- Publications: the AFSC Publications Database contains more than 4,000 citations for publications authored by AFSC scientists. Search results provide complete citation details and links to available on-line publications.
- Image library: the website contains an exhaustive library of fish species.

6.1.3 NMFS Alaska Region

Much of the information relevant to BSAI crab fisheries produced by NMFS Alaska region can be accessed through its website, to be found at:

https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/bering-sea-and-aleutian-islands-bsai-crab-fisheries

The information available through the website includes the following.

- Regulations: the FMP's implementing regulations can be found on the Alaska region website, as well as links to the Magnuson-Stevens Act, the American Fisheries Act, the International Pacific Halibut Commission, and other laws or treaties governing Alaska's fisheries.
- Catch statistics: inseason and end of year catch statistics for the groundfish fisheries can be found dating back to 1993, or earlier for some fisheries; annual harvest specifications and season opening and closing dates; and reports on share-based fishery programs (such as the individual fishing quota program for fixed-gear sablefish).
- Status of analytical projects: the website includes pages for the many analytical projects that are ongoing in the region.
- Habitat protection: maps of essential fish habitat, including a queriable database; status of marine protected areas and habitat protections in Alaska.
- Permit information: applications for and information on permits for Alaska fisheries; data on permit holders.
- Enforcement: reports, requirements, and guidelines.
- News releases: recent information of importance to fishers, fishery managers, and the interested public.

The website also links to the national NMFS website, which covers national issues. For example, NMFS-wide policies on bycatch or improving stock assessments, may be found on the national website. Also,

NMFS produces an annual report to Congress on the status of U.S. fisheries, which can be accessed from the website.

6.1.4 Alaska Department of Fish and Game

Much of the information relevant to BSAI crab fisheries produced by ADF&G can be accessed through its website, to be found at:

https://www.adfg.alaska.gov/index.cfm?adfg=commercialbyareaaleutianislands.shellfish#fishery

The information available through the website includes the following:

- Species information profiles including identification guides.
- An overview of Management authority delegated to the state including TAC announcements, harvest overviews and management area maps.
- Summary of the Crab observer program, including annual reports to the crab observer oversight taskforce (COOTF), and statewide commercial operator's annual reports (COAR) for the statewide crab fisheries
- An overview of permits and licensing requirements such as entry permits, crewmember licenses, vessel registration, etc.
- Reporting resource details such as fish tickets, eLanding.
- A summary of ongoing research including annual stock assessment surveys conducted by ADF&G.

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Appendix A History of the Fishery Management Plan (Amendments)

Table A-1: Amendments to the BSAI King and Tanner crab FMP.

Amendments to the BSAI king and Tanner crab FMP.	
1.	Define overfishing
2.	Establish Norton Sound superexclusive area registration
3.	Establish a research plan
4.	Establish a moratorium on new vessels
5.	Establish a vessel License Limitation Program (LLP)
6.	Repeal the research plan
7.	Revise overfishing definitions
8.	Identify and describe Essential Fish Habitat (EFH)
9.	Extend the moratorium on new vessels established by AM 4
10.	Add a sunken vessel provision and other changes to the LLP
11.	Implement a rebuilding plan for Bering Sea Tanner crab
12.	Identify Habitat Areas of Particular Concern and protection measures
13.	Coordinate FMP with American Fisheries Act
14.	Implement a rebuilding plan for snow crab
15.	Implement a rebuilding plan for St. Matthew blue king crab
16.	Revise EFH descriptions and add measures to protect HAPC
17.	Implement a rebuilding plan for Pribilof Islands blue king crab
18.	Implement BSAI Crab rationalization program
19.	Implement BSAI Crab rationalization program
20.	Split eastern Bering Sea Tanner crab stock into two fisheries with separate harvester and processor QS
21.	Modify deadlines for IFQ/IPQ arbitration proceedings
22.	Modify CDQ eligibility for consistency with MSA (superseded by MSA change)
23.	Revise the Aleutian Islands Habitat Conservation Area boundaries near Agattu and Buldir Islands
24.	Establish a five tier system for crab stock status and OFL, and remove 12 crab stocks from the FMP
25.	Allow conversion of North Region CVO and PQS to CPO quota, and issue PQS
26.	Exempt C shares from processor share and regional landing requirements permanently
27.	Exempt custom processing from use caps on processing shares in some CR fisheries
28.	Allow post-delivery transfer of QS
29.	Coordinate BSAI Crab FMP with the new Arctic FMP
30.	Modify some administrative procedures within the arbitration system
31.	Modify some C-Share provisions and requirements.
32.	Extend the IPQ cooling off period and revise Right of First Refusal (ROFL) conditions for St. George (dropped)
33.	Reduce fees under CR Program
34.	Revise crab sideboard exemptions for the GOA Pacific cod and pollock fisheries
35.	Streamlined administrative aspects of CR Program (housekeeping)
36.	Allow collection of permit fees (dropped)
37.	Exempt Western Aleutian Islands golden king crab IFQ from regional delivery requirements under certain circumstances
38.	Establish Annual Catch Limits and Accountability Measures (ACL/AMs) for crab stocks
39.	Modify the snow crab rebuilding plan
40.	Revisions to essential fish habitat information (revised Amendment 16)
41.	Establish a process for emergency exemptions from regional delivery requirements
42.	Revise information requirements for Economic Data Reports (EDRs)
43.	Revise PIBKC rebuilding plan
44.	Modify ROFL provisions
45.	Modify freezer longline GOA Pacific cod sideboards
46.	Correct text around LLP vessel lengths
47.	Exempt custom processing from the Tanner crab IPQ use caps
48.	Revise ownership attribution model for AFA and crab excessive shares for CDQ Program
49.	Revisions to essential fish habitat information (revised Amendment 40)
50.	Implement a rebuilding plan for St. Matthew blue king crab
51.	Standardized Bycatch Reporting Methodology
52.	Revisions to EDR Requirements
53.	EBS snow crab Rebuilding

Appendix B Establishment of the Fishery Management Plan

Prior to implementation of the FMP, state laws and regulations are subject to mandatory review by the Secretary. Between the date the Secretary approves this FMP and the next regularly scheduled meeting of the Board concerning crab management, any member of the public may petition any existing regulation to the State and, if unsuccessful, to the Secretary, in accordance with the procedure set forth in Section 3.9 herein. If the Secretary finds, on the basis of an appeal, or as a result of mandatory review, that any existing State law or regulation is inconsistent with the Magnuson-Stevens Act, the FMP, or applicable Federal law, he/she will publish Federal rules in the *Federal Register* superseding the State laws or regulations in the EEZ.

The following document is the State/Federal Action Plan for the commercial king and Tanner crab fisheries. This Action Plan details the cooperative management system for BSAI crab fisheries between the North Pacific Fishery Management Council and the State of Alaska.

ALASKA DEPARTMENT OF
FISH & GAME
DIVISION OF COMMERCIAL FISHERIES
JUNEAU, ALASKA

NATIONAL MARINE FISHERIES
SERVICE
ALASKA REGION
JUNEAU, ALASKA

STATE/FEDERAL ACTION PLAN
FOR MANAGEMENT OF
COMMERCIAL KING AND TANNER CRAB FISHERIES
OCTOBER, 1993

PURPOSE: To foster improved coordination and communication between National Marine Fisheries Service (NMFS) and Alaska Department of Fish & Game (ADF&G) with respect to crab management under the Fishery Management Plan for the Commercial King and Tanner Crab Fisheries in the Bering Sea and Aleutian Islands Area (FMP). Interagency action groups will implement this coordination.

BACKGROUND: The FMP approved in 1989 establishes a State/Federal cooperative management regime that defers crab management to the State of Alaska with Federal oversight. The Secretary of Commerce defers to the State's regulatory regime providing it is consistent with the FMP, the Magnuson Fishery Conservation and Management Act (Magnuson Act) and other Federal law.

A management goal and specific objectives are identified in the FMP. ADF&G, in consultation with NMFS, recommends to the Alaska Board of Fisheries (Board) appropriate management measure(s) for a given year and geographical area to accomplish the objectives. Three categories of management measures are available for consideration: (1) those that are specifically fixed and require an FMP amendment to change, (2) those that are framework-type measures which the State can change without an FMP amendment but following specified criteria, and (3) measures that are neither rigidly specified nor frameworked in the FMP. The measures in categories (2) and (3) may be adopted as State laws subject to the appeals process outlined in the FMP.

The State is not limited to the measures outlined above. Any other management measures must be justified based upon consistency with the FMP objectives, the Magnuson Act, and other applicable Federal law.

Overall, the FMP has efficiently managed the crab fisheries. The framework approach has worked well for the majority of crab management issues. However, Category 2 management measures have been appealed to the Secretary (specifically, pot limits and registration areas). Members of the industry also have criticized Board actions with respect to Category 2 measures

(setting of guideline harvest levels). In order to avoid future contentious problems, NMFS and ADF&G will adopt this action plan to more formally implement State/Federal cooperation in crab management.

ACTION: Three action groups, described below, will facilitate this joint coordination.

a) Research Planning Group
b) Crab Plan Team
c) State/Federal Policy Group

Research Planning Group
The purpose of this group will be to consider long-term crab research priorities, current research activities, and each agency's particular research interests. The group will include NMFS, ADF&G and university crab biologists as well as other representatives from NMFS/Fisheries Management Division; Alaska Fisheries Science Center and ADF&G/Division of Commercial Fisheries. Some of these individuals also may be members of the Crab Plan Team.

This group will work on the development of a long-term plan for applied crab research which will help foster a healthy exchange of ideas among fishery biologists and managers on particular needs. The plan will focus on development of optimal long-term harvest policies. The plan will be updated annually and will function as a vehicle to coordinate the expenditure of crab funds between ADF&G and NMFS and to seek additional funding for critical research.

The group will meet annually for a one- or two-day period at a time and place convenient for the majority of group members.

Crab Plan Team
The annual development of the preseason guideline harvest levels (GHLs) is a dynamic process dependent on using the most current information available and applying this information via analysis and statistical modeling. Scientists from NMFS and ADF&G are currently involved in this process.

Though individual members of the Plan Team have always participated in the development of GHLs, public perception is that this is an ad hoc process. Due to the timing of the Bering Sea surveys and the openings of the early fall fisheries, only a limited amount of time exists to analyze, discuss, amend and release the GHLs to the public in a timely fashion. To release preseason GHLs that have been reviewed using a Council process, such as that used to establish annual groundfish harvest specifications under the groundfish FMPs, would require that

current season opening dates for the fall fisheries be delayed and/or rescheduled, or the previous year's survey information would have to be used to set GHLs in the current year. The latter option could interfere with the FMP management objective of biological conservation. In addition, the Council would have to schedule a special meeting or allow time during the September meeting to address crab management after the survey information became available.

The purpose of a Plan Team review will be to formally incorporate its input in the GHL process. The FMP calls for Plan Team input in the preparation of an annual area management report to the Board. This report includes a discussion of the current status of GHLs and support for different management decisions. This report is reviewed by the State, NMFS, and the Council, and available for public comment on an annual basis.

The Plan Team will meet annually to review GHLs in a session that is open to the public.

State/Federal Policy Group

The purpose of the State/Federal Policy Group will be to review and discuss crab management issues prior to Board and/or Council review. This group will include senior staff and legal counsel and will meet annually, or more often if necessary. Many issues may be resolved through interagency agreement. For instance, prior to final Board action, this Policy Group could review whether crab management proposals and petitions are consistent with the FMP and reflect an appropriate and desired management strategy. Also, this group will review FMP amendment proposals. Their recommendations will be forwarded to the Board and the Council, providing guidance as the Board establishes management regulations.

OTHER ACTION:

In addition to the above action groups, NMFS and ADF&G will meet annually with crab industry representatives to discuss crab management issues such as, but not limited to, setting of GHLs, stock analysis, current research, and harvest strategies. The location of meetings will alternate between Washington and Alaska. These meetings will provide an opportunity for review of crab management issues and industry input to management agencies.

Council and Board members have agreed to form a Consultation Group composed of a subcommittee of Council and Board members that will meet publicly on an annual basis to focus on crab issues. (These meetings could occur at one of the regularly scheduled Council or Board meetings.) This joint subcommittee could review staff data on the status of crab stocks and fisheries and both public and staff information regarding crab

management and then provide guidance to the respective Council and Board on pertinent crab issues. Council and Board representatives would benefit by meeting for the sole purpose of discussing crab-related issues.

Both NMFS and ADF&G agree to jointly request Council and Board concurrence on these action groups and their role in the cooperative management of the king and Tanner crab fisheries in the Bering Sea and Aleutian Islands.

This State/Federal Action Plan for Management of Commercial King and Tanner Crab Fisheries has been approved by:

Steven Pennoyer
Director, Alaska Region
National Marine Fisheries Service

10/12/93
Date

Carl L. Rosier
Commissioner
Alaska Department of Fish & Game

10/15/93
Date

Appendix C Community Profiles

Communities engaging in crab commercial fishing

The communities briefly summarized in this section are those most engaged in the federally managed BS/AI crab fisheries off of Alaska and, arguably, are the communities with the most potential to be affected by changes to those fisheries. Understanding how Alaskan fishing communities may be affected by changes in the federally managed fisheries begins with understanding how these communities are currently engaged in and dependent upon those fisheries, as well as the overall socioeconomic context of those communities. Impacts to Alaskan communities involved in these fisheries can occur as a result of changes to fishery management plans, fish stocks, the location of productive fishing grounds, or a combination of all of these factors.

Many of the Alaskan communities directly involved in the federally managed fisheries off Alaska are heavily dependent on these fisheries as a key component of a relatively small and undiversified local economy. Additionally, many of the communities heavily dependent on these fisheries are traditional villages with high proportions of Alaska Native residents, while others feature populations with relatively high proportions of non-Native minority residents drawn to the communities by opportunities in the commercial fishing sector. Understanding how Alaskan communities are reliant upon federally managed fisheries may be affected by changes in conservation and fishery management programs is prescribed by National Standard 8 of the Magnuson- Stevens Fishery Conservation and Management Act (MSA) and Executive Order (EO) 12898 on Environmental Justice. National Standard 8 states that conservation and management measures shall take into account the importance of fishery to fishing communities and, to the extent practicable minimize adverse economic impacts on such communities. EO 12898 states that federal agencies must identify and address disproportionately high and adverse environmental effects of their actions on minority populations and low-income populations.

Ten species of crabs are caught in Alaskan crab fisheries, and seven of these have commercial importance: red king crab, *Paralithodes camtschaticus*; blue king crab, *P. platypus*; golden king crab, *Lithodes aequispinus*; Tanner crab, *Chionoecetes bairdi*; snow crab*, C. opilio*; hair crab, *Erimacrus isenbeckii*; and Dungeness crab, *Cancer magister*. In addition to commercial fisheries, subsistence and personal use fisheries support local food security and cultural cohesion.

In 2021, the FMP BSAI crab fisheries had an active fleet of 67 catcher vessels and two catcher processors, and landed and processed at 15 processing facilities throughout the region.4 Commercial crab fisheries blossomed in the 1950s with the market of king crab fisheries in the Bering Sea, but today many of the stocks are in a depressed state. In 2021 and 2022, several crab stocks experienced unprecedented declines, resulting in closures and drops in total allowable catch (TAC) for a suite of crab fisheries. The declines in Bering Sea crab fisheries and the subsequent closures drastically affected fishermen as well as the social, cultural, and economic wellbeing of fishing communities, including economic dependence, social networks, food security, and identity.

Those communities with high engagement in the BS/AI crab fisheries will be detailed in the subsequent community profiles are: **Seattle, Kodiak, Akutan, Unalaska/Dutch Harbor, King Cove, Sand Point, Nome, St. Paul, Adak and Homer.** Seattle and Anchorage were rated as highly engaged[1]; however, as major cities, both are involved in multiple industries and are distinct from smaller, more remote fisheries-dependent communities. For that reason, Anchorage has been excluded from this iteration of community profiles. However, due to the large presence of Seattle communities in crab harvesting, a Seattle community profile can be found below.

[1] Community engagement ratings can be found in the 2023 ACEPO report on the April 2023 Council agenda.

Please note that the following community profiles are a snapshot in time given the most up-to-date information. These profiles are adapted from content produced by the community profiles (Fey et al. 2016), the 2023 Annual Community Engagement and Participation Overview (ACEPO; Wise et al. 2023), and recently updated community profiles on Akutan and Unalaska (Downs & Henry 2023). Given the instability in crab stocks in recent years, the likelihood that crab engagement will vary in subsequent years is high. For the most up-to-date information, readers can reference the ACEPO report, and npfmc.org for updated community profiles as information becomes available.

Seattle

The Seattle metropolitan statistical area (MSA) is an urban conglomeration in Washington state comprised of the three most populous counties—King, Pierce, Snohomish—and includes the Pacific Northwest's largest city, Seattle. Total population of the Seattle MSA was 737,015 in 2020. The area has long had a vital role in Alaska commercial fisheries, with 75% of Alaska's commercial fishing vessels mooring, docking, and conducting repairs in Seattle. Before Seattle and its suburbs became home to a technology industry, logging was its first major industry. Later in the 19th century, the city became the gateway to Alaska with newfound commercial and shipbuilding industries. For over 100 years, commercial fishers in Seattle have traveled to work and fish in Alaska waters. Commercial fishermen use the three core facilities in the Port of Seattle including Fishermen's Terminal, Maritime Industrial Center, and Terminal 91.

Seattle MSA plays an integral role in Alaska commercial fisheries. Seattle is the home port to 300 vessels with 226 of those involved in fishing Alaska waters for Pollock, Alaskan king crab, groundfish, and salmon. Alaskan fisheries account for an annual harvest greater than all other U.S. states combined, adding more than $4 billion dollars in sales annually to the U.S. economy. In 2017*, Seattle MSA's commercial fishing industry supplied 7,200 jobs. Of that, 5,100 individuals worked on fishing vessels, and 4,900 of those fished in Alaskan waters, supporting over $313 million in labor ($150 million in fishing employment; $163 million in onshore labor). In the same year, commercial fishing operations through the Port of Seattle generated $13.2 million in taxes in to Washington State.

In 2020, Seattle MSA had 11 crab processors, (including both at-sea and shore-based operations). These facilities processed 20.5 million pounds of crab worth $192 million4 across all fisheries. Seattle has a high engagement of crab harvesting (Figure 0-1). Seattle's resident vessels harvesting BSAI crab fisheries saw a dramatic decline in both harvest volume and associated value beginning in 2017 when harvest decreased by 17,441,359 pounds (46%) and $46.9 million (32%) from 2016 to 2018. However, the volume of crab harvested has increased by almost 10.6 million pounds or 51% between 2018 and 2021(Figure 0-1). There has been an increase of an ex-vessel value of $88.5 million (90%) between 2017 and 2021, with Seattle residents harvesting crab with an all time high ex-value of nearly $187 million in 2021.

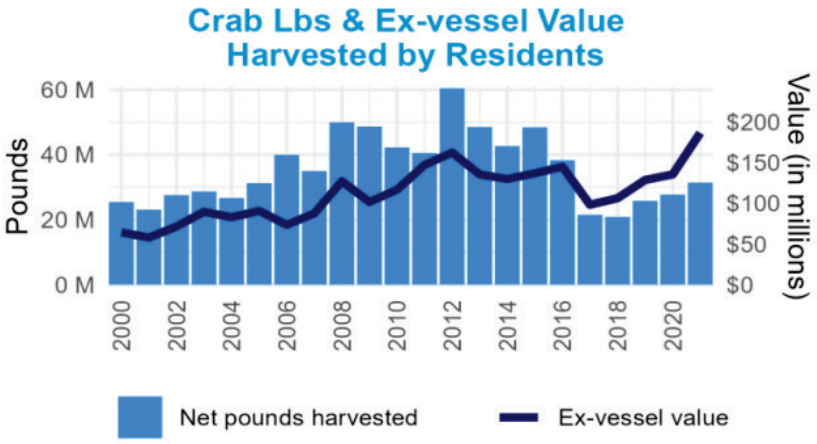

Figure 1 Crab harvested (in lbs.) and total ex-vessel value of crab harvested by Seattle residents

Source: 2023 ACEPO report

The number of crew residing in Seattle who engage in FMP crab fisheries has decreased sharply beginning in 2020, potentially due to the COVID-19 pandemic, with a decrease in 55 crewmembers harvesting BSAI or 41% between 2019 and 2020. This number rebounded slightly in 2021 to 101 crewmembers (down from 135 in 2019). Crab processing engagement in Seattle MSA is low, and there is not a substantial amount of crab processing activity in Seattle to report.

Kodiak

The largest island in the Gulf of Alaska, Kodiak Island is approximately 25 miles across the Shelikof Straight from the Katmai Coast and 90 miles southwest of the Kenai Peninsula, encompassing 6,559 square miles. The city of Kodiak is the largest community on the island, situated on the eastern tip about 219 nautical miles south of Anchorage. Kodiak has a long history and was originally inhabited by the Alutiiq for over 7,000 years. In the late 1800s, after the United States purchased of Alaska from Russia, large-scale fish processing plants were developed, establishing Kodiak as a cornerstone in American fisheries. The population of Kodiak in 2020 was 12,787 individuals. While the majority of the population of Kodiak Island live in Kodiak City, there are seven other island communities including Akhiok, Port Lions, Larsen Bay, Old Harbor, Karluk and Ouzinkie. Native Associations active in the area include the Natives of Kodiak, Inc., Koniag, Inc., and the Kodiak Area Native Association. Kodiak is located in Federal Statistical and Reporting Area 630, Pacific Halibut Fishery Regulatory Area 3A, and Central Gulf of Alaska Sablefish Regulatory Area.

The city of Kodiak is largely dependent upon commercial fishing and the seafood processing industry. Kodiak is home to most of the island's commercial fishing vessels and to the majority of the seafood processing plants. Commercial fishing, seafood processing, and commercial fishing support services are the major industries contributing to the local economy.

There are two main harbors in Kodiak, St. Paul Harbor and St. Herman Harbor, and together they possess a number of slips for commercial and recreational vessels. St. Herman Harbor is the larger of the two harbors and can accommodate vessels up to 150 feet in length. Kodiak's dependence on the fishing industry is apparent in the large number of commercial fishing permits and crewmember licenses issued to its residents. Kodiak Island has a diversified fisheries profile including engagement in both groundfish and crab fisheries. In this year, 526 commercial fishing permits were actively fished by Kodiak residents, with salmon permits representing the largest number at 233, 96 crab, 84 halibut permits, and 76 groundfish permits. In 2022, 604 Kodiak residents attained crewmember licenses, 42 of those were not permanent Alaskan residents.

In 2022, Kodiak residents owned 134 active federal fishing vessels. Two vessels had activity as catcher processors. Most of the vessels participated in multiple fisheries, switching their gear to adapt to different fisheries and seasons. The highest number of vessels participated in the Central Gulf halibut fishery (63). Of the vessels 20 carried trawl gear and 114 carried fixed gear. Groundfish made up the largest portion of all ex-vessel value at ($44M) followed by salmon at $38M, and halibut at $19M. On a species basis Pacific cod and pollock were the two most valuable federally managed species. Pacific cod is harvested by a variety of groups with the pot vessels as the largest user while pollock is mainly utilized by the trawl vessels.

Kodiak Island's resident vessels harvesting BSAI crab fisheries have seen drastic declines since 2012. However, both harvest volume and ex-vessel value have increased slightly each year since 2018 (**Figure 0-2**). In 2021, fishers harvested 3.2 million pounds of crab with an ex-vessel value of $16 million which, compared to 2018, showed a 1.2 million pounds (65%) increase in volume and $6.5 million (69%) increase in value.

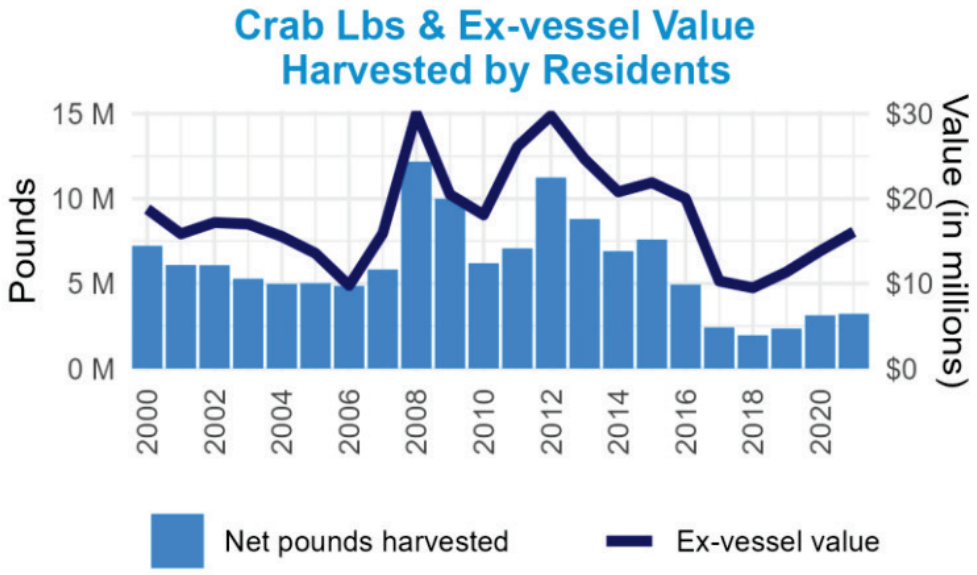

Figure 2 Crab harvested (in lbs.) and total ex-vessel value of crab harvested by Kodiak residents
Source: 2023 ACEPO report

Within the BSAI crab fisheries, the number of crew living in Kodiak Island communities declined from 55 in 2019 to 42 in 2021 (24%), despite a slight rebound from a 2020 low of 33. Having hit a peak in 2015 of 90 resident crew members, the number fell by 21% in 2016, and continues to decline. As of 2021, there were 45 quota share holders residing in Kodiak Island communities. This number has remained relatively constant over the past five years although there is a general downward trend since 2009, which had a high of 57 quota share holders.

In 2022, Kodiak had 7 active shore-based processors. Landings from the federal fishery accounted for 68% of the ex-vessel value received by Kodiak processors. The Central Gulf trawl fishery comprised 37% of the federal value with pollock accounting for $28M or 28% of the federal ex vessel value. Halibut and Sablefish deliveries followed Pollock at $22M and $17M respectively.

In order to show the general processing trends for crab FMP, the processing regional quotient (RQ) pounds and revenue landed in Kodiak show a steady decline over the past two decades, indicating a decrease in participating in the crab processing sector.

Subsistence hunting and fishing are an important part of people's recreation and livelihoods on Kodiak Island. All communities there are significantly reliant on groundfish and crab fisheries for subsistence purposes, with 18%-75% of households using at least one species of groundfish, and 15-90% of households using at least one species of crab.

Akutan

Akutan is located on Akutan Island in the eastern Aleutian Islands, one of the Krenitzin Islands of the Fox Island group. The community is approximately 35 miles east of Unalaska and 766 air miles southwest of Anchorage, the area occupies 14 square miles of land and 4.9 square miles of water. The broader area was historically occupied by the Unangan, and Akutan was used as a fur storage and trading facility starting in 1878. During World War II residents of the area were evacuated, and many former residents did not return after the reestablishment of the village in 1944.

In 1979, Akutan was incorporated as a 2nd Class City with a mayoral form of government and became a part of the Aleutians East Borough (AEB) when that was incorporated in 1987. The Akutan Corporation is the local Alaska Native Claims Settlement Act chartered village corporation, the Aleut Corporation is the regional ANCSA chartered corporation, and the federally recognized tribal entity in the community is the Native Village of Akutan. The population of Akutan in 2020 was 760 individuals.

Akutan is a unique community in terms of its relationship to the Bering Sea commercial fisheries. It has been the site of one of the largest shoreplants in North American, Trident Seafoods, but it is also the site of a village that is geographically, demographically, socially, and historically distinct from the locally operating shore plant. Akutan remains the only community in the region that is both a direct major/developed participant in multiple industrial scale fisheries of the Bering Sea and a CDQ community.

The vast majority of catch landed at the Trident Akutan plant comes from vessels based outside of the community. Most of those vessels focus primarily on pollock, Pacific cod, and crab. The shorebased processor is a multi-species plant. Given that the plant is an American Fisheries Act qualified plant with its own pollock co-op, pollock is the primary species in terms of labor requirements and economic value.

However, the shore plant has also accounted for a significant amount of the regional crab processing, which has historically provided for a significant amount of the processing value at the plant (EDAW 2005). As with plants in Dutch Harbor and King Cove, crab has been an important part of a diverse operation at the shore plant in Akutan, since implementation of CR Program. Closure of the BBR fishery in 2021/22 and closures of both the BBR and BSS fisheries in 2022/23 had substantial impact on this plant and associated tax revenue for the borough.

In 2022, Trident Seafoods announced plans to build a "next-generation processing plant" to replace its existing facility in Akutan[2]. According to company sources, Trident is working with third-party engineering firms to weigh the feasibility, costs, and design options for expanding its footprint in Akutan versus building a new plant on Unalaska's Captains Bay on property it recently acquired through its subsidiary LFS. This operational move would generate a major realignment of regional tax revenue and economic activity. Between fiscal year 2010 and fiscal year 2020 direct fishery revenue represented between 75% - 98% of all general fund revenue for Akutan (Downs & Henry 2023).

No vessels owned by Akutan residents have been active since 2021. In 2022, there were a small number of crew permits (4) and no commercial fishing permits issued.

[2] U.S. Department of Energy, 2023. Industrial Decarbonization and Emissions reduction Demonstration-to-deployment Funding Opportunity Announcement. https://www.documentcloud.org/documents/23809423-trident-makushin-concept-paper

Residents of Akutan regularly engage in subsistence fishing activities. The most popular species of groundfish harvested are cod and rockfish. Recorded numbers of halibut harvested fluctuated in recent years, but data from a subsistence harvesting study conducted in 2015 shows that halibut, salmon and cod are all staple subsistence foods in Akutan and comprise 76% of the major subsistence resources harvested by residents. Between 1991 and 2016, the estimated pounds of salmon harvested varied depending on availability, ranging from 1,000 to more than 18,000 pounds. Residents have also historically harvested a wide variety of species, but this has declined since 2008 as the species harvested and used have become more narrowed.

Unalaska/Dutch Harbor

The City of Unalaska and the port of Dutch Harbor are about 766 miles southwest of Anchorage, located on the Islands of Unalaska and Amaknak. The communities are connected by a bridge and are handled as a single community for this profile because of their socioeconomic interdependences. The City of Unalaska became incorporated in 1942 and it encompasses 111.0 square miles of land and 101.3 square miles of water. After World War II, the community evolved into the busy and prosperous commercial fishing and seafood processing port, and today it yields the nation's largest volume of landings. The population of Unalaska in 2020 was 4,758 individuals.

The city owns six marine facilities, but fishing vessels are mainly moored at the Robert Storrs and Carl E. Moses boat harbors, or at Spit Dock. The Carl E. Moses and Robert Storrs facilities consist of 52 and 71 slips, respectively, whereas the Spit Dock has 2,400 linear feet of dock, along with multiple berths for long and short term moorage.

Commercial fishing and seafood processing play a significant role in the economic success of Unalaska. Major varieties of fish processed in Unalaska include king crab, Tanner crab, pollock, Pacific cod, salmon, herring, halibut, sablefish, turbot, Atka mackerel, and rockfish. As a result, commercial fishing and seafood processing provide a significant number of jobs and income to the community. For example, three of the largest employers in Unalaska are UniSea, Inc., Westward Seafoods, and Alyeska Seafoods, Inc. (EDAW, 2005).

Unlike many of the crab ports in the region, Unalaska also has extensive support services for the BS fisheries. The support services in Unalaska can support all range of services for any vessel class in the pollock, crab, and other groundfish fisheries. As a result, the support services are heavily dependent upon the success of the groundfish and crab fisheries. To some extent, the fleet services also contribute to the diversification of the Unalaska economy, which helps insulate the community from negative changes in individual fisheries. Unalaska participates in a broad suit of fisheries. From 2017-2022, halibut accounted for an average of 40.6% of the community's harvest, Pacific cod 29.7%, and other fish 29.7%. In 2021, Unalaska harvested 2.7 million pounds of groundfish with an associate value of $1 million.

Unalaska is highly engaged in the crab processing sector. Dutch Harbor based processors received a substantial share of the PQS allocation in most crab fisheries under the CR Program. These shares are subject to rights of first refusal of the Dutch Harbor community entity. These shares are unlikely to migrate out of the community because crab processing at most facilities plays an important part in an integrated operation that serves several fisheries. The number of processing facilities in the region has increased since 2019 from 7 to 12. In 2021, Unalaska processed 19.2 million pounds crab with an associated value of $136 million (**Figure 0-3**. This marks a 22% increase (3.5 million pounds) in volume landed since 2019, and a 57% increase in landed value (up $49.9 million). The amount of BSAI crab processed in the region reached a peak of 35.4 million pounds (with a value of $112 million) in 2015, then began a steep decline. However, it has begun increasing again since 2019.

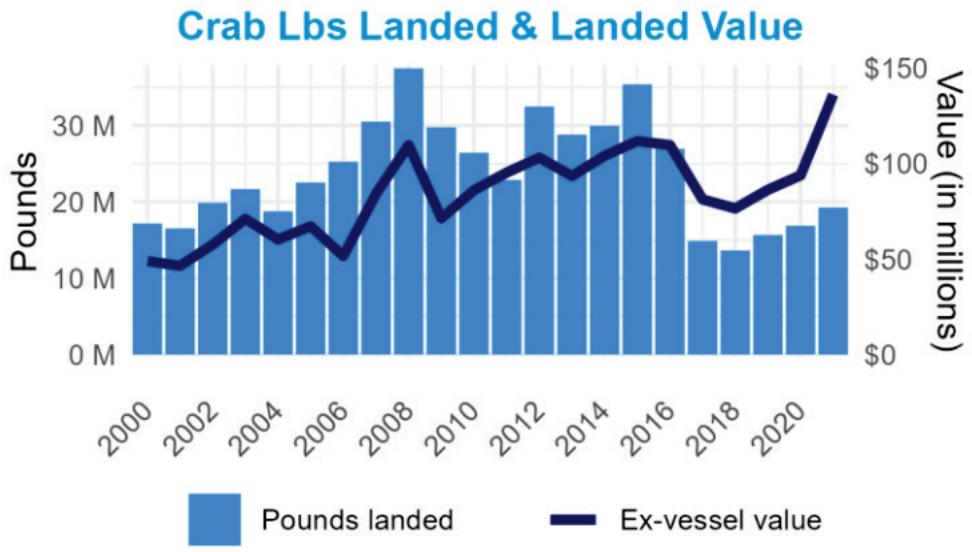

Figure 3 Crab landed (in lbs.) and total landed value of crab harvested by Unalaska/Dutch harbor residents
Source: 2023 ACEPO report

Residents own 3 federally permitted fishing vessels that were active in 2022. All of these commercial fishing vessels operated exclusively as catcher vessels, delivering to shoreside processors or motherships; were less than 60 feet in length; and utilized fixed gear (i.e., pots, hook and line). Due to confidentiality constraints, the specific activity of the Dutch Harbor/Unalaska fleet is withheld, as is shoreside processing. There were a substantial number of crew permits (68) and commercial fishing permits issued (28).

Residents of Unalaska are almost universally engaged in subsistence fishing, with 96.8% of all households utilizing fisheries resources (according to the most recent data available).12, The most common species include salmon, halibut, crabs (King crab, Tanner crab and Dungeness crab), cod, and rockfish. The high per capita harvest rates of both groundfish and crab indicate that residents of Unalaska rely on these species as key sources of nutrition in their diets.

King Cove

King Cove is located on the south side of the Alaska Peninsula and is about 605 miles southwest of Anchorage. The city was established in 1911, when Pacific American Fisheries constructed a salmon cannery. The city was incorporated in 1947 and encompasses 25.3 square miles of land and 4.5 square miles of water. The community lies on a sand spit, separated by King Cove Lagoon and King Cove, and is surrounded by rugged mountains. King Cove is an AEB community but not designed as a CDQ community. The population of King Cove in 2020 was 1,147 individuals.

King Cove's economy is solely dependent on commercial fishing and the seafood processing industry. There are two harbors that have moorage for 96 vessels with a maximum length of 165 feet, as well as a deep water pier for the state ferry, cruise ships, and cargo vessels. The community is home port to large crab vessels, and is also home to Peter Pan Seafoods, the only shore based processor located in the community. The plant processes salmon; crab; halibut; and groundfish.

Although the plant operates year- round, its peak seasons are in the winter and summer, when it employs up to 500 people (Himes-Cornell et al. 2013).

In 2022, King Cove residents owned 10 active federally permitted fishing vessels. All of these commercial fishing vessels operated exclusively as catcher vessels, delivering to shoreside processors or

motherships. These catcher vessels were less than 60 feet in length and deployed fixed gear or trawl gear (three boats used both). The pot fleet of King Cove has 8 vessels, followed by halibut (3 vessels), and trawl (3 vessels). King Cove had 108 crewmember licenses issued. In 2022, 86 commercial fishing permits were issued to King Cove residents and actively fished, with salmon permits representing the largest number at 35, followed by 30 crab permits.

Residents of King Cove are moderately engaged in subsistence fishing activities within the groundfish and crab fisheries. Cod is the most utilized groundfish species by far, while King Crab and Tanner Crab are the most popular crab species. Compared to other communities, their harvested pounds per capita are on the lower end, however they have been highly stably engaged in halibut and salmon subsistence fishing. A study conducted by the Alaska Sustainable Salmon Fund in 2016 showed that the harvesting, processing, sharing and consumption of salmon, especially sockeye, was culturally essential for King Cove residents. While many residents still used traditional subsistence methods, many households had also begun meeting their subsistence needs by removing salmon for home use from their commercial harvests. In King Cove, nearly all households (91%) were found to use salmon, with 75% attempting to harvest and 59% receiving salmon from others. Overall, it was the most widely utilized wild resource by pounds. Changes and weather patterns, rising sea levels, and warming oceans were some of the environmental factors which had recently impacted residents' ability to harvest salmon. However, economic and social factors, such as access to funds to buy equipment and the influence of local canneries, also affected residents' harvest patterns.

Sand Point

Sand Point, also known as Qagun Tayagungin, is situated on Popof Island, off the southern coast of the Alaska Peninsula. The settlement of Sand Point was founded in 1898 as a cod fishing outpost and incorporated in 1946. Sand Point is home to one of the largest fishing fleets in the Aleutian Chain. Fisheries employs a number of seasonal workers each year. Included under the Alaska Native Claims Settlement Act (ANCSA), Sand Point was has three native tribes: The Qagan Tayagungin Tribe of Sand Point Village, the Native Village of Unga, and Pauloff Harbor Village. The population of King Cove in 2020 was 1,186 individuals.

Sand Point has marine facilities include a 25-acre boat harbor with four docks, 134 boat slips, a harbormaster office, barge off-loading area, and a 150-ton lift. Regular barge services supply the community. The state ferry operates between Sand Point and Unalaska, Akutan, False Pass, Cold Bay, and King Cove between May and October. Sand Points' economy is primarily based on commercial fishing and processing, with Trident Seafoods being a top employer.

The total number of resident owned fishing vessels decreased by 14 in 2021 (down 16% from 2019); this marks an upward trend from 2020 , which saw an all time low of 66. Ownership of groundfish vessels among residents also decreased since 2019, but increased slightly from a dip in 2020. These declines in 2020 are likely due to impacts from the COVID-19 pandemic

Commercial salmon harvest dominates the area's fisheries; however groundfish harvest accounted for an average of 18% of the total value landed over the past five years for these three communities.. In 2021, groundfish harvests were 26% of the total ex-vessel value landed in these communities, landing 12.2 million whole pounds, with an ex-vessel value of $3.1 million. Compared to 2019, this represents a 23% decline in pounds harvested and 32% in the associated value. Over the last five years, Pollock has on average accounted for 38.6% of the landed value within the processing sector in Akutan, King Cove, and Sand Point, while 14.7% is Pacific cod and 14.2% is salmon. The number of processing facilities has decreased by 1 since 2019 to just 5, processing 593 million pounds of groundfish with an ex-vessel value of $114 million in 2021.

Community engagement in the BSAI crab fisheries is varied. Due to the small number of participants, some data are Crab Harvesting Engagement LOW considered confidential. For this reason, data were

aggregated to include adjacent communities within the Aleutians East Borough (AEB): Akutan, Sand Point, and King Cove communities. In 2021, 780,662 whole pounds of BSAI crab were harvested across Akutan, Sand Point, and King Cove, with an ex-vessel value of $3.1 million. A number of hired crew resides in these communities and residents continue to own crab licenses and quota shares, although participation has fluctuated. In 2021, there were 13 crew members working in the BSAI crab industry, and just 4 BSAI crab QS holders. This represents a slight increase of 2 crew members since 2019, but 1 fewer QS holder.

BSAI crab processing data has been aggregated for Akutan, King Cove, and Sand Point processing activities due to confidentiality reasons. These communities are highly engaged in the crab processing sector with seven processing facilities in the region. In 2021, these communities processed 7.5 million net pounds of crab with an associated exvessel value of $39 million. Compared to 2019, the volume decreased by 581,437 pounds (down 7%) and the value decreased by $5.7 million (down 12%). The amount of BSAI crab processed in the region reached a peak of 24.5 million pounds in 2015, quickly dropping to 16.3 million pounds the following year (down 33%) (**Figure 0-4**). Comparatively, the associated value dropped by $5.4 million or 7% during the same year. Both volume and landed value continued a steady decline since.

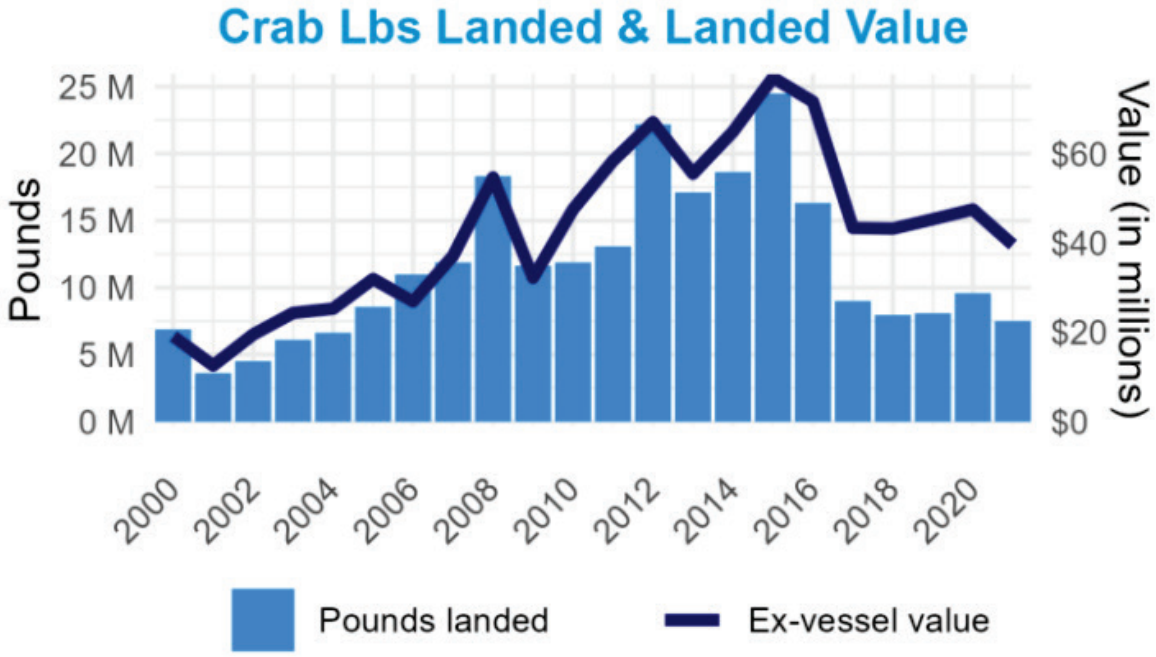

Figure 4 Crab landed (in lbs.) and total landed value of crab harvested by aggregated Sand point/King Cove/ Akutan residents
Source: 2023 ACEPO report

Residents of Sand Point rely heavily on certain species of groundfish for subsistence purposes, particularly cod and rockfish. They also rely heavily on crab species, including dungeness and king crab. According to Alaska Dept. of Fish and Game data, their subsistence harvests of halibut have increased since 2012, while their harvests of salmon have decreased. This is concerning, given that a study conducted by the Alaska Sustainable Salmon Fund in 2016 showed that the harvesting, processing, sharing and consumption of salmon, especially sockeye, was culturally essential for Sand Point residents. While many residents still used traditional subsistence methods, many households had also begun meeting their subsistence needs by removing salmon for home use from their commercial harvests. This study also showed that nearly every household in Sand Point (97%) used salmon, with 68% of households attempting to harvest and 66% receiving salmon from others.

Nome

Nome is located on the south coast of the Seward Peninsula. Historically, Malemiut, Kauweramiut, and Unalikmiut Iñupiat have occupied the area for thousands of years. Nome was a supply center for Russian whaling and trading in the mid 1800s; its population exploded during the Nome gold rush in 1898. Commercial exploitation of halibut and groundfish first extended into the Bering Sea region in 1928. King crab fisheries began in the 1950s, and Norton Sound is one of the fisheries historical centers. Nome is located in Pacific Halibut Fishery Regulatory Area 4E and the Bering Sea Sablefish Regulatory Area. The population of King Cove in 2020 was 9,865 individuals.

Nome's economy is based on public administration, fishing and other public-sector jobs. In recent years, 2017-2021, commercial harvest in Nome is predominantly focused on crab (59.2%), halibut (27.2%), and other groundfish species (13.6%). Among commercial fisheries in Nome, groundfish engagement has been low and primarily targeting Pacific cod. However, starting in 2020 and continuing in 2021, Pacific cod accounted for a much higher percentage of pounds harvested (74%) and harvest revenue (34%) than in previous years. During the same time period, both pounds harvested and harvest revenue fell significantly for crab and halibut. This was likely a consequence of the Red King Crab fishery closure in 2020. Today, Nome king crab fishermen hold both state-issued king crab permits, as well as permits in the Community Development Quota fishery. Norton Sound Seafood Products was established in 1995 and processes red king crab, salmon, and halibut.

Alaska FMP crab fisheries have struggled in recent years: hitting a peak in 2016 in both harvested volume and associated ex-vessel value, then beginning a steep decline. Bering Sea snow crab, Bristol Bay and Norton Sound Red King Crab have faced closures, late starts to the season, and reduced catch limits in recent years. In 2021, crab vessels registered in Nome harvested just 684 pounds of BSAI crab, a 98% decrease from 2019. The associated ex-vessel value in 2019 was $286,858, then down to $15,267 in 2021 (down 95%) (**Figure 0-5**) . Communities highly engaged in FMP crab fisheries, such as Nome, have undergone substantial economic and social challenges as a result of these declines, including loss of income, reduced opportunities, high levels of uncertainty, personal disruption, and increased food insecurity.

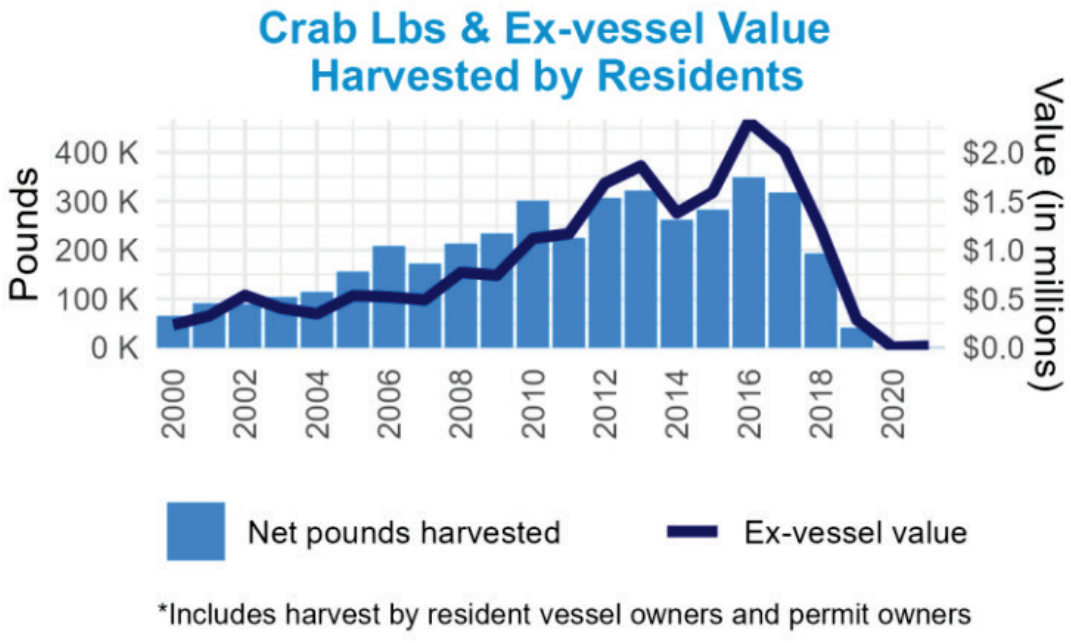

Figure 5 Crab harvested (in lbs.) and total ex-vessel value of crab harvested by Nome residents
Source: 2023 ACEPO report

In 2020, both the summer and winter Norton Sound red king crab (RKC) fisheries were closed due to low stock. To support rebuilding the stock, the Norton Sound Economic Development Corporation ceased purchasing RKC. This is reflected in the data which shows crab harvests and ex-vessel value decreased to zero in 2020, as well as lack of vessels and permits (**Figure 0-6**). Given simultaneous increases in harvests of Pacific cod during these two years, it is possible Nome fishermen attempted to compensate for the crab declines by engaging more in the groundfish fishery.

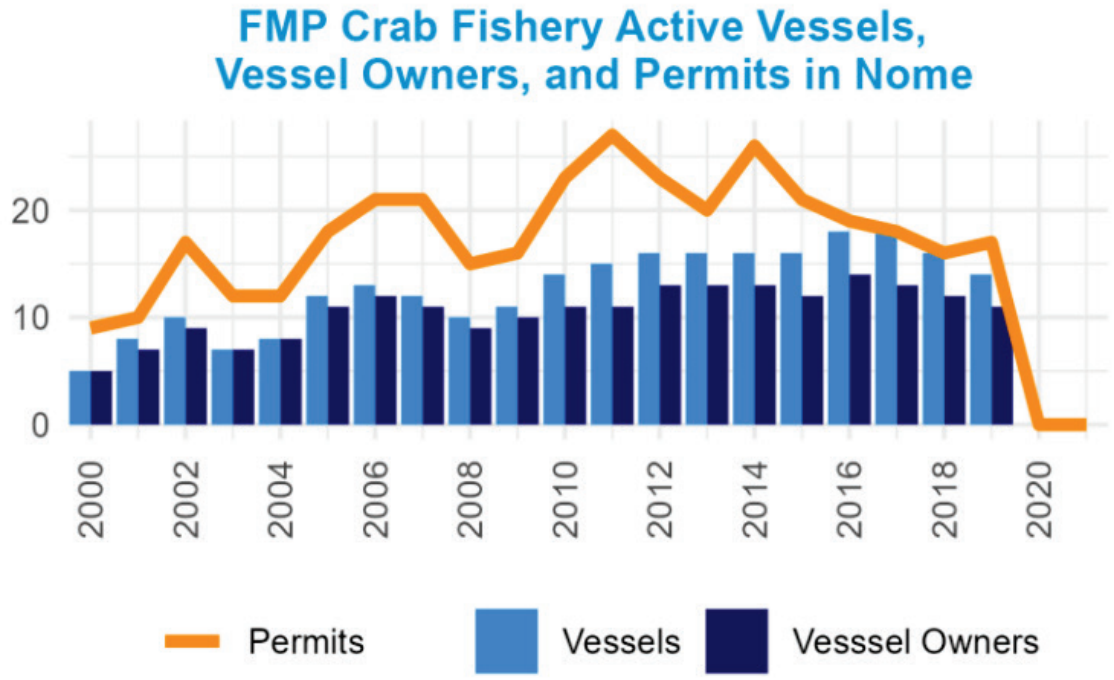

Figure 6 Number of Nome permits, vessels and vessel owners participating in the BSAI crab fisheries

The majority of the Alaska Native population in Nome depends heavily on local wild food resources such as salmon, tomcod, crab, and seal as important nutritional sources in their diets. According to Alaska Dept. of Fish and Game data, while subsistence harvests of halibut have fluctuated since 2012, 61 subsistence harvests of salmon have remained relatively constant and at a high level. Declines in salmon stocks have also been found to affect Nome residents, who have often turned to less regulated areas to subsistence fish when severe salmon fishing restrictions have been instituted. recent data from the Norton Sound overall show that from 2016-2020 there was an average of 2,873 pounds of red king crab caught for subsistence during the summer season and 8,844 pounds in the winter season. The summer saw an average of 40 subsistence harvesting permits issued, and the winter 121. These numbers decreased in 2021 to just 1,723 pounds harvested in the summer and 6,941 pounds in the winter. Winter permits also decreased to just 103, but summer permits increased to 42.1.

St. Paul

The community of St. Paul is located on a narrow peninsula on the southern tip of St. Paul Island, the largest of the five Pribilof Islands. It lies 47 miles north of St. George Island, 240 miles north of the Aleutian Islands, 300 miles west of the Alaska mainland, and 750 air miles west of Anchorage. St. Paul Island is located in the Aleutian Islands Recording District. The community encompasses 40.3 square miles of land and 255.2 square miles of water.

The population of St. Paul in 2020 was 399 individuals. The economy in St. Paul has focused on servicing the commercial fishing industry and the city is a port for the Central Bering Sea fishing fleet. Unlike King Cove, Akutan, or Unalaska, the majority of fisheries revenue for St. Paul depends almost entirely upon

the processing of crab, with some halibut from local vessels typically processed in summer months as well. One shorebased processor exists on St. Paul Island, Trident Seafoods. Prior to the decline of the BS snow crab stock and closure of the fishery in 202/23, Trident Seafoods' processing operation in St. Paul existed as the largest crab production facility in the world (Himes-Cornell et al., 2013). In recent years on average, 96.5% of landed revenue by species came from crab for the city of St. Paul. With the majority of St. Paul's municipal tax revenue generated from fish tax, the closures of the Bristol Bay red king crab and BS snow crab fisheries have been particularly devastating to this community which is so dependent on crab.

St. Paul is a primary beneficiary of the North regional distribution of shares in the CR Program. This restriction on landings ensures that, when open, a substantial portion of the processing in the BS snow crab fishery is undertaken in St. Paul. The community of St. Paul also participates in the Western Alaska CDQ Program, under the Central Bering Sea Fishermen's Association (CBSFA), and receives an allocation of crab under that program.

In 2019, the island of St. Paul had six processing facilities, which landed 13.2 million pounds of crab with an associated value of $40.7 million. This marked an increase from the last two previous years; however compared to the previous five year average, there was an overall decreased in volume by 1.1 million pounds (8%) and increase of $39 million (4%) in landed ex-vessel value

St. Paul Island had also historically been the site of a number of mobile processing operations over the years either inside the harbor (with larger operations including UniSea and Icicle) or in the area but outside the harbor (including Norquest and a number of others) as the nature of the fishery and its economic incentives dictated, and by limitations imposed by weather.

No vessel owned by Saint Paul residents has been active since 2021. There were a small number of crew permits (3) and commercial fishing permits issued (6) to community residents. All commercial fishing permits were halibut permits.

Though subsistence was not historically practiced in local culture, today halibut and seal comprise many subsistence practiced on the island in exchange with other communities for salmon. St. Paul residents are also engaged heavily in subsistence harvesting of halibut. In 1994, 90.5% of households reported harvesting halibut, and according to more recent data, harvests of halibut, while fluctuating, have remained a constant activity for St. Paul residents.

Adak

The City of Adak is located on Kuluk Bay on the northeastern side of Adak Island, approximately 1,126 miles southwest of Anchorage. Adak Island is part of the Andreanof Islands group of the Aleutian Islands, and Adak is both the southernmost town in Alaska and the westernmost town in the United States. Adak covers 122 square miles of land and 4.9 square miles of water.

Historically, the island was inhabited by the Unangan people (Aleuts) but was abandoned in the early 1800s due to the eastward shifting fur trade and famine. During World War II, Adak was used as an army installation, and was later converted to a naval air station. The naval station officially closed in 1997. The Aleut Corporation acquired the majority of Adak's former military facilities in 2004. Since that time, the Aleut Corporation has continued its efforts to develop Adak as a civilian community with a private sector economy focused heavily on commercial fishing. According to the American Community Survey, there were 171 residents in Adak in 2021

Adak is home to one large shore-based processing plant, which is currently not operational. The Adak shoreplant has had numerous ownership changes since its establishment in 1999 as Adak Seafoods. Most recently, the City of Adak has been financially involved in the local seafood processing plant as it bought processing equipment from a former plant operator and then financed the sale of the gear to the most recent plant operator, which ceased operations in June 2020.

Adak is not eligible to participate in the CDQ program, but Adak Community Development Corporation (ACDC) is considered a Community Quota Entity on behalf of the community, which allows ACDC to purchase halibut catcher vessel quota share assigned to Area 4B and sablefish quota share assigned to the Aleutian Islands. In addition, as a result of Congressional action it receives a 10 percent allocation of WAG allocation to help foster the development and maintenance of sustained fisheries participation. Congressional action has also provided an allocation of AI pollock to the Aleut Corporation for the benefit of Adak, outside of the CDQ program.

Adak serves as a refueling point for boats, and provides access to an airport, ship repair and a grocery store. There is also one vessel owner that operates out of Adak.

Homer

Homer is located on the north shore of Kachemak Bay on the southwestern edge of the Kenai Peninsula. Homer is located in the traditional territory of the Kenaitze people, a branch of Athabascan Native Peoples. In 1895, the U.S. Geological Survey settled in the area to study coal and gold resources and named the community after Homer Pennock, a gold mining company promoter.2 Commercial fisheries began in the Cook Inlet in the mid 1800s with salmon and herring. Commercial exploitation of halibut and groundfish first extended into the Gulf of Alaska in the 1920s. The first year-round processing facility in Homer opened in 1954 specializing in frozen king crab and shrimp. The population of Homer in 2020 was 5,719 individuals.

The main economic contributors of Homer are commercial fishing, and tourism. Homer fishers are diversified in commercial fisheries, including salmon, halibut, crab, groundfish, and herring. Salmon remains the most abundant and valuable species; however, a wide range of fishing vessels use Homer as a base of fishing operations.

On average, from 2017-2021, the majority of harvest revenue came from salmon (66%), then halibut (15%). Fishing vessels owned by Homer residents continued a slight downward trend from a peak of 410 in 2015 to 390 in 2021 (5% decrease). Homer is one of the leading groundfish processing communities in Alaska. In 2021, Homer's processing sector processed 1.8 million pounds of groundfish with an associated value of $1.3 million. The number of processors fell slightly in 2020 to just 62, potentially due to the COVID-19 pandemic, but rose to 2019 levels in 2021 with 77 processors.

Homer's resident vessels harvesting BSAI crab fisheries saw a dramatic decline in both harvest volume and associated revenue beginning in 2016 when harvests decreased by 1.6 million pounds (44%), and $2.2 million (22%) from 2015. In 2017, harvests fell again by 1.4 million pounds (73%) and $5.5 million in associated revenue (70%). In 2021, Homer's resident vessels harvested 800 thousand pounds of BSAI crab with a value of $4 million (**Figure 0-7**). Quota shareholders have remained relatively constant in the last five years, ranging from 11 (2016) to 9 (2021). The number of crew residing in Homer participating in FMP crab fisheries decreased sharply in 2020, potentially due to the COVID-19 pandemic, but rebounded slightly in 2021 to 17. There is not a substantial amount of crab processing activity in Homer to report.

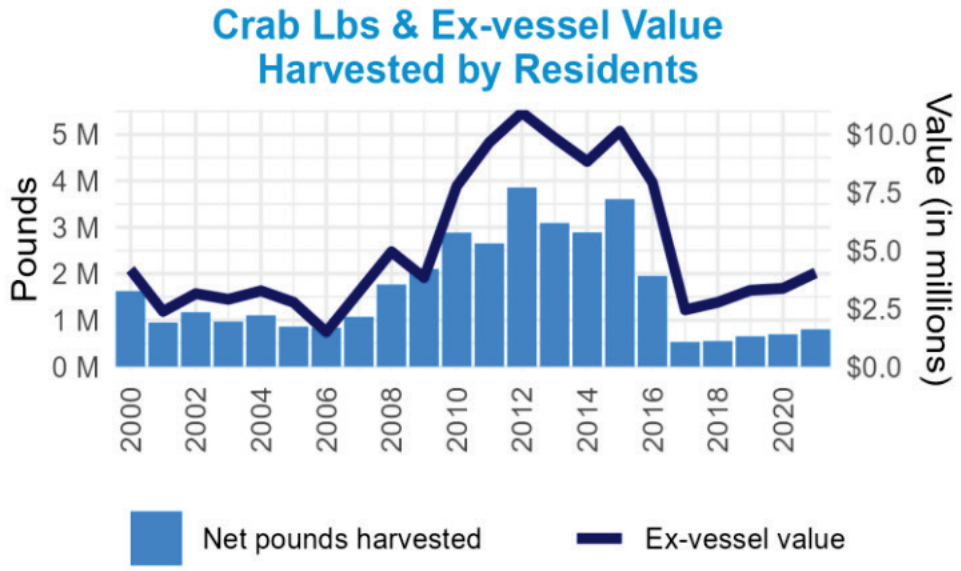

Figure 7 Crab harvested (in lbs.) and total ex-vessel value of crab harvested by Homer residents
Source: 2023 ACEPO report

The residents of Homer take part in a wide range of subsistence hunting and fishing activities. Historically, Homer residents have been highly engaged in subsistence uses of these two fisheries, particularly the crab fishery, and relied heavily on subsistence salmon.19 In 1998, a majority of residents were engaged in subsistence fishing activities which illustrates how ubiquitous subsistence fishing has been in the area.

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Appendix D Essential Fish Habitat (EFH) and Habitat Areas of Particular Concern (HAPC)

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1 Overview

Section 303(a)(7) of the Magnuson-Stevens Act requires that fisheries management plans (FMPs) describe and identify Essential Fish Habitat (EFH), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to conserve and enhance EFH. FMPs must describe EFH in text, map EFH distributions, and provide information on habitat and biological requirements for each life history stage of the species. This appendix contains all of the required EFH provisions of the FMP, including the requirement in EFH regulations (50 Code of Federal Regulations [CFR] 600.815(a)(2)(i)) that each FMP must contain an evaluation of the potential adverse effects of all regulated fishing activities on EFH.

In 2005 NMFS and the Council completed the Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska (EFH EIS, NMFS 2005). The EFH EIS provided a thorough analysis of alternatives and environmental consequences for amending the Council's FMPs to include EFH information pursuant to Section 303(a)(7) of the Magnuson-Stevens Act and 50 CFR 600.815(a). Specifically, the EFH EIS examined three actions: (1) describing and identifying EFH for Council managed fisheries, (2) adopting an approach to identify habitat areas of particular concern (HAPCs) within EFH, and (3) minimizing to the extent practicable the adverse effects of fishing on EFH. The Council's preferred alternatives from the EFH EIS were implemented through Amendment 16 to the BSAI King and Tanner Crab FMP and corresponding amendments to the Council's other FMPs.

The Council undertook the first five-year review of EFH in 2010 for the Council's managed species, which was documented in the Final EFH 5-year Review Summary Report (NPFMC and NMFS 2010). The review evaluated new information on EFH, including EFH descriptions and identification, and fishing and non-fishing activities that may adversely affect EFH. The review also assessed information gaps and research needs, and identified whether any revisions to EFH are needed or suggested. The Council identified various elements of the EFH descriptions meriting revision, and approved omnibus amendments 98/90/40/15/11 to the BSAI Groundfish FMP, the GOA Groundfish FMP, the BSAI King and Tanner Crab FMP, the Scallop FMP, and the Salmon FMP, respectively, in 2011. Amendment 11 to the Salmon FMP updated the description of EFH impacts from non-fishing activities, and EFH conservation recommendations for non-fishing activities; revised the timeline associated with the HAPC process to a 5-year timeline coinciding with the EFH 5-year review; and updated EFH research objectives in the FMP. While EFH identification and description for salmon species was considered as part of the 2010 EFH 5-year review, the implementation of changes was delayed because the methodology that has been proposed to revise EFH descriptions for salmon species was under peer review, and the Council determined to wait until the review process was complete before amendment this portion of the FMP.

From 2015 through 2017, the Council undertook a second five-year review of EFH for the Council's managed species, which was documented in the Final EFH 5-year Review Summary Report (Simpson et al. 2017). The review evaluated new information on EFH, including EFH descriptions and identification, and fishing and non-fishing activities that may adversely affect EFH. The review also assessed information gaps and research needs, and identified whether any revisions to EFH are needed or suggested. The Council identified various elements of the EFH descriptions meriting revision, and recommended omnibus amendments 115/105/49/13/2 to the BSAI Groundfish FMP, the GOA Groundfish FMP, the BSAI King and Tanner Crab FMP, the Salmon FMP, and the Arctic FMP, respectively, in 2017. Amendment 49 to the Crab FMP revised the EFH descriptions for crab species, and updated the analysis of fishing and non-fishing impacts to crab habitat in areas that are considered crab EFH.

2 Life History Features and Habitat Requirements of FMP Species

This section describes habitat requirements and life histories of the crab species managed by this FMP. Information contained in this appendix details life history information for federally managed crab species. Each species or species group is described individually. Habitat summary tables that denote habitat associations, biological associations, and predator and prey associations are also provided. In each section, a species-specific table summarizes habitat requirements.

2.1 Habitat Types

Bering Sea

The Bering Sea is a semi-enclosed, high-latitude sea. Of its total area of 2.3 million sq. km, 44 percent is continental shelf, 13 percent is continental slope, and 43 percent is deep-water basin. Its broad continental shelf is one of the most biologically productive areas of the world. The Eastern Bering Sea (EBS) contains approximately 300 species of fish, over 150 species of crustaceans and mollusks, 50 species of seabirds, and 26 species of marine mammals (Livingston and Tjelmeland 2000).

The dominant circulation of the water begins with the passage of North Pacific water (the Alaska Stream) into the EBS through the major passes in the Aleutian Islands (AI) (Favorite et al. 1976). The net current flows eastward along the north side of the AI and turns northward at the continental shelf break and at the eastern perimeter of Bristol Bay. Eventually EBS water exits northward through the Bering Strait, or westward and south along the Russian coast, entering the western North Pacific via the Kamchatka Strait. Some resident water joins new North Pacific water entering Near Strait, which sustains a permanent cyclonic gyre around the deep basin in the central Bering Sea (BS).

The EBS sediments are a mixture of the full range of potential grain sizes of mud (subgrades clay and silt), sand, and gravel. The proportion of each constituent determines the sediment type at any one location (Smith and McConnaughey 1999). Sand and silt are the primary components over most of the seafloor, with sand predominating in waters with a depth less than 60 m. In general, the fraction of finer-grade sediments increases (i.e. the average grain size decreases) with increasing depth and distance from shore. This grading is particularly noticeable on the southeastern BS continental shelf in Bristol Bay and immediately westward. The condition occurs because settling velocity of particles decreases with particle size (Stokes Law). Because the kinetic energy of sea waves reaching the bottom decreases with increasing depth, terrigenous grains entering coastal shallows drift with water movement until they are deposited at the depth at which water speed can no longer transport them. However, there is considerable fine-scale deviation from the graded pattern, especially in shallower coastal waters and offshore of major rivers, due to local variations in the effects of waves, currents, and river input (Johnson 1983).

The distribution of benthic sediment types in the EBS shelf is related to depth. Considerable local variability occurs in areas along the shore of Bristol Bay, the north coast of the Alaska Peninsula, and west and north of Bristol Bay, especially near the Pribilof Islands. In general, nearshore sediments in the east and southeast on the inner shelf (0 to 50 m depth) are sandy gravel and gravelly sand, transitioning to plain sand farther offshore and west. On the middle shelf (50 to 100 m), sand transitions to muddy sand and sandy mud, which continue over much of the outer shelf (100 to 200 m) to the the continental slope. Sediments on the central and northeastern shelf (including Norton Sound) have not been extensively sampled, but Sharma (1979) reports that, although sand is dominant in places, as it is in the southeast, there are deposits of silt both in shallow nearshore waters and in deep areas near the shelf slope. In addition, there are areas of exposed relic gravel, possibly deposited by glaciers. These departures from a classic seaward decrease in grain size are due to the large input of fluvial silt from the Yukon River and to flushing and scouring of sediment through the Bering Strait by the net northerly current.

McConnaughey and Smith (2000) and Smith and McConnaughey (1999) describe the available sediment data for the EBS shelf. These data were used to describe four habitat types. The first, situated around the shallow eastern and southern perimeter and near the Pribilof Islands, has primarily sand substrates with a little gravel. The second, across the central shelf out to the 100 m contour, has mixtures of sand and mud. A third, west of a line between St. Matthew and St. Lawrence islands, has primarily mud (silt) substrates, with some sand. Finally, the areas north and east of St. Lawrence Island, including Norton Sound, have a complex mixture of substrates.

Important water column properties in the EBS include temperature, salinity, and density. These properties remain constant with depth in the near-surface mixed layer, which varies from approximately 10 to 30 m in summer to approximately 30 to 60 m in winter (Reed 1984). The inner shelf (less than 50 m) is, therefore, one layer and is well mixed most of the time. On the middle shelf (50 to 100 m), a two-layer temperature and salinity structure exists because of downward mixing of wind and upward mixing due to relatively strong tidal currents (Kinder and Schumacher 1981). On the outer shelf (100 to 200 m), a three-layer temperature and salinity structure exists due to downward mixing by wind, horizontal mixing with oceanic water, and upward mixing from the bottom friction due to relatively strong tidal currents. Oceanic water structure is present year-round beyond the 200-m isobath.

Three fronts, the outer shelf, mid-shelf, and inner shelf, follow along the 200-, 100-, and 50-m bathymetric contours, respectively; thus, four separate oceanographic domains appear as bands along the broad EBS shelf. The oceanographic domains are the deep water (more than 200 m), the outer shelf (200 to 100 m), the mid-shelf (100 to 50 m), and the inner shelf (less than 50 m).

The vertical physical system regulates the biological processes leading to different cycles of nutrient regeneration. The source of nutrients for the outer shelf is the deep oceanic water; for the mid-shelf, it is the shelf-bottom water. In winter, surface waters across the shelf are high in nutrients. Spring surface heating stabilizes the water column, the spring bloom follows and consumes the nutrients. Steep seasonal thermoclines over the deep EBS (30 to 50 m), the outer shelf (20 to 50 m), and the mid-shelf (10 to 50 m) restrict vertical mixing of water between the upper and lower layers. Below these seasonal thermoclines, nutrient concentrations in the outer shelf water are higher than those in the deep EBS water with the same salinity. Winter values for nitrate-N/phosphate-P are similar to the summer ratios, which suggests that, even in winter, the mixing of water between the mid-shelf and the outer shelf domains is substantially restricted (Hattori and Goering 1986).

Effects of a global warming climate should be greater in the EBS than in the GOA. Located further north than the GOA, the seasonal ice cover of the EBS lowers albedo effects. Atmospheric attributes that are predicted to change ocean conditions include increased air temperature, pCO_2, storm intensity, storm frequency, southerly wind, humidity, and precipitation. Increased precipitation, plus snow and ice melt, would lead to increased freshwater runoff. The predicted decrease in sea level pressure is associated with the northward shift in the storm track. Although the location of the maximum in the mean wind stress curl will probably shift poleward, how the curl is likely to change is unknown. The net effect of the storms largely determines the curl, and there is likely to be compensation between changes in storm frequency and intensity.

Ocean circulation decreases are likely to occur in the major current systems: the Alaska Stream, Near Strait Inflow, Bering Slope Current, and Kamchatka Current. Competing effects make changes in the Unimak Pass inflow, the shelf coastal current, and the Bering Strait outflow difficult to predict. Changes in hydrography should include increases in sea level, sea surface temperature, shelf bottom temperature, pCO_2 (with an accompanying decrease in pH), and basin stratification. Decreases should occur in mixing energy and shelf break nutrient supply, while competing effects make changes in shelf stratification and eddy activity unknown. Ice extent, thickness, and brine rejection are all expected to decrease.

Temperature anomalies in the EBS illustrate a relatively warm period in the late 1950s, followed by cooling, especially in the early 1970s, and then by a rapid temperature increase in the latter part of that

decade. For more information on the physical environment of the EBS, refer to the Alaska Groundfish Fisheries Programmatic Supplemental EIS (NMFS 2004).

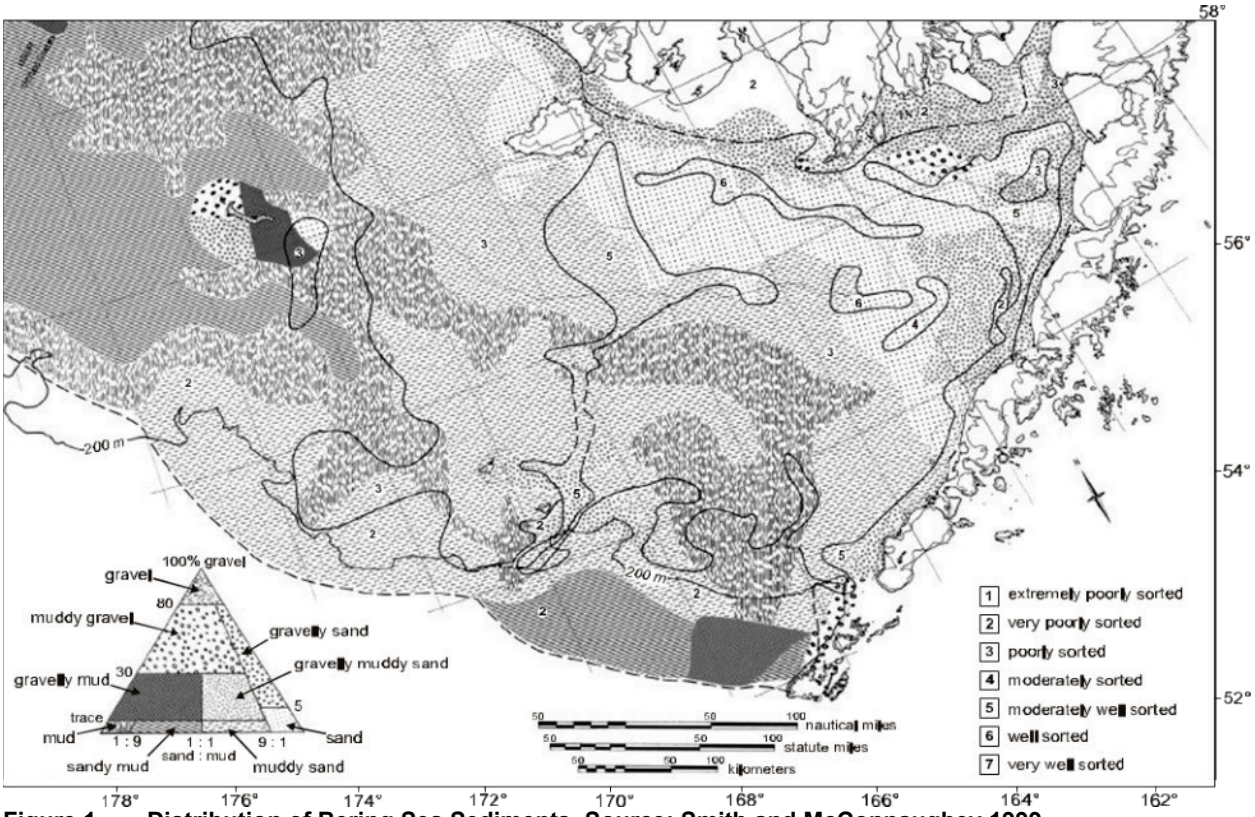

Figure 1 Distribution of Bering Sea Sediments. Source: Smith and McConnaughey 1999

Aleutian Islands

The Aleutian Islands lie in an arc that forms a partial geographic barrier to the exchange of northern Pacific marine waters with EBS waters. The AI continental shelf is narrow compared with the EBS shelf, ranging in width on the north and south sides of the islands from less than 4 km to 46 km; the shelf broadens in the eastern portion of the AI arc. The AI comprises approximately 150 islands and extends about 2,260 km in length.

Bowers Ridge in the AI is a submerged geographic structure forming a ridge arc off the west-central AI, approximately 550 km long and 75 to 110 km wide. The summit of the ridge is 150 to 200 m deep in the southern portion, deepening northward to about 800 to 1,000 m at its northern edge.

The AI region has complicated mixes of substrates, including a significant proportion of hard substrates (pebbles, cobbles, boulders, and rock), but data are not available to describe the spatial distribution of these bottom types. The patterns of water density, salinity, and temperature are similar to the GOA. Along the edge of the shelf in the Alaska Stream, a low salinity (less than 32.0 ppt) tongue-like feature protrudes westward. On the south side of the central AI, nearshore surface salinities can reach as high as 33.3 ppt, as the higher salinity EBS surface water occasionally mixes southward through the AI. Proceeding southward, a minimum of approximately 32.2 ppt is usually present over the slope in the Alaska Stream; values then rise to above 32.6 ppt in the oceanic water offshore. Whereas surface salinity increases toward the west as the source of fresh water from the land decreases, salinity values near 1,500 m decrease very slightly. Temperature values at all depths decrease toward the west.

Climate change effects on the AI area are similar to the effects described for climate change in the EBS. For more information on the physical environment of the AI, refer to the Alaska Groundfish Fisheries Programmatic Supplemental EIS (NMFS 2004).

2.2 General Life History Information for Crabs

Shallow inshore areas (less than 50 m depth) are very important to king crab reproduction as the adults move onshore to molt and mate. Tanner crabs also occupy shallower depths during molting and mating. All BSAI crab are highly vulnerable to predation and damage during molting when they shed their exoskeleton. Female king crab molt annually and must mate annually while Tanner and snow crab have a terminal molt to maturity and can store sperm internally for future clutch fertilization. The habitat occupied by molting and mating crab differs from that occupied by mature crabs during the remainder of the year. The EFH EIS crab technical team noted protection of crab in molting mating habitat during this sensitive life history stage as important.

Larval stages are planktonic for 2-3 months and their vertical distribution in the water column is determined by swimming behavior, currents, vertical mixing, or water column stratification. Generally, the larval stages are thought to occupy the upper 40 m of the water column, within the mixed layer. After molting through multiple larval stages, post-larvae settle on the ocean bottom. Habitat with adequate shelter, food, and temperature is imperative to survival of newly settling crabs. Young of the year red and blue king crabs require habitat with crevice spaces (e.g., structural invertebrates, macroalgae, shell hash, cobble, shale) that offers protection, which typically occurs in nearshore areas. Both species rely on cryptic behavior in complex habitat to reduce predation risk. Early juvenile stage Tanner and snow crab also occupy shallow waters and are found on mud habitat. Late juvenile stage crab are most active at night when they feed and molt.

Egg Stage
Female king and Tanner crabs extrude eggs, carry and nurture them outside the maternal body under their abdominal flap. Thus the habitat for eggs is the same as for egg-bearing females. The number of eggs produced by the female increases with body size.

Larval Stage
Successful hatch of king and Tanner crab larvae is a function of temperature and concentration of diatoms, so presence of larvae in the water column can vary accordingly. Crab larvae are planktonic: horizontal swimming is inconsequential compared to horizontal advection by oceanographic conditions. Larvae vertically migrate in the water column, which impacts the extent of horizontal transport as current direction and strength can vary with depth. Behaviors such as diel vertical migration may be a retention mechanism to transport larvae inshore.

Early Juvenile Stage
The early juvenile stage includes crabs first settling on the bottom as post-larvae (glaucothoe and megalopae) up to approximate size at age 2. Habitat complexity is obligatory for red and blue king crabs of this life stage and individuals less than 20 mm carapace length (CL) are typically distributed in nearshore waters among niches provided by sea star arms, anemones, shell hash, rocks and other complex habitat types. Early juvenile Tanner crab settle on mud, occur there during summer, but are not easily found in this habitat in winter.

Late Juvenile Stage
The late juvenile stage for crab is defined as the size at about age 2 to the first size of functional maturity. Late juvenile crabs are typically found further offshore in cooler water than early juvenile crabs. Smaller red king crabs of this life stage form pods during the day that break apart during the night when the crabs forage and molt. As these crabs increase in size, podding behavior declines and the animals forage throughout the day.

Mature Stage

Mature crabs are defined as those crabs of a size that is functionally mature. Functional maturity is based on size observed in mating pairs of crabs. This maturity definition differs from morphometric maturity based on chela height and physiological maturity when spermatophores or oocytes can be produced. The mature stage includes crabs from the first size of functional maturity to senescence.

Table 1 Summary of habitat associations for BSAI crab species

BSAI Crab Species	Life Stage	Nearshore: Freshwater	Nearshore: Estuarine	Nearshore: Intertidal	Nearshore: Subtidal	Shelf: Inner 1-50m	Shelf: Middle 51-100m	Shelf: Outer 101-200m	Slope: Upper 201-300m	Slope: Upper 301-500m	Slope: Intermediate 501-700m	Slope: Intermediate 701-1000m	Slope: Lower 1001-3000m	Slope: Basin >3000m
Blue King Crab	M					x	x	x						
	LJ					x	x	x						
	EJ			x	x	x	x							
	L					x	x							
	E					x	x	x						
Golden King Crab	M							x	x	x	x	x		
	LJ												x	x
	EJ												x	x
	L													
	E							x	x	x	x			
Red King Crab	M					x	x	x						
	LJ					x	x	x						
	EJ			x	x	x	x							
	L					x	x							
	E					x	x	x						
Snow Crab	M					x	x	x						
	LJ					x	x	x						
	EJ					x	x							
	L					x	x							
	E					x	x	x						
Tanner Crab	M					x	x	x	x	x	x			
	LJ			x	x	x	x	x	x	x				
	EJ			x	x	x	x	x	x	x				
	L		x	x	x	x	x							
	E				x	x	x	x	x	x	x	x		

BSAI Crab Species	Life Stage	Stratum Reference: Shallows	Island Pass	Bay/Fjord	Bank	Flat	Edge	Gully	Location: Surafce	Near surface	Semi-demersal	Demersal	Pelagic: 1-200m (epi)	Pelagic: 201-1000m (meso)	Pelagic: >1000m (bathy)	Physical Oceanography: Upwelling areas	Gyres	Thermo/pycnocline	Fronts	Edges (ice, bath)
Blue King Crab	M											x								
	LJ											x								
	EJ											x								
	L												x							
	E											x								
Golden King Crab	M		x		x							x								
	LJ				x							x								
	EJ											x								
	L																			
	E				x							x								
Red King Crab	M											x								
	LJ											x								
	EJ											x								
	L												x							
	E											x								
Snow Crab	M											x								
	LJ											x								
	EJ											x								
	L												x							
	E											x								
Tanner Crab	M			x	x							x							x	
	LJ				x							x						x	x	
	EJ				x							x								
	L												x						x	x
	E											x							x	

BSAI Crab Species	Life Stage	Substrate: Organic Debris	Mud	Sand	Gravel	Mud & sand	Mud & gravel	Sand & mud	Gravel & mud	Gravel & sand	Gravel & sand & mud	Gravel & mud & sand	Cobble	Rock
Blue King Crab	M			x	x								x	x
	LJ			x	x								x	x
	EJ												x	x
	L													
	E			x	x								x	x
Golden King Crab	M			x	x								x	x
	LJ			x	x								x	x
	EJ													
	L													
	E			x	x								x	x
Red King Crab	M	x	x	x	x	x	x	x	x	x	x	x		
	LJ	x	x	x	x	x	x	x	x	x	x	x		
	EJ				x								x	x
	L													
	E	x	x	x	x	x	x	x	x	x	x	x		
Snow Crab	M	x	x	x	x	x	x	x	x	x	x	x		
	LJ	x	x	x	x	x	x	x	x	x	x	x		
	EJ	x	x	x	x	x	x	x	x	x	x	x		
	L													
	E	x	x	x	x	x	x	x	x	x	x	x		
Tanner Crab	M	x	x	x	x	x	x	x	x	x	x	x	x	
	LJ	x	x	x	x	x	x	x	x	x	x	x	x	
	EJ	x	x	x	x	x	x	x	x	x	x	x	x	
	L													
	E	x	x	x	x	x	x	x	x	x	x	x	x	

BSAI Crab Species	Life Stage	Structure: Bars	Sinks	Slumps\Rockfalls\Debris	Channels	Ledges	Pinnacles	Seamounts	Reefs	Vertical Walls	Man-made	Community Associations: Algal Cover	Anenomes	Enchinoderms	Soft Coral	Hard Coral	Mollusca	Drift Algae\Kelp	Kelp	Polychaetes	Sea Grasses	Sea Onions	Tunicates	Oceanographic Properties: Temperature (Celsius)	Salinity (ppt)	Oxygen Conc (ppm)	Life Stage
Blue King Crab	M			x	x	x	x		x	x			x	x	x		x			x							M
	LJ			x	x	x	x		x	x			x	x	x		x			x							LJ
	EJ																x										EJ
	L																										L
	E			x	x	x	x		x	x			x	x	x		x			x							E
Golden King Crab	M			x	x	x	x	x	x	x			x	x	x		x			x				<5	>30		M
	LJ			x	x	x	x		x	x			x	x	x		x			x				<5	>30		LJ
	EJ																							<5	>30		EJ
	L																							<5	>30		L
	E			x	x	x	x		x	x			x	x	x		x			x				<5	>30		E
Red King Crab	M												x	x	x		x			x							M
	LJ												x	x	x		x			x							LJ
	EJ											x					x			x		x					EJ
	L																										L
	E												x	x	x		x			x							E
Snow Crab	M																										M
	LJ																										LJ
	EJ																										EJ
	L																										L
	E																										E
Tanner Crab	M	x	x	x	x			x			x		x	x	x	x	x	x	x	x		x	x	>4	>30		M
	LJ	x	x	x	x						x		x	x	x	x	x	x	x	x		x	x	>4	>30		LJ
	EJ	x	x	x	x						x		x	x	x	x	x	x	x	x		x	x	>4	>30		EJ
	L																							>4	>30		L
	E	x	x	x	x						x		x	x	x	x	x	x	x	x		x	x	>4	>30		E

Table 2 Summary of Reproductive Traits of BSAI Crab

Reproductive Traits																														
BSAI Crab		Age at Maturity				Fertilization/Egg Development					Spawning Behavior						Spawning Season													
		Female		Male																										
Species	Life Stage	50%	100%	50%	100%	External	Internal	Oviparous	Ovoviviparous	Viviparous	Batch Spawner	Broadcast Spawner	Egg Case Deposition	Nest Builder	Egg/Young Guarder	Egg/Young Bearer	January	February	March	April	May	June	July	August	September	October	November	December
Blue King Crab	M	6+			6+	X		X								X	X	X	X	X	X	X	X					
	LJ																												
	EJ																												
	L																												
	E																												
Golden King Crab	M	6+			6+	X		X								X	X	X	X	X	X	X	X	X	X	X	X	X	X
	LJ																												
	EJ																												
	L																												
	E																												
Red King Crab	M	7 to 8		7 to 10		X		X								X	X	X	X	X	X	X	X						
	LJ																												
	EJ																												
	L																												
	E																												
Snow Crab	M	5 to 6		6 to 8		X	X	X								X	X	X	X	X	X	X							
	LJ																												
	EJ																												
	L																												
	E																												
Tanner Crab	M	5 to 6		6 to 8		X	X	X								X	X	X	X	X	X	X							
	LJ																												
	EJ																												
	L																												
	E																												

Table 3 Summary of predator and prey associations for BSAI crab species

BSAI Crab Species	Life Stage	Predator to: Algae	Plants	Plankton	Zooplankton	Diatoms	Sponges	Eusphausiid	Hydroids	Amphipoda	Copepods	Starfish	Polychaetes	Squid	Philodae (gunnels)	Bi-valves	Other - Mollusks	Crustaceans	Ophiuroids (brittle stars)	Shrimps, mysidacae	Sand lance	Osmerid (eulachon)	Herring	Myctophid (lantern fishes)	Cottidae (sculpins)	Arrowtooth	Salmon	Cod	Pollock	Halibut
Blue King Crab	M								x			x	x			x	x	x	x	x										
	LJ								x			x	x			x	x	x	x	x										
	EJ																													
	L			x	x																									
	E																													
Golden King Crab	M								x			x	x			x	x	x	x											
	LJ								x			x	x			x	x	x												
	EJ																													
	L																													
	E																													
Red King Crab	M								x			x	x			x	x	x	x	x										
	LJ								x			x	x			x	x	x	x	x										
	EJ	x				x	x			x	x		x																	
	L			x	x																									
	E																													
Snow Crab	M												x			x	x	x	x	x										
	LJ								x				x			x	x	x	x	x										
	EJ								x	x			x					x												
	L			x	x																									
	E																													
Tanner Crab	M								x			x	x			x	x	x		x										
	LJ								x			x	x			x	x	x		x										
	EJ																													
	L	x		x	x	x																								
	E																													

BSAI Crab Species	Life Stage	Prey of: Jellyfish	Starfish	Chaetognaths (arrowworms)	Crab	Herring	Salmon	Pollock	Pac fic Cod	Ling Cod	Rockfish	Rock Sole	Flathead Sole	Yellowfin sole	Arrowtooth flounder	Skate	Halibut	Cottidae (sculpins)	Eel pouts	Salmon Shark	Northern Fur Seal	Harbor Seal	Steller sea lion	Dalls Porpoise	Beluga whale	Killer Whale	Minke whale	Eagles	Murres	Puffin	Kittiwake	Gull	Terrerstrial Mammals
Blue King Crab	M								x								x															
	LJ				x				x								x															
	EJ				x				x								x															
	L																															
	E																															
Golden King Crab	M								x								x															
	LJ								x								x															
	EJ								x								x															
	L																															
	E																															
Red King Crab	M							x	x								x															
	LJ				x			x	x			x	x	x	x	x	x															
	EJ				x			x	x			x	x	x	x	x	x	x														
	L																															
	E																															
Snow Crab	M				x				x									x														
	LJ				x				x			x	x		x	x	x	x	x													
	EJ				x				x									x	x													
	L																															
	E																															
Tanner Crab	M				x				x									x	x													
	LJ				x			x	x		x	x	x	x	x	x	x	x	x													
	EJ				x			x	x		x	x	x		x	x	x	x	x													
	L	x		x		x	x	x						x																		
	E																															

2.3 Habitat Description for Red King Crab (*Paralithodes camtschaticus*)

Abbreviations used in the habitat tables to specify location, position in the water column, bottom type, and other oceanographic features are provided in Table 4.

Table 4 Abbreviations used in the EFH report tables to specify location, depth, bottom type, and other oceanographic features

Location

ICS =	inner continental shelf (1–50 m)	USP =	upper slope (200–1000 m)
MCS =	middle continental shelf (50–100 m)	LSP =	lower slope (1000–3000 m)
OCS =	outer continental shelf (100–200 m)	BSN=	basin (>3000 m)
BCH =	beach (intertidal)		
BAY =	nearshore bays, give depth if appropriate (e.g., fjords)		
IP =	island passes (areas of high current), give depth if appropriate		

Water column

D =	demersal (found on bottom)
SD/SP =	semi-demersal or semi-pelagic if slightly greater or less than 50% on or off bottom
P =	pelagic (found off bottom, not necessarily associated with a particular bottom type)
N =	neustonic (found near surface)

Bottom Type

M = mud	S = sand	R = rock
SM = sandy mud	CB = cobble	C = coral
MS = muddy sand	G = gravel	K = kelp
SAV = subaquatic vegetation (e.g., eelgrass, not kelp)		

Oceanographic Features

UP = upwelling	G = gyres	F = fronts	E = edges
CL = thermocline or pycnocline			

General

U = Unknown	N/A = not applicable

Life History and General Distribution

Red king crab (*Paralithodes camtschaticus*) is widely distributed throughout the BS and AI, GOA, Sea of Okhotsk, and along the Kamchatka shelf, typically at depths less than 100 fathoms (fm). King crab molt multiple times per year through age 3 after which molting is annual. At larger sizes, king crab may skip molt as growth slows. Females grow more slowly than and do not get as large as males. In Bristol Bay, 50 percent maturity is attained by males at approximately 12 cm CL and 9 cm CL by females (about 7 years). Female red king crab in the Norton Sound area reach 50 percent maturity at approximately 7 cm and do not attain maximum sizes found in other areas. Size at 50 percent maturity for females in the western Aleutians is 8.9 cm CL. Natural mortality of adult red king crab is assumed to be about 18 percent per year (M=0.2), due to old age, disease, and predation.

The EFH EIS crab technical team emphasized the importance of shallow areas to all early juvenile stage crabs and in particular the importance to red and blue king crabs of high relief habitat nearshore with extensive biogenic assemblages. The area north and adjacent to the Alaska peninsula (Unimak Island to Port Moller), the eastern portion of Bristol Bay, and nearshore areas of the Pribilof and Saint Matthew Islands are locations known to be particularly important for king crab spawning and juveniles.

Relevant Trophic Information

Pacific cod is a known predator on adult red king crabs and likely primarily targets newly molted softshell crabs. Walleye pollock, yellowfin sole, and Pacific halibut are minor consumers of pelagic larvae, settling larvae, and larger crabs, respectively. Juvenile crab may be cannibalistic. Other known predators of juveniles in the GOA include hermit crabs, Alaskan ronquil, Arctic shanny, northern rock sole, sculpins, and kelp greenling. It is likely that other similar crustaceans and fish are predators but data is limited.

Approximate Upper Size Limit of Juvenile Crab (in cm): The size at 50 percent maturity is approximately 7 and 9 cm CL for female and male red king crabs, respectively, from Norton Sound and St. Matthew and St. Lawrence Islands; it is approximately 9 cm for females and 12 cm for males in Bristol Bay and the Pribilof and Aleutian Islands.

Habitat and Biological Associations

Egg: In southeast Alaska egg hatch of larvae is synchronized with the spring phytoplankton bloom suggesting temporal sensitivity in the transition from benthic to planktonic habitat. Also see mature phase description; eggs are carried by adult female crab.

Larvae: Red king crabs spend 2 to 3 months in pelagic larval stages before settling to the benthic life stage. In the BS, larvae are thought to undergo diel vertical migration, which may serve to balance feeding opportunities and predator avoidance.

Early Juvenile: Early juvenile stage red king crabs are solitary and need complex habitat, consisting of coarse substrate (i.e., boulders, cobble, shell hash) or structural invertebrates (e.g., bryozoans, stalked ascidians). Young-of-the-year crabs occur at depths of 50 m or less.

Late Juvenile: Late juvenile stage red king crabs of 2 and 4 years exhibit decreasing reliance on complex habitat and a tendency for the crab to form pods consisting of hundreds to thousands of crabs. Late juvenile crab associate with deeper waters and migrate to shallower water for molting and mating in the spring. Aggregation behavior continues into adulthood.

Mature: Mature red king crabs exhibit seasonal migration to shallow waters for reproduction. The remainder of the year, red king crabs are found in deeper waters. In Bristol Bay, red king crabs mate when they enter shallower waters (less than 50 m). Timing of mating is variable, depending on water temperature, and can occur January through June. Males grasp females just prior to female molting, after which the eggs (43,000 to 500,000 eggs) are extruded and fertilized on the female's abdomen. The female red king crab carries the eggs for approximately 10 to 12 months before they hatch, generally in April.

Table 5 Red king crab, Paralithodes camtschaticus (abbreviations are in Table 4)

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceanographic Features	Other
Eggs	10–12 mo	NA	Jan–April	NA	NA	NA	F	
Larvae	3–5 mo	Diatoms, Phytoplankton Copepod nauplii	April–August	MCS, JCS	P	NA	F	
Juveniles	1 to 5–6 yrs	Diatoms Hydroids	All year	ICS, MCS, BCH, BAY	D	(epifauna), R, CB, G	F	Found among biogenic assemblages (sea onions, tube worms, bryozoans, ascidians, sea stars)
Adults	5–6+ yrs	Mollusks, echinoderms, polychaetes, decapod, crustaceans, Algae, urchins, hydroids, sea stars	Spawning Jan– June	MCS, ICS, BAY, BCH	D	S, M, CB, G	F	

2.4 Habitat Description for Blue King Crab *(Paralithodes platypus*)

Life History and General Distribution

Blue king crab (*Paralithodes platypus*) has a discontinuous distribution throughout its range (Hokkaido, Japan to Southeast Alaska). In the BS, discrete populations exist in the cooler waters around the Pribilof Islands, St. Matthew Island, and St. Lawrence Island. Smaller populations have been found in Herendeen Bay and around Nunivak and King Island, as well as isolated populations in the GOA. Blue king crab molt multiple times as juveniles. In the Pribilof area, 50 percent maturity of females is attained at approximately 9.6 cm CL, which occurs at about 5 years of age. Blue king crab in the St. Matthew area mature at smaller sizes (50 percent maturity at approximately 8.1 cm CL for females) and do not get as large overall. Skip molting occurs with increasing probability for those males larger than 10 cm CL and is more prevalent for St. Matthew Island crab. Larger female blue king crab have a biennial ovarian cycle and a 14-month embryonic period. Adult male blue king migrate offshore to deeper waters and soft-bottomed habitats.

Relevant Trophic Information

Pacific cod is a predator on blue king crabs.

Approximate Upper Size Limit of Juvenile Crab (in cm): The size at 50 percent maturity is 10- and 12-cm CL for female and male crabs, respectively, from the Pribilof Islands, and 8- and 10.5-cm CL for St. Matthew Island female and male crabs, respectively.

Habitat and Biological Associations

Egg: See mature phase description; eggs are carried by adult female crab.

Larvae: Blue king crab larvae spend 3.5 to 4 months in pelagic larval stages before settling to the benthic life stage. Larvae are found in waters between 40 and 60 m deep. There is some evidence that blue king crab larvae exhibit diel vertical migration, but data is limited.

Early Juvenile: Early juvenile blue king crabs require ample crevice spaces for refuge from predators and foraging opportunities. Such substrates are typically characterized by gravel and cobble overlaid with shell hash and sponge, hydroid, and barnacle assemblages, which have been observed around the Pribilof Islands at 40 to 60 m depths. Early juveniles also occur in shallower water up to the intertidal in Herendeen Bay in rocky substrates and they may occur in similar habitats in other areas.

Late Juvenile: Late juvenile blue king crab are found in nearshore rocky habitat with shell hash.

Mature: Mature blue king crabs occur most often between 45 and 75 m deep on mud-sand substrate adjacent to gravel rocky bottom. Female crabs are found in a habitat with a high percentage of shell hash. Mating occurs in mid-spring. Larger older females reproduce biennially, while small females tend to reproduce annually. Fecundity of females range from 50,000 to 200,000 eggs per female. Spawning may depend on the availability of nearshore rocky-cobble substrate for protection of females. Larger older crabs disperse farther offshore and are thought to migrate inshore for molting and mating.

Table 6 Blue king crab, Paralithodes platypus (abbreviations are in Table 4)

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceano-graphic Features	Other
Eggs	14 mo.	NA	Starting April-May	NA	NA	NA	F	
Larvae	3.5 to 4 mo.		April-July	MCS, ICS	P	NA	F	
Juveniles	to about 5 years		All year	MCS, ICS, BAY, BCH	D	CB, G, R	F	
Adults	5+ years		Spawning Feb-Jun	MCS, ICS	D	S, M, CB, G, R	F	

2.5 Habitat Description for Golden King Crab (*Lithodes aequispina*)

Life History and General Distribution

Golden king crab (*Lithodes aequispina*), also called brown king crab, range from Japan to British Columbia. In the BS and AI, golden king crab are found at depths from 100 to 1,000 m, generally in high relief habitat such as inter-island passes, and they are usually slope-dwelling. Size at sexual maturity depends on latitude and ranges from 9.2 to 12.5 cm CL, with crabs in the northern areas maturing at smaller sizes. Females carry up to 20,000 eggs, depending on their size. Spawning appears to be non-synchronous and to occur throughout the year. Larvae are lecithotrophic and are pelagic for 3 to 5 months, but nothing is known about where they reside in the water column.

Relevant Trophic Information

Unknown

Approximate Upper Size Limit of Juvenile Crab (in cm): The size (CL) at 50 percent maturity for females and males, respectively: Aleutians 11 and 12.5 cm, Pribilofs 10 and 10.7 cm, Northern BS 9.8 and 9.2 cm.

Habitat and Biological Associations

Golden king crabs occur on hard bottom, over steep rocky slopes, and on narrow ledges. Strong currents are prevalent. Golden king crabs coexist with abundant quantities of epifauna: sponges, hydroids, coral, sea stars, bryozoans, and brittle stars.

Egg: Information is limited. See mature phase description; eggs are carried by adult female crab.

Larvae: Information is not available.

Early Juvenile: Information is not available.

Late Juvenile: Late juvenile golden king crabs are found throughout the depth range of the species. Abundance of late juvenile crab increases with depth, and these crab are most abundant at depths greater than 548 m.

Mature: Mature golden king crabs occur at all depths within their distribution. Males tend to congregate in somewhat shallower waters than females, and this segregation appears to be maintained throughout the year. Legal male crabs are most abundant between 274 and 639 m. Abundance of sub-legal males increases at depths greater than 364 m. Female abundance is greatest at intermediate depths between 274 and 364 m.

Table 7 Golden king crab, *Lithodes aequispina (abbreviations are in Table 4)*

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceano-graphic Features	Other
Eggs	15 mo.	n/a	all year	LSP	D	N/A		
Larvae	3–5 mo.	lecithotrophic	all year	U	P	N/A		
Juveniles		U	all year		D			
Adults		Ophiuroids, sponges, fish, plants, crustaceans	Spawning all year	LSP, BSN	D	R		

2.6 Habitat Description for Tanner Crab (*Chionoecetes bairdi*)

Life History and General Distribution

Tanner crab (*Chionoecetes bairdi*) are distributed on the continental shelf of the North Pacific Ocean and BS from Kamchatka to Oregon. Off Alaska, Tanner crab are concentrated around the Pribilof Islands and immediately north of the Alaska Peninsula. They occur in lower abundance in the GOA. Size at 50 percent maturity is variable, but approximately 11 cm for males and 9 cm carapace width (CW) for females in the BS. The age of maturity for male Tanner crab is estimated at 6 to 8 years. Mature male Tanner crabs may skip a year of molting as they attain maturity. Natural mortality of adult Tanner crab is assumed to be about 25 percent per year (M=0.3).

Relevant Trophic Information

Pacific cod is the main predator on Tanner crabs in terms of biomass. Predators consume primarily age 0 and 1 juvenile Tanner crab with a less than 7 cm CW. However, flathead sole, rock sole, halibut, skates, and yellowfin sole are important in terms of numbers of small crab. Larval predators include salmon, herring, jellyfish, and chaetognaths. Cannibalism is also common.

Approximate Upper Size Limit of Juvenile Crab (in cm): The size at 50 percent maturity is 9- and 11-cm CW for female and male crabs, respectively.

Habitat and Biological Associations

Egg: See mature phase description; eggs are carried by adult female crab.

Larvae: Larvae of *C. bairdi* Tanner crabs are typically found in the BSAI water column from 0 to 100 m in early summer but mostly above 20m. They usually stay near the depth of the chlorophyll maximum, and in the BS there is no evidence of diel migration. The last larval stage settles onto the bottom mud.

Early Juvenile: Early juvenile *C. bairdi* Tanner crabs occur at depths of 10 to 70 m in mud habitat in summer and are known to burrow or associate with many types of cover. Early juvenile *C. bairdi* Tanner crabs are not easily found in winter.

Late Juvenile: The preferred habitat for late juvenile *C. bairdi* Tanner crabs is mud. Late juvenile Tanner crab migrate offshore of their early juvenile nursery habitat.

Mature: Mature *C. bairdi* Tanner crabs likely migrate inshore, and mating occurs from February through June. Mature female *C. bairdi* Tanner crabs can form high density mating aggregations, or pods, consisting of hundreds of crabs per mound. These mounds may provide protection from predators and also attract males for mating. Mating need not occur every year, as female *C. bairdi* Tanner crabs can retain viable sperm in spermathecae for at least 2 years. Females carry clutches of 24,000 to 400,000 eggs and brood the embryos for 1 year after fertilization (Hilsinger 1976). Primiparous females may carry the fertilized eggs for as long as 1.5 years. Brooding occurs in 100 to 150 m depths.

Table 8 Tanner crab, Chionoecetes bairdi (abbreviations are in Table 4)

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceano-graphic Features	Other
Eggs	1 year	NA	Feb-March	NA	NA	NA	F	
Larvae	3 to 5 mo.	Diatoms Algae Zooplankton	Summer	MCS, ICS	P	NA	F	
Juveniles	1 to 6 years	Crustaceans polychaetes mollusks diatoms algae hydroids	All year	MCS, ICS, BAY, BCH	D	M	F	
Adults	6+ years	Polychaetes crustaceans mollusks hydroids algae fish	Spawning Jan. to June (peak April-May)	MCS, ICS	D	M	F	

2.7 Habitat Description for Snow Crab (*Chionoecetes opilio*)

Life History and General Distribution

Snow crabs (*Chionoecetes opilio*) are distributed on the continental shelf of the BS, Chukchi Sea, and in the western Atlantic Ocean as far south as Maine. Snow crab are not present in the GOA. In the BS, snow crabs are common at depths less than 200 m. The EBS population within U.S. waters is managed as a single stock; however, the distribution of the population extends into Russian waters to an unknown degree. While 50 percent of the females are mature at 5-cm CW, the mean size of mature females varies from year to year over a range of 6.3- to 7.2-cm CW. Females cease growing with a terminal molt to maturity and rarely exceed 8 cm CW. The median size of maturity for males is about 8.5-cm CW

(approximately 6 to 8 years old). Males larger than 6 cm grow at about 2 cm per molt, up to an estimated maximum size of 14.5-cm CW, but individual growth rates vary widely. Natural mortality of adult snow crab is assumed to be about 25 percent per year (M=0.3).

Relevant Trophic Information

Pacific cod, sculpins, skates, and halibut are the main predators on snow crabs in terms of biomass. Snow crabs less than 7-cm CW are most commonly consumed. Other predators include yellowfin sole, flathead sole, Alaska plaice, walleye pollock, rock sole, bearded seals, and walrus. Snow crabs are also cannibalistic.

Approximate Upper Size Limit of Juvenile Crab (in cm): The size at 50 percent maturity is 5- and 8.5-cm CW for female and male crabs, respectively.

Habitat and Biological Associations

Egg: See mature phase description; eggs are carried by adult female crab.

Larvae: Larvae of *C. opilio* snow crab are found in early summer primarily in the upper mixed layer (greater than 20 depth) and do not exhibit diel migration. The last of three larval stages settles onto bottom in nursery areas.

Early Juvenile: Shallow water areas of the EBS with muddy substrate are considered nursery areas for *C. opilio* snow crabs and are confined to the mid-shelf area due to the thermal limits of early and late juvenile life stages.

Late Juvenile: A geographic cline in size of *C. opilio* snow crabs indicates that a large number of morphometrically immature crabs occur in shallow waters less than 80 m.

Mature: Female *C. opilio* snow crabs have a terminal molt to maturity. Primiparous female snow crabs mate January through June and may exhibit longer egg development period and lower fecundity than multiparous female crabs. Multiparous female snow crabs can store spermatophores in seminal vesicles and fertilize subsequent egg clutches without mating. At least two clutches can be fertilized from stored spermatophores, but the frequency of this occurring in nature is not known. Females carry clutches of 10,000 to 70,000 eggs depending on size, and brood the embryos for either 1 or 2 years after fertilization depending on the water temperature. However, fecundity may decrease up to 50 percent between the time of egg extrusion and hatching, presumably due to predation, parasitism, abrasion, or decay of unfertilized eggs. Brooding probably occurs in depths greater than 50 m.

Table 9 Snow crab, *Chionoecetes opilio* (abbreviations are in Table 4)

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceano-graphic Features	Other
Eggs	1 to 2 years	NA		NA	NA	NA	F	
Larvae	3 to 5 mo.	Diatoms algae zooplankton	Spring, summer	ICS, MCS	P	NA	F	
Juveniles	1 to 4 years	Crustaceans polychaetes mollusks diatoms algae hydroids	All year	ICS, MCS, OCS	D	M	F	
Adults	4+ years	Polychaetes brittle stars mollusks crustaceans	Spawning Jan. to June (peak	ICS, MCS, OCS	D	M	F	

Life Stage	Duration or Age	Diet/Prey	Season/ Time	Location	Water Column	Bottom Type	Oceano-graphic Features	Other
		hydroids algae diatoms	April to May)					

3 Essential Fish Habitat

EFH is determined to be the general distribution of a species described by life stage. General distribution is a subset of a species' total population distribution, and is identified as the distribution of 95 percent of the species population, for a particular life stage, if life history data are available for the species. Where information is insufficient and a suitable proxy cannot be inferred, EFH is not described. General distribution is used to describe EFH for all stock conditions whether or not higher levels of information exist, because the available higher level data are not sufficiently comprehensive to account for changes in stock distribution (and thus habitat use) over time.

EFH is described for FMP-managed species by life stage as general distribution using guidance from the EFH Final Rule (50 CFR 600.815), including the EFH Level of Information definitions. New analytical tools are used and recent scientific information is incorporated for each life history stage from updated scientific habitat assessment reports. EFH descriptions include both text (see 3.1) and maps (see 3.2), if information is available for a species' particular life stage.

EFH descriptions are interpretations of the best scientific information. In support of this information, a thorough review of FMP species is contained in the Environmental Impact Statement for Essential Fish Habitat Identification and Conservation (EFH EIS, NMFS 2005) in Section 3.2.1, Biology, Habitat Usage, and Status of Magnuson-Stevens Act Managed Species and detailed by life history stage in Appendix F: EFH Habitat Assessment Reports. This EIS was supplemented in 2010 and 2017 by the 5-year review cycle, which re-evaluated EFH descriptions and fishing and non-fishing impacts on EFH in light of new information (NPFMC and NMFS 2010, and Simpson et al. 2017). The EFH descriptions are risk averse, supported by scientific rationale, and account for changing oceanographic conditions and regime shifts.

3.1 Description of Essential Fish Habitat

EFH descriptions are based upon the best available scientific information. In support of this information, a thorough review of FMP species is contained in this Appendix and in the EFH EIS (NMFS 2005). A summary of the habitat information levels for each species, as described in the EFH regulations at 50 CFR 600.815(a)(1)(iii), is listed in Table 8.1. An "x" means that insufficient information is available to determine EFH for the life stage and a"1" means information is available to determine EFH.

Table 10 EFH information levels currently available for BSAI crab, by life history stage.

BSAI Crab Species	Egg	Larvae	Early Juvenile	Late Juvenile	Adult
Red king crab	inferred	x	1	1	1
Blue king crab	inferred	x	1	1	1
Golden king crab	inferred	x	x	1	1
Tanner crab	inferred	x	x	1	1
Snow crab	inferred	x	x	1	1

x indicates insufficient information is available to describe EFH
1 indicates general distribution data are available for some or all portions of the geographic range of the species
2 indicates quantitative data (density or habitat-related density) are available for the habitats occupied by a species or life stage

3.1.1 Red King Crab

Eggs
Essential fish habitat of the red king crab eggs is inferred from the general distribution of egg-bearing female crab. (See also Adults.)

Larvae-No EFH Description Determined
Insufficient information is available.

Early Juveniles-
EFH for early juvenile red king crab is the general distribution area for this life stage, located in demersal habitat along the intertidal and subtidal zones, and inner and middle shelf (0 to 100 m). Early juveniles have specific habitat requirements based on their anti-predator strategy and can only occur in places where there is significant habitat structure either in the form of substrates such as rock, cobble, and gravel, or biogenic habitats such as bryozoans, ascidians, hydroids, or shell hash. In the BS, these habitats generally only occur in nearshore areas along the north side of the AI and the Alaskan Peninsula, around Bristol Bay, around the Pribilof Islands, and in nearshore areas of Norton Sound.

Late Juveniles
EFH for late juvenile red king crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of rock, cobble, and gravel and biogenic structures such as *Boltenia* spp., bryozoans, ascidians, and shell hash.

Adults
EFH for adult red king crab is the general distribution area for this life stage, located in bottom habitats along the nearshore (spawning aggregations) and the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of sand, mud, cobble, and gravel.

3.1.2 Blue King Crab

Eggs
EFH of the blue king crab eggs is inferred from the general distribution of egg-bearing female crab. (See also Adults.)

Larvae-No EFH Description Determined
Insufficient information is available.

Early Juveniles-
EFH for early juvenile blue king crab is the general distribution area for this life stage, located in demersal habitat along the intertidal and subtidal zones, and inner and middle shelf (0 to 100 m). Early juveniles require specific habitat types to avoid predation. In particular, they require either rock or cobble substrates or shell hash beds. Within the range of blue king crab, this only occurs in nearshore areas around the Pribilof Islands, St. Matthew Island, and St. Lawrence Island.

Late Juveniles
EFH for late juvenile blue king crab is the general distribution area for this life stage, located in bottom habitats along the nearshore where there are rocky areas with shell hash and the inner (0 to 50), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of rock, cobble, and gravel.

Adults
EFH for adult blue king crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting of sand and mud adjacent to rockier areas and areas of shell hash.

3.1.3 Golden King Crab

Eggs
EFH of golden king crab eggs is inferred from the general distribution of egg-bearing female crab. (See also Adults.)

Larvae-No EFH Description Determined
Insufficient information is available.

Early Juveniles-No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile golden king crab is the general distribution area for this life stage, located in bottom habitats along the along the upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high-relief living habitats, such as coral, and vertical substrates, such as boulders, vertical walls, ledges, and deep water pinnacles.

Adults
EFH for adult golden king crab is the general distribution area for this life stage, located in bottom habitats along the along the outer shelf (100 to 200 m), upper slope (200 to 500 m), intermediate slope (500 to 1,000 m), lower slope (1,000 to 3,000 m), and basins (more than 3,000 m) of the BSAI where there are high relief living habitats, such as coral, and vertical substrates such as boulders, vertical walls, ledges, and deep water pinnacles.

3.1.4 Tanner Crab

Eggs
EFH of Tanner crab eggs is inferred from the general distribution of egg-bearing female crab. (See also Adults.)

Larvae-No EFH Description Determined
Insufficient information is available.

Early Juveniles-No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile Tanner crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting mainly of mud.

Adults
EFH for adult Tanner crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting mainly of mud.

3.1.5 Snow Crab

Eggs
EFH of snow crab eggs is inferred from the general distribution of egg-bearing female crab. (See also Adults.)

Larvae-No EFH Description Determined
Insufficient information is available.

Early Juveniles-No EFH Description Determined
Insufficient information is available.

Late Juveniles
EFH for late juvenile snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting mainly of mud.

Adults
EFH for adult snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m), middle (50 to 100 m), and outer shelf (100 to 200 m) throughout the BSAI wherever there are substrates consisting mainly of mud.

3.2 Maps of Essential Fish Habitat

Scientists at the Alaska Fisheries Science Center created species distribution models of EFH for all major crab species in the eastern Bering Sea (Laman et al. 2017) and in the Aleutian Islands (Turner et al. 2017). With Amendment 49, the Council adopted these new model-based maps for crab EFH that represent the 95th percentile by season for each species and life stage, as information is available.

3.2.1 Aleutian Islands crab EFH maps

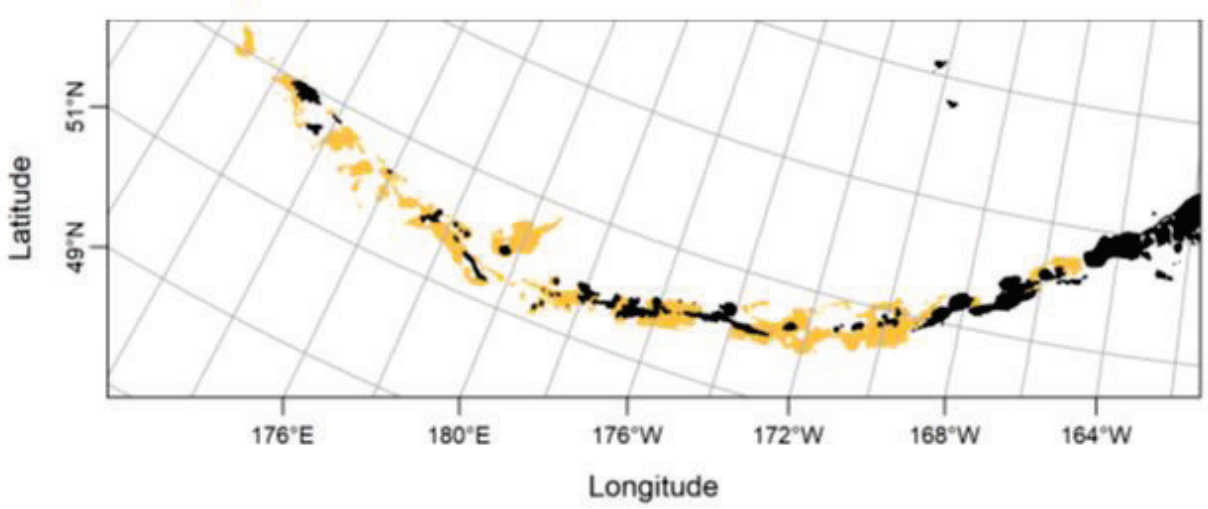

Figure 2 AI adult Golden king crab fall EFH

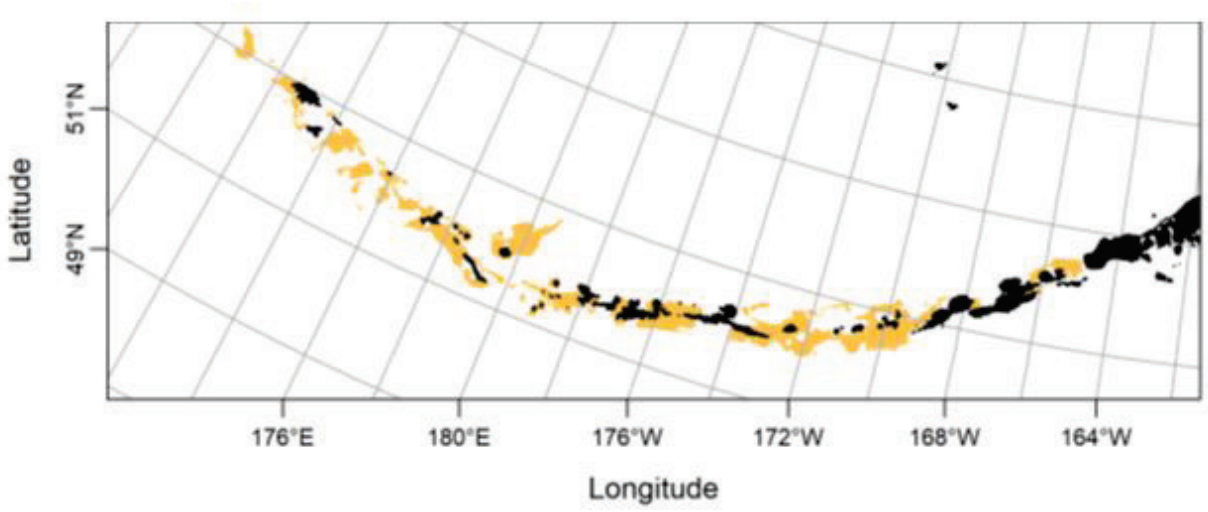

Figure 3 AI adult Golden king crab spring EFH

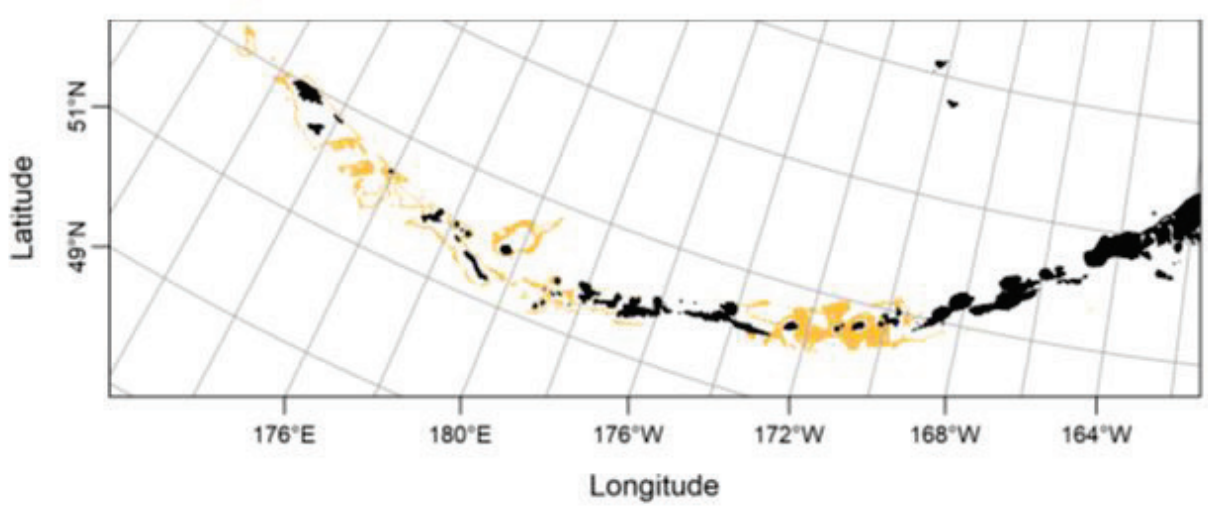

Figure 4 AI adult Golden king crab summer EFH

3.2.2 Bering Sea crab EFH maps

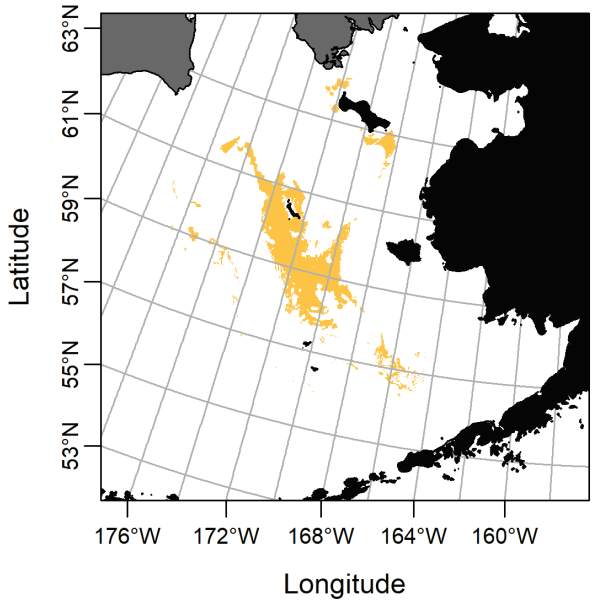

Figure 5 EBS adult Blue king crab fall EFH

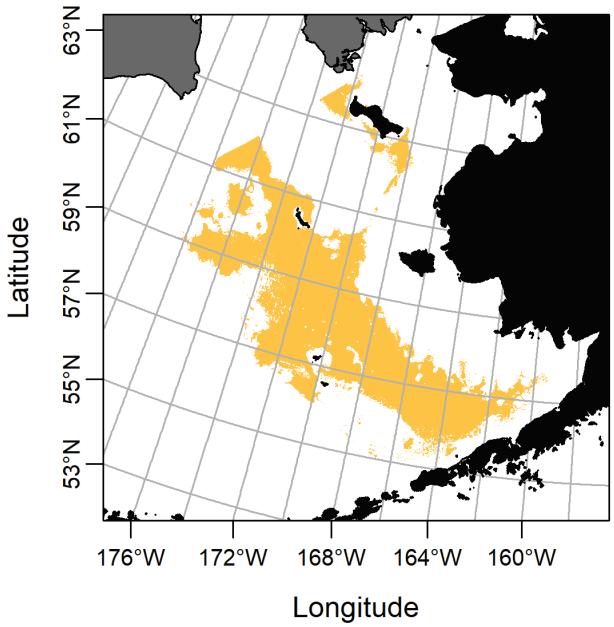

Figure 6 **EBS adult Blue king crab spring EFH**

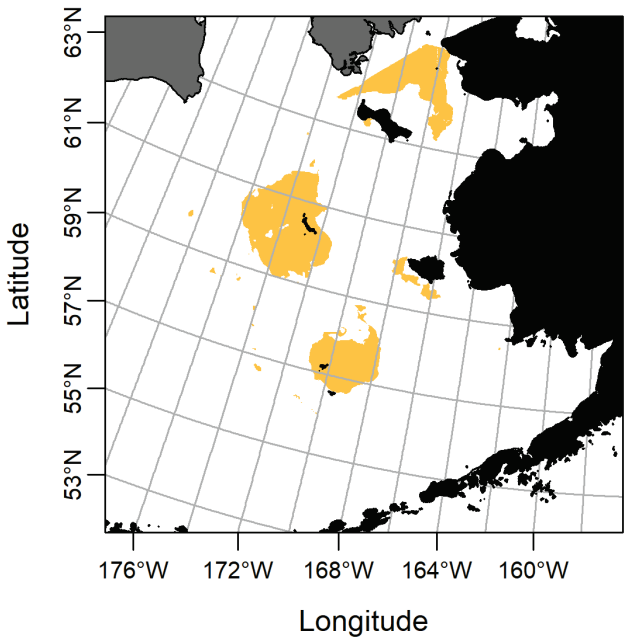

Figure 7 **EBS adult Blue king crab winter EFH**

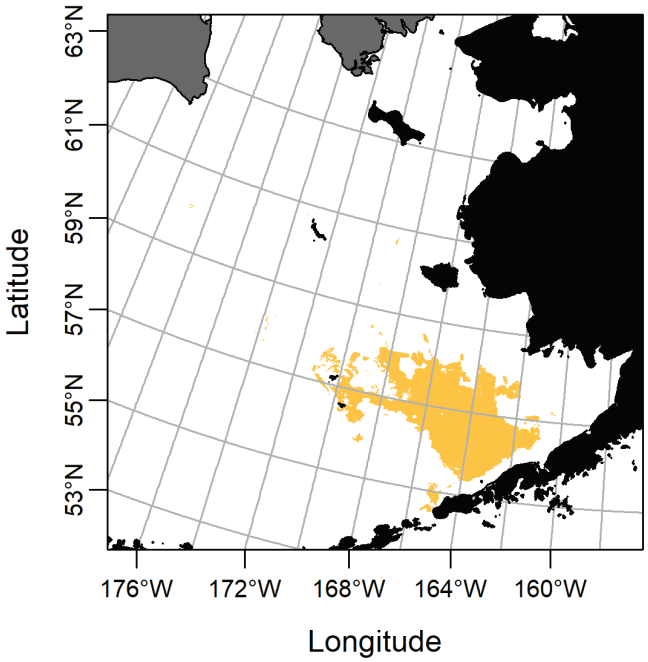

Figure 8 **EBS adult Red king crab fall EFH**

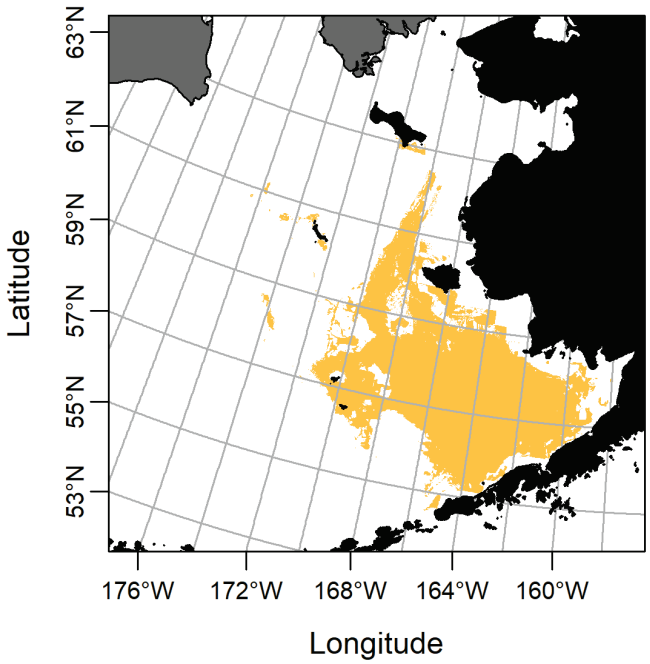

Figure 9 **EBS adult Red king crab spring EFH**

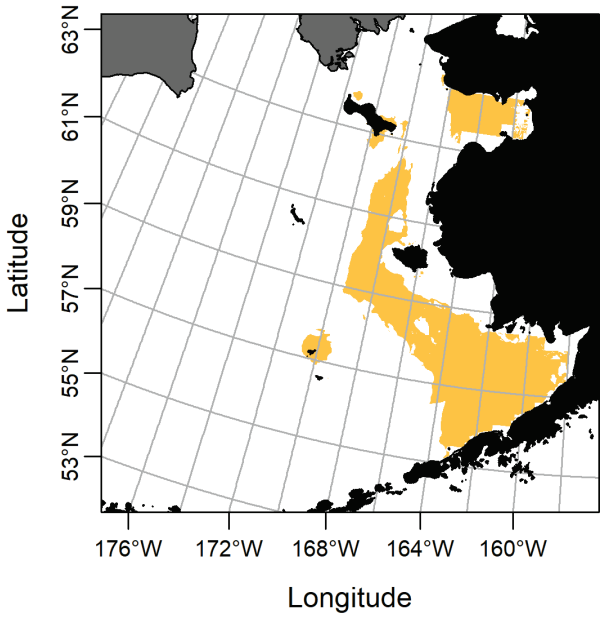

Figure 10 EBS adult Red king crab summer EFH

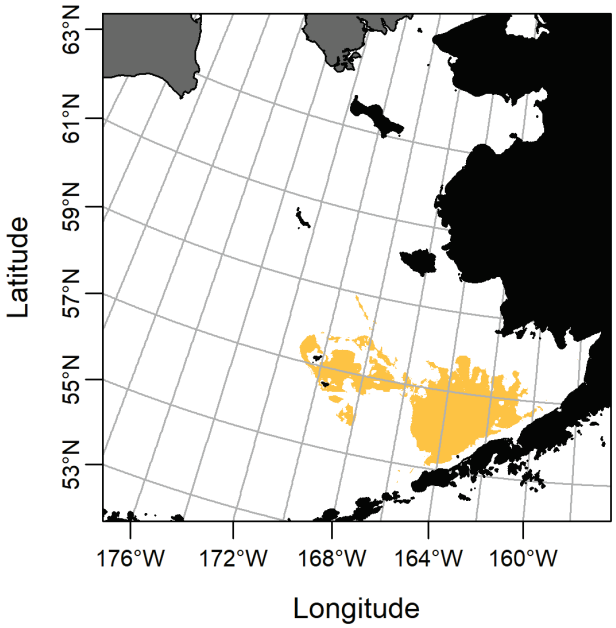

Figure 11 EBS adult Red king crab winter EFH

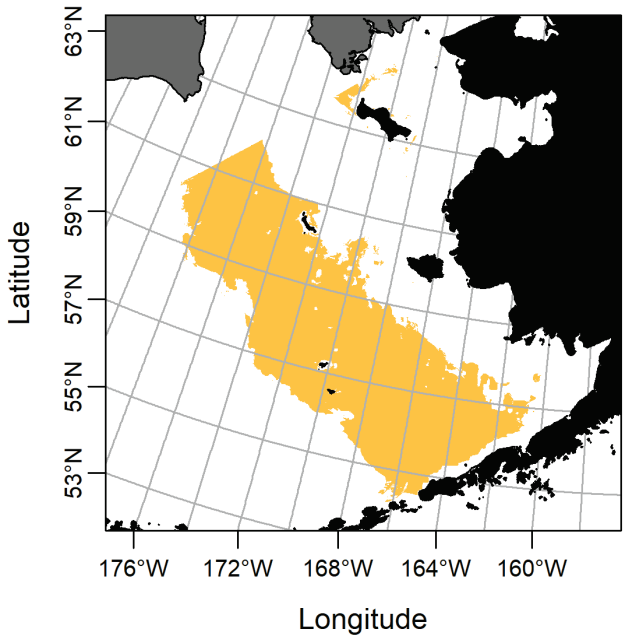

Figure 12 EBS adult Snow crab fall EFH

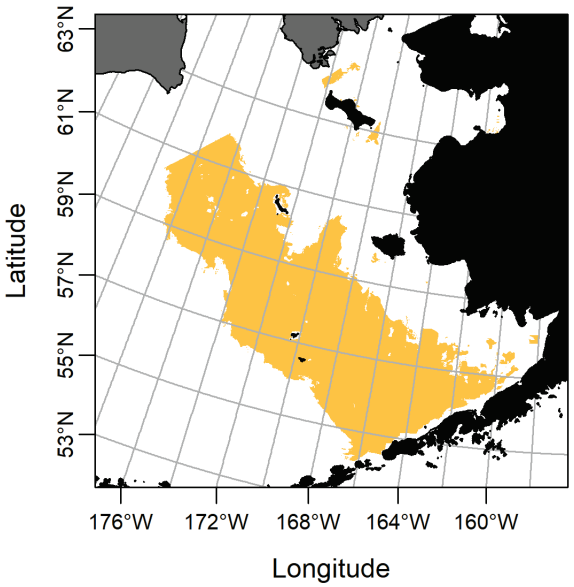

Figure 13 EBS adult Snow crab spring EFH

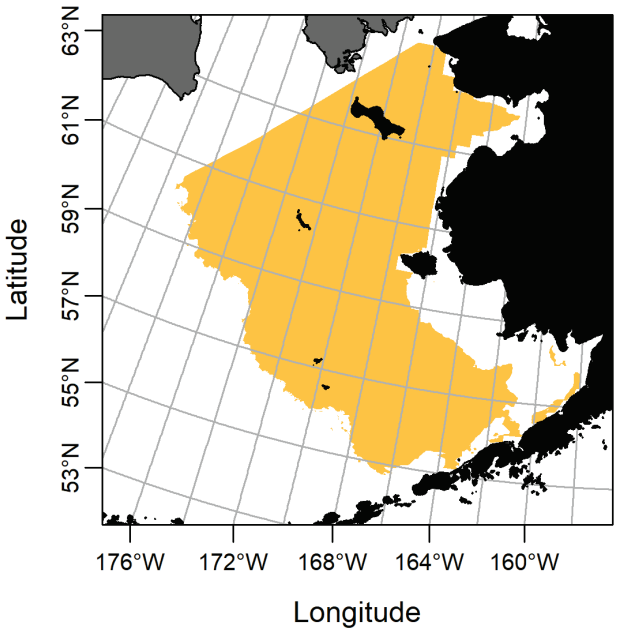

Figure 14 EBS adult Snow crab summer EFH

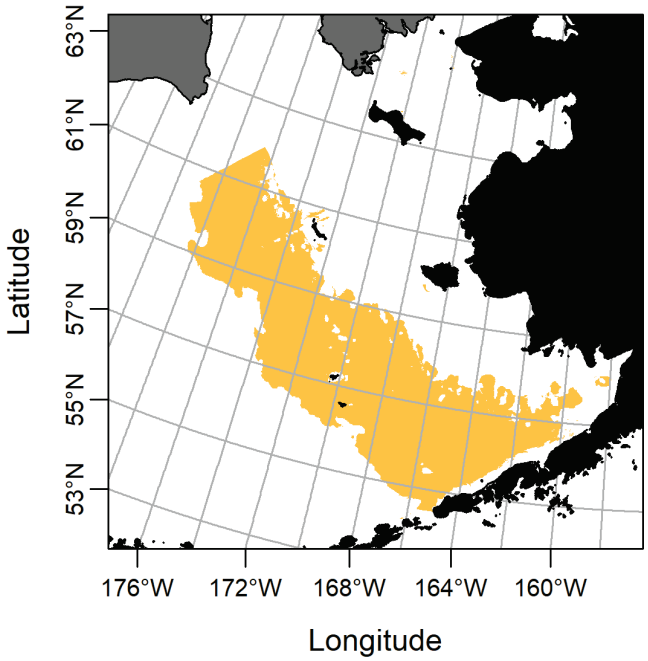

Figure 15 EBS adult Snow crab winter EFH

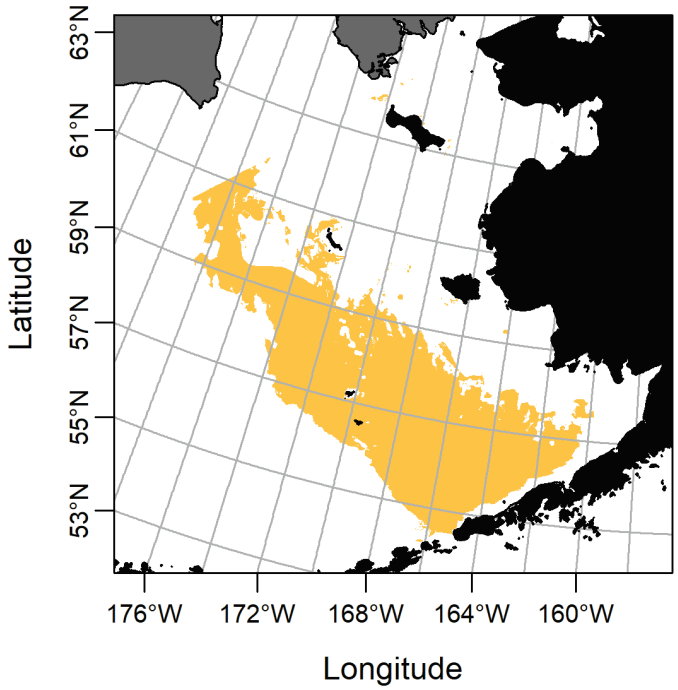

Figure 16 EBS adult Tanner crab fall EFH

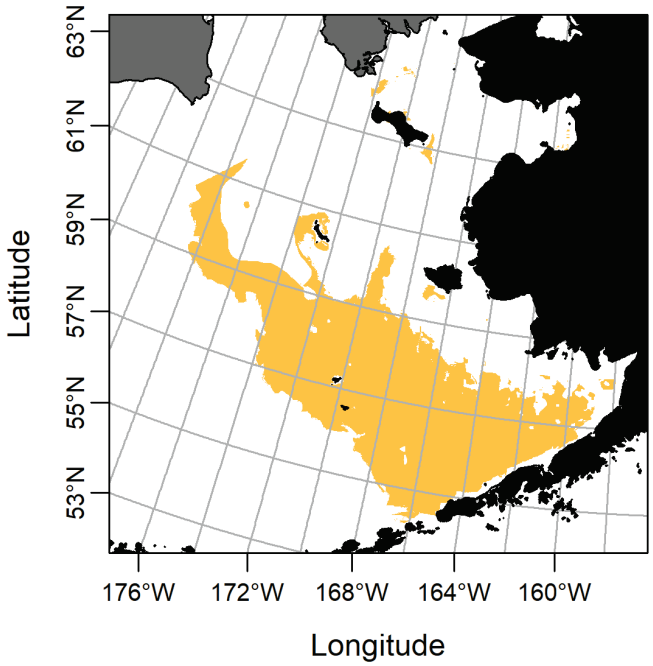

Figure 17 EBS adult Tanner crab spring EFH

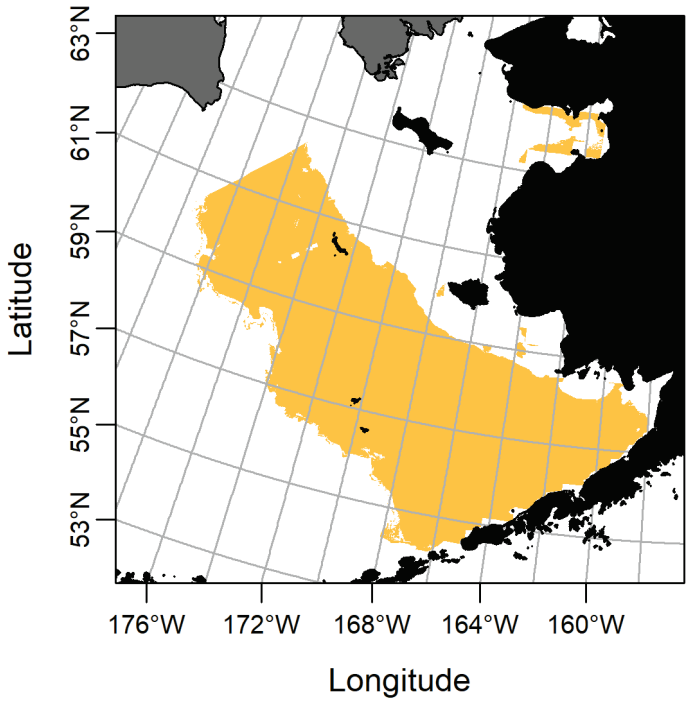

Figure 18 EBS adult Tanner crab summer EFH

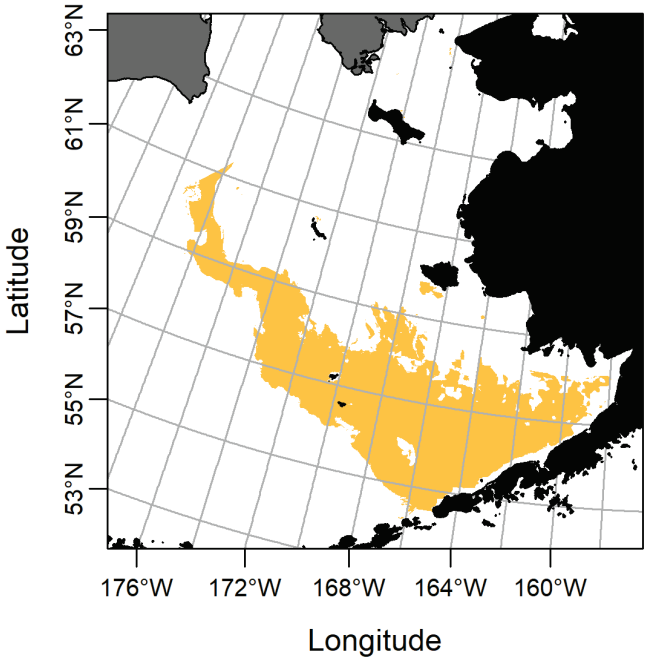

Figure 19 EBS adult Tanner crab winter EFH

3.3 Essential Fish Habitat Conservation and Habitat Areas of Particular Concern

The Council established the Aleutian Islands Habitat Conservation Area and the Aleutian Islands Coral Habitat Protection Areas to protect EFH from fishing threats. The Council also established two Habitat Areas of Particular Concern (HAPCs) within crab EFH to protect those areas from fishing threats: the Alaska Seamount Protection Area and the Bowers Ridge Habitat Conservation Zone. Maps of these areas, as well at the coordinates, are provided below.

HAPCs are specific sites within EFH that are of particular ecological importance to the long-term sustainability of managed species, are of a rare type, or are especially susceptible to degradation or development. HAPCs are meant to provide greater focus to conservation and management efforts and may require additional protection from adverse effects.

3.3.1 Aleutian Islands Coral Habitat Protection Areas

The use of bottom contact gear, including pot gear, as described in 50 CFR part 679, is prohibited year-round in the Aleutian Islands Coral Habitat Protection Areas, see Figure 20. Anchoring by a federally permitted fishing vessel, as described in 50 CFR part 679, is also prohibited. The coordinates for the areas are listed in the table below.

Table 11 Aleutian Islands Coral Habitat Protection Areas

Area Number	Name	Latitude			Longitude		
1	Great Sitkin Is	52	9.56	N	176	6.14	W
	Great Sitkin Is	52	9.56	N	176	12.44	W
	Great Sitkin Is	52	4.69	N	176	12.44	W
	Great Sitkin Is	52	6.59	N	176	6.12	W
2	Cape Moffett Is	52	0.11	N	176	46.65	W
	Cape Moffett Is	52	0.10	N	176	53.00	W
	Cape Moffett Is	51	55.69	N	176	53.00	W
	Cape Moffett Is	51	55.69	N	176	48.59	W
	Cape Moffett Is	51	57.96	N	176	46.52	W
3	Adak Canyon	51	39.00	N	177	0.00	W
	Adak Canyon	51	39.00	N	177	3.00	W
	Adak Canyon	51	30.00	N	177	3.00	W
	Adak Canyon	51	30.00	N	177	0.00	W
4	Bobrof Is	51	57.35	N	177	19.94	W
	Bobrof Is	51	57.36	N	177	29.11	W
	Bobrof Is	51	51.65	N	177	29.11	W
	Bobrof Is	51	51.71	N	177	19.93	W
5	Ulak Is	51	25.85	N	178	59.00	W
	Ulak Is	51	25.69	N	179	6.00	W
	Ulak Is	51	22.28	N	179	6.00	W
	Ulak Is	51	22.28	N	178	58.95	W
6	Semisopochnoi Is	51	53.10	N	179	53.11	E
	Semisopochnoi Is	51	53.10	N	179	46.55	E
	Semisopochnoi Is	51	48.84	N	179	46.55	E
	Semisopochnoi Is	51	48.89	N	179	53.11	E

Note: Each area is delineated by connecting the coordinates in the order listed by straight lines. The last set of coordinates for each area is connected to the first set of coordinates for the area by a straight line. The projected coordinate system is North American Datum 1983, Albers.

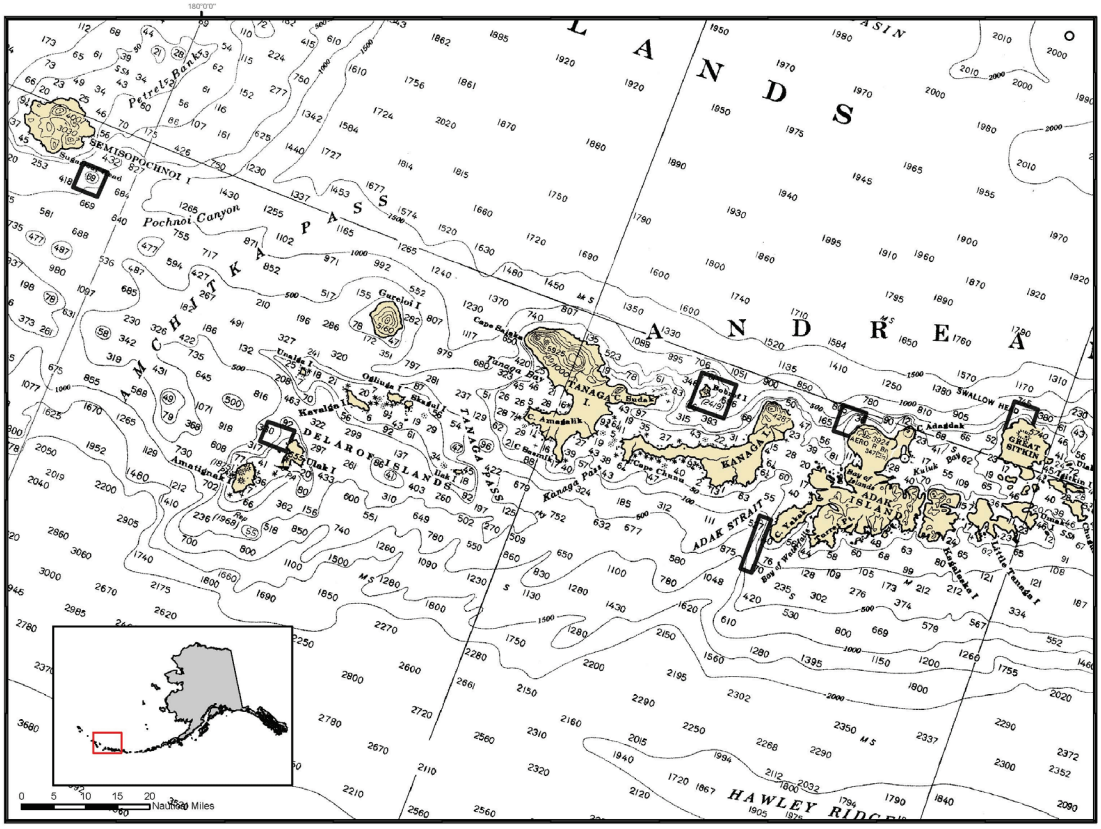

Figure 20 Aleutian Islands Coral Habitat Protection Areas

3.3.2 Aleutian Islands Habitat Conservation Areas

Nonpelagic trawl gear fishing is prohibited year-round in the Aleutian Islands Habitat Conservation Area, except for designated areas open to nonpelagic trawl gear. The Aleutian Islands Habitat Conservation Area is defined as the entire Aleutian Islands groundfish management subarea, as described in 50 CFR 679. Areas open to nonpelagic trawl gear fishing in the Aleutian Islands shown in Figure 21; however, the use of trawl gear is prohibited in the BSAI King and Tanner crab fisheries.

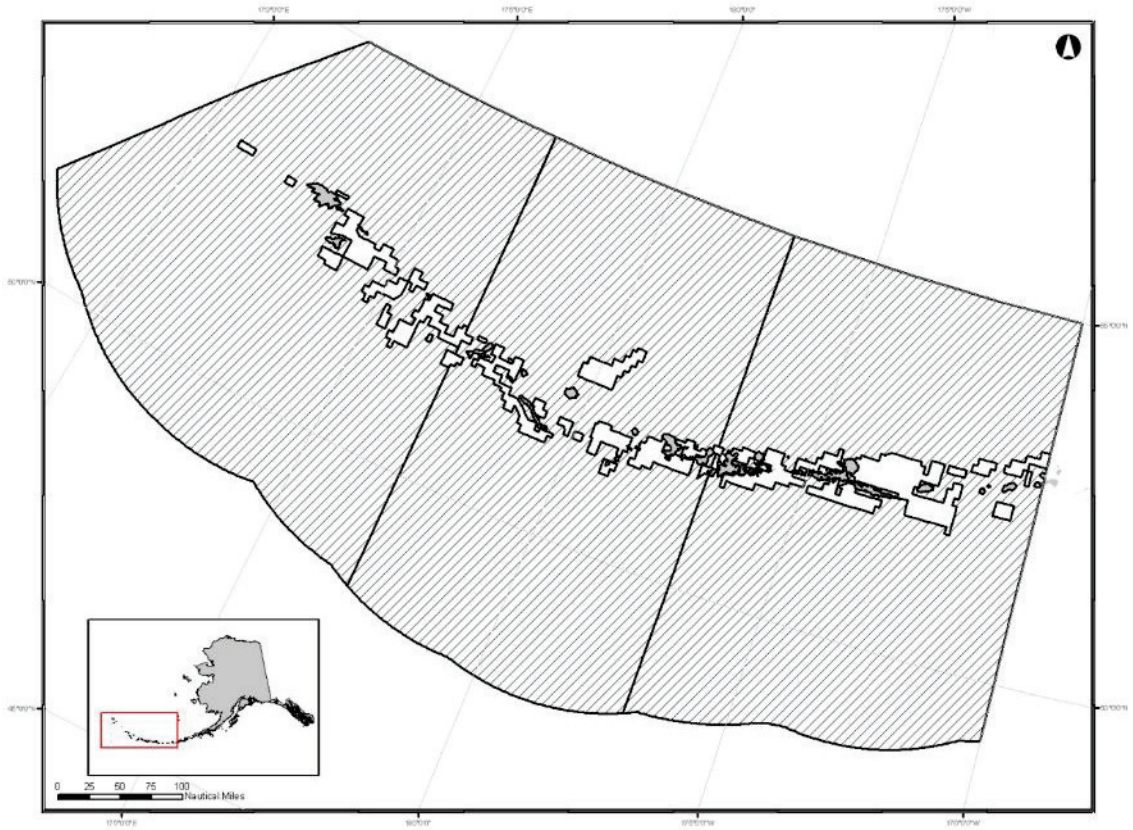

Figure 21 Aleutian Islands Habitat Conservation Area. Polygons are areas open to nonpelagic trawl gear.

3.3.3 Alaska Seamount Habitat Protection Area

The use of bottom contact gear by a federally permitted fishing vessel, as described in 50 CFR part 679, is prohibited year-round in the Alaska Seamount Habitat Protection Area, see Figure 22. Anchoring by a federally permitted fishing vessel, as described in 50 CFR part 679, is also prohibited. Coordinates for the Alaska Seamount Habitat Protection Area are listed in the table below.

Table 12 Alaska Seamount Habitat Protection Area

Area Number	Name	Latitude	Longitude
15	Bowers Seamount	54 9.00 N	174 52.20 E
	Bowers Seamount	54 9.00 N	174 42.00 E
	Bowers Seamount	54 4.20 N	174 42.00 E
	Bowers Seamount	54 4.20 N	174 52.20 E

Note: The area is delineated by connecting the coordinates in the order listed by straight lines. The last set of coordinates is connected to the first set of coordinates by a straight line. The projected coordinate system is North American Datum 1983, Albers.

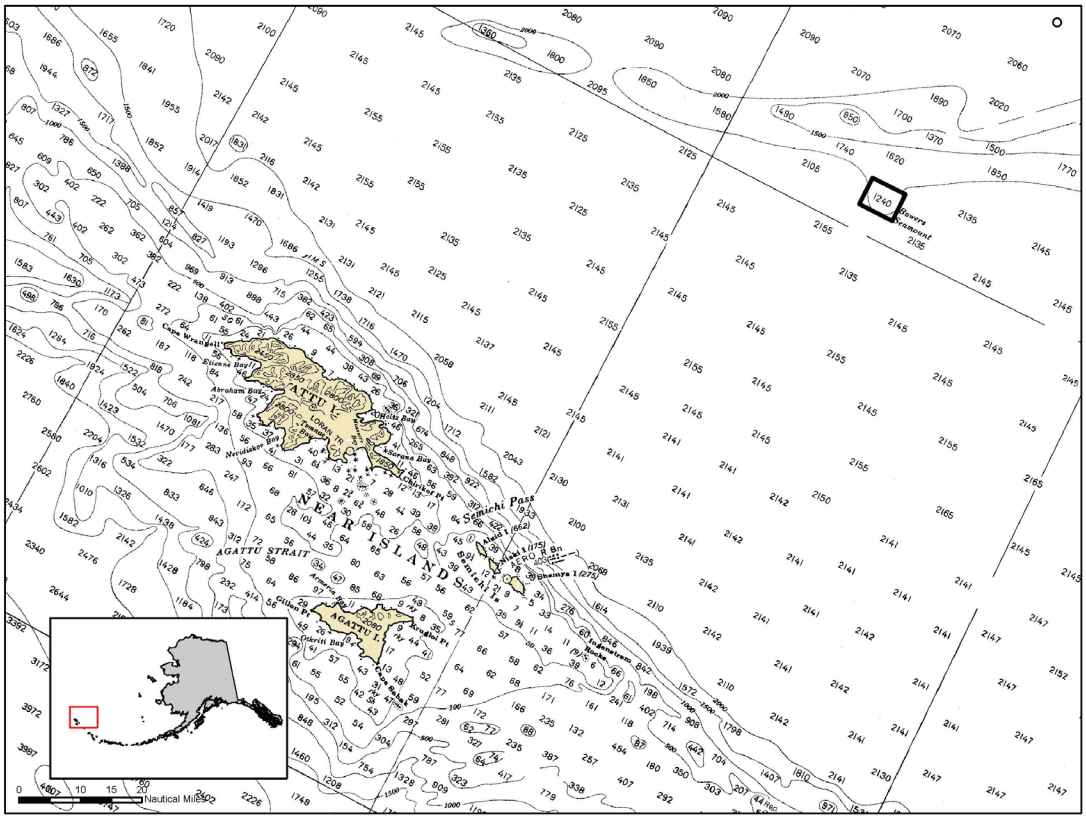

Figure 22 Alaska Seamount Habitat Protection Area in the Aleutian Islands

3.3.4 Bowers Ridge Habitat Conservation Zone

The use of mobile bottom contact gear, as described in 50 CFR part 679, is prohibited year-round in the Bowers Ridge Habitat Conservation Zone, see Figure 23. The areas are described in the table below.

Table 13 Bowers Ridge Habitat Conservation Zone

Area Number	Name	Latitude			Longitude		
1	Bowers Ridge	55	10.50	N	178	27.25	E
	Bowers Ridge	54	54.50	N	177	55.75	E
	Bowers Ridge	54	5.83	N	179	20.75	E
	Bowers Ridge	52	40.50	N	179	55.00	W
	Bowers Ridge	52	44.50	N	179	26.50	W
	Bowers Ridge	54	15.50	N	179	54.00	W
2	Ulm Plateau	55	5.00	N	177	15.00	E
	Ulm Plateau	55	5.00	N	175	60.00	E
	Ulm Plateau	54	34.00	N	175	60.00	E
	Ulm Plateau	54	34.00	N	177	15.00	E

Note: Each area is delineated by connecting the coordinates in the order listed by straight lines. The last set of coordinates for each area is connected to the first set of coordinates for the area by a straight line. The projected coordinate system is North American Datum 1983, Albers.

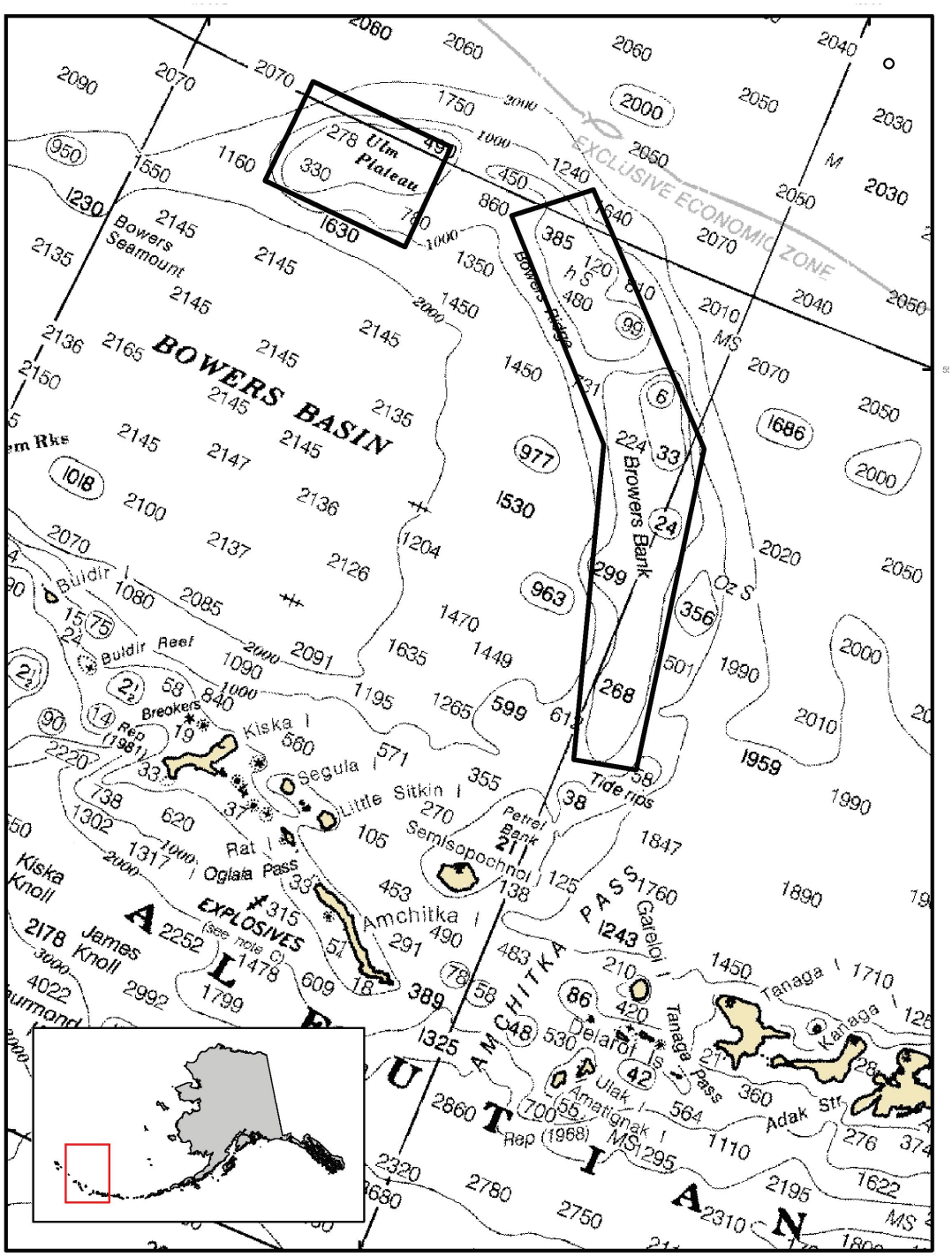

Figure 23 Bowers Ridge Habitat Conservation Zone

3.3.5 HAPC Process

The Council may designate specific sites as HAPCs and may develop management measures to protect habitat features within HAPCs.

50 CFR 600.815(a)(8) provides guidance to the Councils in identifying HAPCs. FMPs should identify specific types or areas of habitat within EFH as habitat areas of particular concern based on one or more of the following considerations:

1. (i) The importance of the ecological function provided by the habitat.
2. (ii) The extent to which the habitat is sensitive to human-induced environmental degradation.
3. (iii) Whether, and to what extent, development activities are, or will be, stressing the habitat type.
4. (iv) The rarity of the habitat type.

Proposed HAPCs, identified on a map, must meet at least two of the four considerations established in 50 CFR 600.815(a)(8), and rarity of the habitat is a mandatory criterion. HAPCs may be developed to address identified problems for FMP species, and they must meet clear, specific, adaptive management objectives.

The Council will initiate the HAPC process by setting priorities and issuing a request for HAPC proposals. Any member of the public may submit a HAPC proposal. HAPC proposals may be solicited every 5 years, to coincide with the EFH 5-year review, or may be initiated at any time by the Council. The Council will establish a process to review the proposals. The Council may periodically review existing HAPCs for efficacy and considerations based on new scientific research.

4 Effects of Fishing on Essential Fish Habitat

This section addresses the requirement in EFH regulations (50 Code of Federal Regulations [CFR] 600.815(a)(2)(i)) that each FMP must contain an evaluation of the potential adverse effects of all regulated fishing activities on EFH. This evaluation must 1) describe each fishing activity, 2) review and discuss all available relevant information, and 3) provide conclusions regarding whether and how each fishing activity adversely affects EFH. Relevant information includes the intensity, extent, and frequency of any adverse effect on EFH; the type of habitat within EFH that may be affected adversely; and the habitat functions that may be disturbed.

In addition, the evaluation should 1) consider the cumulative effects of multiple fishing activities on EFH, 2) list and describe the benefits of any past management actions that minimize potential adverse effects on EFH, 3) give special attention to adverse effects on habitat areas of particular concern (HAPCs) and identify any EFH that is particularly vulnerable to fishing activities for possible designation as HAPCs, 4) consider the establishment of research closure areas or other measures to evaluate the impacts of fishing activities on EFH, and use the best scientific information available, as well as other appropriate information sources.

This evaluation assesses whether fishing adversely affects EFH in a manner that is more than minimal and not temporary in nature (50 CFR 600.815(a)(2)(ii)). This standard determines whether Councils are required to act to prevent, mitigate, or minimize any adverse effects from fishing, to the extent practicable. Although methods used in the EFH Environmental Impact Statement of 2005 are different from those described in this FMP, Appendix B of the EFH EIS (2005) also contains a comprehensive, peer-reviewed analysis of fishing effects on EFH and detailed results for managed species.

Fishing operations change the abundance or availability of certain habitat features (e.g., prey availability or the presence of living or non-living habitat structure) used by managed fish species to accomplish spawning, breeding, feeding, and growth to maturity. These changes can reduce or alter the abundance, distribution, or productivity of that species, which in turn can affect the species' ability to "support a

sustainable fishery and the managed species' contribution to a healthy ecosystem" (50 CFR 600.10). The outcome of this chain of effects depends on characteristics of the fishing activities, the habitat, fish use of the habitat, and fish population dynamics. The duration and degree of fishing's effects on habitat features depend on the intensity of fishing, the distribution of fishing with different gears across habitats, and the sensitivity and recovery rates of habitat features.

4.1 Effects of Fishing Analysis

The 2005 EFH FEIS and 2010 EFH Review effects of fishing on EFH analyses included application of a numerical model that provided spatial distributions of an index of the effects of fishing on several classes of habitat features, such as infauna prey and shelter created by living organisms. The Long-term Effect Index (LEI) estimated the eventual proportional reduction of habitat features from a theoretical unaffected habitat state, should the recent pattern of fishing intensities be continued indefinitely (Fujioka 2006). For the 2005 and 2010 analyses, the LEI generated represented a 5-year time period.

During the 2015 EFH Review, the Council requested several updates to the LEI model to make the input parameters more intuitive and to draw on the best available data. In response to their requests, the Fishing Effects (FE) model was developed (Harris et al. 2017). Like the LEI model, it is run on 25 km^2 grid cells throughout the North Pacific and is based on interaction between habitat impact and recovery, which depend on the amount of fishing effort, the types of gear used, habitat sensitivity, and substrate. The FE model updates the LEI model in the following ways:

1. The FE model is cast in a discrete time framework. This means rates such as impact or recovery are defined over a specific time interval, compared to the LEI model which used continuous time. Using discrete time makes fishing impacts and habitat recovery more intuitive to interpret compared to continuous time.
2. The FE model implements sub-annual (monthly) tracking of fishing impacts and habitat disturbance. While this was theoretically possible in the LEI model, the LEI model was developed primarily to estimate long term habitat disturbance given a constant rate of fishing and recovery. The FE model allows for queries of habitat disturbance for any month from the start of the model run (January 2003). This aids in the implications of variable fishing effort within season and among years.
3. The FE model draws on the spatially explicit Catch-In-Areas (CIA) database to use the best available spatial data of fishing locations. The CIA database provides line segments representing the locations of individual tows or other bottom contact fishing activities. This provides a more accurate allocation of fishing effort among grid cells. In comparison, the LEI model used haulback locations summarized to the 25 km^2 grids to represent fishing activity. The description of fishing gears that may contact benthic habitat was also greatly improved with significant input from fishing industry representatives.
4. The FE model incorporates an extensive, global literature review from Grabowski et al. (2014) to estimate habitat susceptibility and recovery dynamics. The FE model identifies 27 unique biological and geological habitat features and incorporates impact and recovery rates to predict habitat reduction and recovery over time. The FE model is also designed to be flexible to produce output based on any single habitat feature or unique combination of features.

Once the FE model has been run and a surface of predicted habitat reduction is produced, the 95% species descriptions for each species can be used as a mask and the cumulative fishing effect on that species can be calculated. It is important to note that because the FE model incorporates both impact to and recovery of benthic structures, the calculated habitat reduction for any grid is the cumulative value at that point in time.

4.1.1 Habitat Categorization

The FE and LEI model both consider habitat impacts and recovery at the level of habitat features, where habitat is the sum total of all habitat features. Aside from structural differences between models (i.e. continuous vs discrete time), both LEI and FE treat habitat features in the same way, just define them differently. The 2005 EFH FEIS analyzed approximately 2,000 sediment point data and divided Bering Sea habitat types into 4 sediment types – sand, mixed sand and mud, and mud. Additional categories were added for the slope below 200 m depth and the northern shelf. The ability to classify habitats in the Aleutian Islands and Gulf of Alaska was highly constrained due to the lack of comprehensive sediment distribution data, so the RACE survey strata, split into shallow, deep, and slope were used. The LEI model defined four broad habitat features: infaunal prey, epifaunal prey, biological structure, and physical structure. The FE model, in contrast, defines 27 habitat features which can be grouped into biological or geological features. These 27 habitat features were drawn from the literature review described above. The FE model, however, is flexible to produce results over any combination of habitat features, if for example a specific subset of habitat features was important for a specific species.

For the 2015 EFH Review, sediment data were compiled from various surveys collected across the North Pacific, and now includes over 240,000 individual points. The data consist of spatially explicit points attributed with sediment descriptions although the various surveys varied widely in methodology, sediment descriptions, and point density. Sediment points in the Eastern Bering Sea are separated on average by ~10.5 km, while some localized sampling efforts, especially near shore, collected data at much greater densities. Very few points were located deeper than 500 meters or in areas of boulder or hard rock habitat.

Initial processing of the data consisted of parsing through the various sediment descriptions to map them to a sediment category used in the FE model (mud, sand, granule/pebble, cobble, or boulder). The mapping was not one-to-one, however, such that more than one sediment category could be described by a single sediment description. Each point was attributed as present or absent for each sediment category. An indicator Kriging algorithm was used (Geostatistical Wizard, ArcMap v10.2) to interpolate a probability surface for each sediment category over a 2.5 km grid aligned to the 5 km grid used for the FE model. A probability threshold of 0.5 to indicate presence/absence of each sediment category was set, so four sediment grid cells were located within each 5 km grid cell, providing a pseudo-area weighted measured of each sediment type within each 5 km grid cell. For each 5 km grid cell, the proportion of each sediment type was calculated as the sum of all 2.5 km grid cells with sediment present (up to four for each sediment class) divided by the sum of all present cells across all sediments (up to 20 possible, 4 cells X 5 sediment classes). In ~10% of the 5 km grid cells, no sediment class was predicted present. In these cases, sediment proportions from the nearest 5 km grid cell were used.

4.1.2 General Fishing Gear Impacts

The following sections summarize pertinent research on the effects of fishing on seafloor habitats.

4.1.2.1 Bottom Trawls

The EFH EIS evaluates the effects of bottom trawls on several categories of habitats: infaunal prey, epifaunal prey, living structure, hard corals, and nonliving structure.

4.1.2.2 Infaunal Prey

Infaunal organisms, such as polychaetes, other worms, and bivalves, are significant sources of prey for Alaska groundfish species. Studies of the effects of representative trawl gear on infauna included Kenchington et al. (2001), Bergman and Santbrink (2000), Brown (2003), Brylinsky et al. (1994), and Gilkinson et al. (1998).

Kenchington et al. (2001) examined the effects on over 200 species of infauna from trawl gear that closely resembled the gear used off of Alaska. Three separate trawling events were conducted at intervals

approximating 1 year. Each event included 12 tows through an experimental corridor, resulting in an average estimate of three to six contacts with the seafloor per event. Of the approximately 600 tests for species effects conducted, only 12 had statistically significant results. The statistical methods were biased toward a Type 1 error of incorrectly concluding an impact. Ten of the significant results are from a year when experimental trawling was more concentrated in the center of the corridors where the samples of infauna were taken. It is likely that more trawl contacts occurred at these sampled sites than the 4.5 estimate (average of three to six contacts) used to adjust the multiple contact results. As such, the results that were available from the study (non-significant values were not provided) represent a sample biased toward larger reductions when used to assess median reductions of infauna.

Bergman and Santbrink (2000) studied effects on infauna (mostly bivalves) from an otter trawl equipped with 20-centimeter (cm) rollers in the North Sea. Because the study was conducted on fishing grounds with a long history of trawling, the infaunal community may already have been affected by fishing. Experimental trawling was conducted to achieve average coverage of 1.5 contacts within the experimental area over the course of the study. Results were provided for two substrate types: coarse sand with 1 to 5 percent of the area contacted, and silt and fine sand with 3 to 10 percent of the area contacted. The five infauna biomass reductions in the first area had a median of 8 percent. The ten infauna biomass reductions from the second area had a median of 5 percent.

Brown (2003) studied the effects of experimental trawling in an area of the nearshore EBS with sandy sediments. Trawling covered 57 percent of the experimental area. Several bivalves had lower abundance after trawling, while polychaetes were less affected. The median of the reduction in percentages for each species, after adjusting for coverage, was a 17 percent reduction in biomass per gear contact.

Brylinsky et al. (1994) investigated effects of trawling on infauna, mainly in trawl door tracks, at an intertidal estuary. Eight results on the effects of trawl doors on species biomass were available for polychaetes and nemerteans. These results had a median of 31 percent reduction in biomass and a 75th percentile of 42 percent reduction in biomass. Gilkinson et al. (1998) used a model trawl door on a prepared substrate to estimate that 64 percent of clams in the door's path were exposed after one pass, but only 5 percent were injured.

4.1.2.3 Epifaunal Prey

Epifaunal organisms, such as crustaceans, echinoderms, and gastropods, are significant prey of Alaska groundfish species. However, one of the most common classes of echinoderms, asteroids, are rarely found in fish stomachs. While some crustaceans may be infauna, an inability to consistently identify these species resulted in all crustaceans being categorized as epifaunal prey. Studies of the effects of representative trawl gear on epifauna included Prena et al. (1999), Brown (2003), Freese et al. (1999), McConnaughey et al. (2000), and Bergman and Santbrink (2000).

Prena et al. (1999), as a component of the Kenchington et al. (2001) study, measured the effects of trawling on seven species of epifauna. The median of these results was a 4 percent biomass reduction per gear contact. There appeared to be in-migration of scavenging crabs and snails in this and other studies. Removing crab and snails left only two measurements, 6 and 7 percent reductions in biomass. Bergman and Santbrink (2000) measured effects on four epifaunal species in the experimental coarse sand area (median reduction in biomass was 12 percent) and five epifaunal species in the experimental fine sand area (median reduction in biomass was 16 percent). When crabs and snails were removed, the coarse sand area was unchanged, and the median value for the fine sand area was 15 percent biomass reduction. Brown (2003) studied six epifaunal species, resulting in a median reduction in biomass per gear contact of 5 percent. Combining results from Prena et al. (1999), Brown (2003), and Bergman and Santbrink (2000), and removing crabs and snails, gives a median reduction in biomass of epifaunal species of 10 percent, and 25th and 75th percentiles of 4 and 17 percent, respectively.

The study of McConnaughey et al. (2000) compared the effects of fishing on an area that received heavy fishing pressure between 4 and 8 years previously, using an adjacent unfished area as a control.

Therefore, results included a combination of species reductions and recovery, were not adjusted for multiple contacts, and were not directly comparable to the results of the studies above.

Freese et al. (1999) studied the effects of tire gear on the epifauna of a pebble and boulder substrate. Eight epifaunal species gave a median response of 17 percent reduction in biomass and a 75th percentile of 43 percent reduction in biomass. The authors noted a strong transition to apparently smaller effects outside of the direct path of the tire gear.

4.1.2.4 Living Structure

Organisms that create habitat structure in Alaska waters include sponges, bryozoans, sea pens, soft and stony corals, anemones, and stalked tunicates. Studies of the effects of representative trawls on these groups include Van Dolah et al. (1987), Freese et al. (1999), Moran and Stephenson (2000), Prena et al. (1999), and McConnaughey et al. (2000). The first three studies examined the effects on epifauna on substrates such as pebble, cobble, and rock that support attached erect organisms, while the last two studies were located on sandy substrates. Effect estimates were available for only one type of structure-providing organism, the soft coral *Gersemia*, from Prena et al. (1999).

Both the Van Dolah et al. (1987) and Freese et al. (1999) studies identified removal rates and rates of damage to organisms remaining after contact, raising the question of how damage incurred from contact with gear reduces the structural function of organisms. In Freese et al. (1999), sponges were indicated as damaged if they had more than 10 percent of the colony removed, or if tears were present through more than 10 percent of the colony length. Van Dolah et al. (1987) classified organisms as heavily damaged (more than 50 percent damage or loss) or lightly damaged (less than 50 percent damage or loss).

4.1.2.5 Hard Corals

While numerous studies have documented damage to hard corals from trawls (e.g., Fossa 2002, Clark and O'Driscoll 2003), only one (Krieger 2001) was found that related damage to a known number of trawl encounters. Fortunately, this study occurred in the GOA with a common species of gorgonian coral (Primnoa rubi) and with gear not unlike that used in Alaska commercial fisheries. Krieger used a submersible to observe a site where large amounts of Primnoa were caught during a survey trawl. An estimated 27 percent of the original volume of coral was removed by the single trawl effort. The site was in an area closed to commercial trawling, so other trawling effects were absent.

In the 2005 EFH FEIS, the effects of fishing analysis noted that the LEI results required separate consideration for particularly long-lived and slow-growing living structures, exemplified by corals in hard bottom areas. Even relatively low fishing intensities still eventually reduced corals to very low levels in exposed areas. As a result, this class of living structure is treated separately from those with faster recovery rates. Research on coral distribution and fishing impacts moved forward, with studies by Stone (2006), expanded in Heifitz et al. (2009). Areas of highest coral density in the central Aleutian Islands were found to be deeper than most trawling effort. These studies found coral ubiquitous throughout transects across the central Aleutian Islands and damage to these correlated to the intensity of bottom trawling effort. Damage was also noted in depths with little trawling effort, where longline and pot fisheries were the only fishing effort contacting the seafloor. Damage from those gears was harder to identify and attribute due to the less continuous pattern of their effects.

These studies are consistent with the effects of fishing analysis of the 2005 EFH FEIS in that bottom trawling damages corals and that the slow growth rates of coral make them particularly vulnerable. In the development of the 2005 EFH FEIS, a suggestion was made to evaluate the effects of fishing on EFH by identifying areas of high coral bycatch, or "hotspots". In response, NMFS analysts utilized the observer and survey databases to plot observed catch of corals and assess the capability of the data to support area closures based on high coral observed catch. The results of this analysis were that observer and survey data are not useful for "hotspot" analysis of coral catch.

NMFS and the Council continue to track coral & sponge observed catch through both observer and survey programs. This information is reported yearly in several publications, including the SAFE reports, and those data are made available to the public. Recently, species distribution models have been developed for coral and sponge species in the Eastern Bering Sea, Gulf of Alaska, and Aleutian Islands (Rooper et al. 2014, Sigler et al. 2015). NMFS's Deep Sea Coral Research and Technology Program (DSCRTP) funds research in Alaska to examine the location, distribution, ecosystem role, and status of deep-sea coral and sponge habitats based upon research priorities identified by the DSCRTP, the Council, and the EFH 5-year review process. Research priorities include:

- Determine the distribution, abundance, and diversity of sponge and deep-sea coral in Alaska (and their distribution relative to fishing activity);
- Compile and interpret habitat and substrate maps for the Alaska region;
- Determine deep-sea coral and sponge associations with species regulated by fishery management plans (especially juveniles) and the contribution of deep-sea coral and sponge ecosystems to fisheries production;
- Determine impacts of fishing by gear type and test gear modifications to reduce impacts;
- Determine recovery rates of deep-sea coral and sponge communities in Alaska from disturbance or mortality; and
- Establish a long-term monitoring program to determine the impacts of climate change and ocean acidification on deep-coral and sponge ecosystems.

At the October 2016 Council meeting, the SSC supported the use of the FE model as a tool for assessing the effects of fishing on EFH. In response to public comment, however, the SSC raised concern that the longest recovery time incorporated into the model (10 years) may not capture the recovery needed for long-lived species like some hard corals that live on rocky substrate at deep depths. The authors of the model explained that recovery is addressed in the model as an exponential decay function and that 10 years is a recovery to 50% of original coral biomass; a site would recover to 80% of the original biomass after 34 years in the absence of further damage or removals. However, to further address these concerns, a deep and rocky substrate habitat category was added using published information from Stone (2014).

This study was focused on the central Aleutian Islands, but is the most comprehensive source of information on corals in Alaska. Results indicate that corals have the highest density and depths of 400-700m, on bedrock or cobbles, with moderate to very high roughness, and slopes greater than 10 percent.

To account for long-lived species expected to be found in these habitats, a new "Long-Lived Species" habitat feature was added with a new recovery score of "4", corresponding to a recovery time of 10-50 years. The 50-year upper limit of recovery time was calculated with the expectation that 5% of the long-lived species would require 150 years to recover. Inclusion of this new category resulted in an average increase of 0.03% more habitat in a disturbed state compared to the original model predictions. Predicted habitat reduction was about 70% less in grid cells that contained Deep/Rocky substrate compared to the entire domain, reflecting the reduced fishing effort in those areas.

At the April 2017 Council meeting, the SSC mentioned that techniques are emerging that would allow future assessment of corals as an ecosystem component, as opposed to a living structure. The SSC encouraged FE analysts to consider this in future assessments.

4.1.2.6 Non-living Structure

A variety of forms of the physical substrates in Alaska waters can provide structure to managed species, particularly juveniles. These physical structures range from boulder piles that provide crevices for hiding to sand ripples that may provide a resting area for organisms swimming against currents. Unfortunately, few of these interactions are understood well enough to assess the effects of substrate

changes on habitat functions. A number of studies describe changes to the physical substrates resulting from the passage of trawls. However, there is no consistent metric available to relate the use of such structures by managed species to their abundance or condition. This lack of relationship effectively precludes a quantitative description of the effects of trawling on non-living structure. The following discussion describes such effects qualitatively.

4.1.2.7 Sand and Silt Substrates:

Schwinghamer et al. (1998) described physical changes to the fine sand habitats caused by trawling as part of the same study that produced Prena et al. (1999) and Kenchington et al. (2001). Door tracks, approximately 1 m wide and 5 cm deep, were detected with sidescan sonar, adding to the surface relief of the relatively featureless seafloor. Finer scale observations, made with video cameras, indicated that trawling replaced small hummocky features a few cm tall with linear alignments of organisms and shell hash. A dark organic floc that was present before trawling was absent afterwards. While no changes in sediment composition were detected, measurements of the internal structure of the top 4.5 cm of sediment were interpreted to indicate loss of small biogenic sediment structures such as mounds, tubes, and burrows. Brylinsky et al. (1994) describe trawl tracks as the most apparent effect of trawls on a silty substrate and the tracks of rollers as resulting in much shallower lines of compressed sediment than tracks of trawls without rollers. A wide variety of papers describes trawl marks; these papers include Gilkinson et al. (1998), who describe the scouring process in detail as part of a model door study.

For effects on sedimentary forms, the action of roller gear trawls replaces one set of cm-scale forms, such as hummocks and sand ripples, with door and roller tracks of similar scales. In habitats with an abundance of such structures, this can represent a decrease in seabed complexity, while in relatively smooth areas, an increase in complexity will result (Smith et al. 2000). The effects on internal sediment structure are considered too small in scale to provide shelter directly to the juveniles of managed species. The extent to which they affect the availability of prey for managed species is better measured by directly considering the abundance or those prey species.

4.1.2.8 Pebble to Boulder Substrates:

In substrates composed of larger particles (large pebbles to boulders), the interstitial structure of the substrate has a greater ability to provide shelter to juveniles and adults of managed species. The association of species aggregations with such substrates provides evidence of their function as structure (Krieger 1992, 1993). Freese et al. (1999) documented that the tire gear section of a trawl disturbed an average of 19 percent of the large boulders (more than 0.75-m longest axis) in its path. They noted that displaced boulders can still provide cover, while breaking up boulder piles can reduce the number and complexity of crevices.

In areas of smaller substrate particles (pebble to cobble), the track of the tire gear was distinguishable from the rest of the trawl path due to the removal of overlying silt from substrates with more cobble or the presence of a series of parallel furrows 1 to 8 cm deep from substrates with more pebble. Of the above effects, only breaking up boulder piles was hypothesized to decrease the amount of non-living functional structure for managed species. A key unknown is the proportional difference in functional structure between boulder piles and the same boulders, if separated. If that difference comprised 20 percent of the functional structure, and 19 percent of such piles were disturbed over one-third of the trawl paths (tire gear section), a single trawl pass would reduce non-living structure by only about 1 percent. Even if piles in the remaining trawl path were disturbed at half the rate of those in the path of the tire gear (likely an overestimate from descriptions in Freese et al. 1999).

4.1.2.9 Pelagic Trawls

Studies using gear directly comparable to Alaska pelagic trawls, and thus identifying the resulting effect of such gear contact with the seafloor, are lacking. By regulation, these trawls must not use bobbins or other protective devices, so footropes are small in diameter (typically chain or sometimes cable or

wrapped cable). Thus, their effects may be similar to other footropes with small diameters (i.e., shrimp or Nephrops trawls). However, these nets have a large enough mesh size in the forward sections that few, if any, benthic organisms that actively swim upward would be retained in the net. Thus, benthic animals that were found in other studies to be separated from the bottom and removed by trawls with small-diameter footropes would be returned to the seafloor immediately by the Alaska pelagic trawls. Pelagic trawls are fished with doors that do not contact the seafloor, so any door effects are eliminated. Finally, because the pelagic trawl's unprotected footrope effectively precludes the use of these nets on rough or hard substrates, they do not affect the more complex habitats that occur on those substrates.

Sessile organisms that create structural habitat may be uprooted or pass under pelagic trawl footropes, while those that are more mobile or attached to light substrates may pass over the footrope, with less resulting damage. Non-living structures may be more affected by pelagic trawl footropes than by bottom trawl footropes because of the continuous contact and smaller, more concentrated, surfaces over which weight and towing force are applied. In contrast, bottom trawls may capture and remove more of the large organisms that provide structural habitat than pelagic trawls because of their smaller mesh sizes. The bottom trawl doors and footropes could add complexity to sedimentary bedforms as mentioned previously, while pelagic trawls have an almost entirely smoothing effect.

4.1.2.10 Longlines

The light weight of the lines used with longline gear, effects on either infaunal or epifaunal prey organisms are considered to be limited to anchors and weights. Since these components make up less than 1/500th of the length of the gear, their effects are considered very limited (0.05 percent reduction per contact was the value used). Similarly, effects on the non-living structure of soft bottoms are also likely to be very limited.

Organisms providing structure may be hooked or otherwise affected by contact with the line. Observers have recorded anemones, corals, sea pens, sea whips, and sponges being brought to the surface hooked on longline gear (Stellar sea lion protection measures SEIS, 2001), indicating that the lines move some distance across the seafloor and can affect some of the benthic organisms. The effects on non-living structure in hard-bottom areas due to hang-ups on smaller boulder piles and other emergent structures are limited to what may occur at forces below those necessary to break the line. Similar arguments to those used for bottom trawl effects on hard non-living structure would justify an even lower effect than the value generated for bottom-trawling (1 percent). Unfortunately, there are no data to indicate what proportion the retained organisms represent of those contacted on the seafloor or the level of damage to any of the affected organisms.

4.1.2.11 Pots

The only studies on pots (Eno et al. 2001) have examined gear much smaller and lighter than that used in Alaska waters and are, thus, not directly applicable in estimating effects of pots on habitat. Alaska pots are approximately 110 times as heavy and cover 19 times the area as those used by Eno et al. (2001) (2.6 kilograms [kg], 0.25^2 m). The Eno et al. (2001) study did show that most sea pens recovered after being pressed flat against the bottom by a pot. Most Alaska pots have their mesh bottoms suspended 2.5 to 5 cm above their weight rails (lower perimeter and cross pieces that contact the substrate first); hence, the spatial extent to which the greater weight of those pots is applied to organisms located underneath the pots is limited, but more intense.

The area of seafloor disturbed by the weight rails is of the greatest concern, particularly to the extent that the pot is dragged across the seafloor by bad weather, currents, or during hauling. Based on the estimated weight of the pots in water, and the surface area of the bottom of these rails, the average pressure applied to the seafloor along the weight rails (about 1 pound per square inch [lb/in^2] [0.7 kilogram per square centimeter (kg/cm^2)]) is sufficient to penetrate into most substrates during lateral movement. The

effects of pots as they move across the bottom were speculated to be most similar to those of pelagic trawls with smaller contact diameter and more weight concentrated on the contact surface.

4.1.2.12 Dinglebar

Dinglebar troll gear (Figure 3-9 of the HAPC EA) consists of a single line that is retrieved and set with a power or hand troll gurdy, with a terminally attached weight (cannon ball -12 lbs. or iron bar), from which one or more leaders with one or more lures or baited hooks are pulled through the water while a vessels is underway (NPFMC 2003). Dinglebar troll gear is essentially the same as power or hand troll gear, the difference lies in the species targeted and the permit required. For example, dinglebar troll gear can be used in the directed fisheries for groundfish (e.g. cod) or halibut. These species may only be taken incidentally while fishing for salmon with power or hand troll gear. There is a directed fishery for ling cod in Southeast Alaska using dinglebar troll gear. Trolling can occur over any bottom type and at almost any depths. Trollers work in shallower coastal waters, but may also fish off the coast, such as on the Fairweather Grounds. The dinglēbar is usually made of a heavy metal, such as iron, is used in nearly continuous contact with the bottom, and therefore, is likely to disturb bottom habitat.

4.1.2.13 Dredge Gear

Dredging for scallops may affect groundfish habitat by causing unobserved mortality to marine life and modification of the benthic community and sediments. Similar to trawling, dredging places fine sediments into suspension, buries gravel below the surface and overturns large rocks that are embedded in the substrate (NEFMC 1982, Caddy 1973). Dredging can also result in dislodgement of buried shell material, burying of gravel under re-suspended sand, and overturning of larger rocks with an appreciable roughening of the sediment surface (Caddy 1968). A study of scallop dredging in Scotland showed that dredging caused significant physical disturbance to the sediments, as indicated by furrows and dislodgement of shell fragments and small stones (Eleftheriou and Robertson 1992). The authors note, however, that these changes in bottom topography did not change sediment disposition, sediment size, organic carbon content, or chlorophyll content. Observations of the Icelandic scallop fishery off Norway indicated that dredging changed the bottom substrate from shell-sand to clay with large stones within a 3-year period (Aschan 1991). Mayer et al. (1991), investigating the effects of a New Bedford scallop dredge on sedimentology at a site in coastal Maine, found that vertical redistribution of bottom sediments had greater implications than the horizontal translocation associated with scraping and plowing the bottom. The scallop dredge tended to bury surficial metabolizable organic matter below the surface, causing a shift in sediment metabolism away from aerobic respiration that occurred at the sediment-water interface and instead toward subsurface anaerobic respiration by bacteria (Mayer et al. 1991). Dredge marks on the sea floor tend to be short-lived in areas of strong bottom currents, but may persist in low energy environments (Messieh et al. 1991).

Two studies have indicated that intensive scallop dredging may have some direct effects on the benthic community. Eleftheriou and Robertson (1992), conducted an experimental scallop dredging in a small sandy bay in Scotland to assess the effects of scallop dredging on the benthic fauna. They concluded that while dredging on sandy bottom has a limited effect on the physical environment and the smaller infauna, large numbers of the larger infauna (molluscs) and some epifaunal organisms (echinoderms and crustaceans) were killed or damaged after only a few hauls of the dredge. Long-term and cumulative effects were not examined, however. Achan (1991) examined the effects of dredging for islandic scallops on macrobenthos off Norway. Achan found that the faunal biomass declined over a four-year period of heavy dredging. Several species, including urchins, shrimp, seastars, and polychaetes showed an increase in abundance over the time period. In summary, scallop gear, like other gear used to harvest living aquatic resources, may affect the benthic community and physical environment relative to the intensity of the fishery.

4.1.3 Fishing Effects Vulnerability Assessment

A goal of the vulnerability assessment is to base estimates of susceptibility and recovery of features to gear impacts on the scientific literature to the extent possible. In previous EFH fishing effects analyses (2005 and 2010), an overview of new and existing research on the effects of fishing on habitat was included in this document. Each of the inputs to the fishing effects model were evaluated, including the distribution of fishing intensity for each gear type, spatial habitat classifications, classification of habitat features, habitat- and feature-specific recovery rates, and gear- and habitat- specific sensitivity of habitat features. Many of these estimates were best professional judgement by fisheries managers and scientists.

For the 2015 EFH Review, a more empirical literature review method was incorporated to assess the effects of fishing on habitat. A vulnerability assessment and associated global literature review was developed by members of the New England Fishery Management Council's Habitat Plan Development Team while developing the Swept Areas Seabed Impacts model, which was in part based on the LEI model. Studies were selected for evaluation based on their broad relevance to Northeast Region habitats and fishing gears, but have been adapted for use in the North Pacific. Synthesis papers and modeling studies are excluded from the review, but the research underlying these publications is included when relevant. Most of the studies reviewed are published as peer-reviewed journal articles, but conference proceedings, reports, and these are considered as well.

A Microsoft Access database was developed to organize the review and to identify in detail the gear types and habitat features evaluated in each study. In addition to identifying gear types and features, the database included field codes for basic information about study location and related research; study design, relevance and appropriateness to the vulnerability assessment; depth; whether recovery of features is addressed; and substrate types found in the study area. Analysts interacted with the database via an Access form.

Over 115 studies are evaluated, although additional literature referenced in the previous section on feature descriptions was used in some cases to inform recovery scores, and not all of the studies are used equally to inform the matrix-based vulnerability assessment. The long-term intention is to create new records in the database as additional gear impacts studies are published. This database is published as Grabowski et al (2014).

As a model parameterization tool, the vulnerability assessment quantifies both the magnitude of the impacts that result from the physical interaction of fish habitats and fishing gears, and the duration of recovery following those interactions. This vulnerability information from this database has been modified to condition area swept (i.e. fishing effort) in the FE model via a series of susceptibility and recovery parameters.

A critical point about the vulnerability assessment and accompanying FE model is that they consider EFH and impacts to EFH in a holistic manner, rather than separately identifying impacts to EFH designated for individual species and life stages. This is consistent with the EFH final rule, which indicates "adverse effects to EFH may result from actions occurring within EFH or outside of [designated] EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions" (§600.810). To the extent that key features of species' EFH can be related to the features in the vulnerability assessment, post-hoc analysis of model outputs can be conducted to better evaluate the vulnerability of a particular species' essential habitat components to fishing gear effects.

4.1.4 Impact Assessment Methods

In 2005, distribution of LEI values for each class of habitat feature were provided to experts on each managed species, to use in their assessment of whether such effects were likely to impact life history processes in a way that indicated an adverse change to EFH. Experts were asked to assess connections between the life history functions of their species at different life stages and the classes of habitat features

used in the LEI model. Then, considering the distribution of LEIs for each of those features, they were asked whether such effects raised concerns for their species. Experts also considered the history of the status of species stocks in their assessments. While this process provided the first information available of the effects of fishing on stocks, it was not overly analytical.

In December 2016, the Council approved a three-tiered method to evaluate whether there are adverse effects of fishing on EFH (Figure 24). This analysis considers impacts of commercial fishing first at the population level, then uses objective criteria to determine whether additional analysis is warranted to evaluate if habitat impacts caused by fishing are adverse and more than minimal or not temporary.

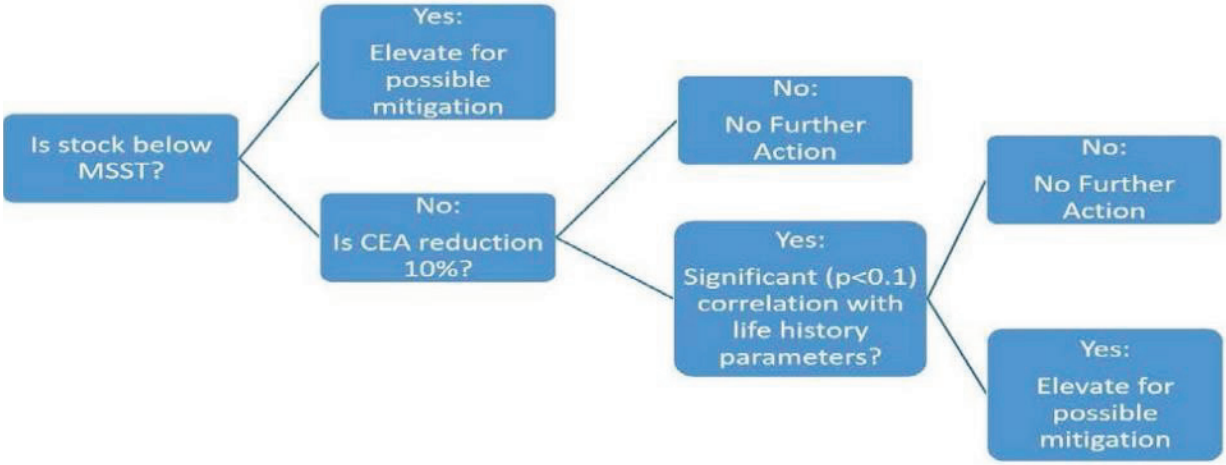

Figure 24 Three tiered method to evaluate effects of fishing on Essential Fish Habitat in Alaska

Because EFH is defined for populations managed by Council FMPs, stock authors first considered whether the population is above or below the Minimum Stock Size Threshold (MSST), defined as 0.5*MSY stock size, or the minimum stock size at which rebuilding to MSY would be expected to occur within 10 years if the stock were exploited at the Maximum Fishing Mortality Threshold (MFMT). Stock authors were asked to identify any stock that is below MSST for review by the Plan Teams. Mitigation measures may be recommended by the Plan Team if they concur that there is a plausible connection to reductions of EFH as the cause.

To investigate the potential relationships between fishing effects and stock production, the stock assessment authors examined trends in life history parameters and the amount of disturbed habitat in the "core EFH Area" (CEA) for each species. The CEA is identified as the predicted 50 percent quantile threshold of suitable habitat or summer abundance (Laman et al., 2017, Turner et al. 2017, Rooney et al., In Press). Stock assessment authors evaluated whether 10 percent or more of the CEA was impacted by commercial fishing in November 2016 (the end of the time series). The 10 percent threshold was selected based on the assumption that impacts to less than 10 percent of the CEA means than more than 90 percent of the CEA (top 50 percent of suitable habitat or summer abundance) was undisturbed, and therefore represented minimal disturbance. If 10 percent or more of the CEA was impacted, the stock assessment authors examined indices of growth-to-maturity, spawning success, breeding success, and feeding success to determine whether there are correlations between those parameters and the trends in the proportion of the CEA impacted by fishing. If a correlation exists, positive or negative, stock assessment authors determined whether the correlation is significant at a p-value of 0.1. If a significant correlation was found, stock assessment authors used their expert judgement to determine whether there is a plausible connection to reductions in EFH as the cause. Stock assessment authors identified the correlation, and the significance in their reports.

Reports from the stock assessment authors were collated and presented to representatives of the GOA and BSAI Groundfish Plan Teams and the Crab Plan Team. Plan Team representatives reviewed the reports

in March, 2017. Representatives concurred with the stock assessment authors determinations in all cases. None of the stock assessment authors concluded that habitat reduction within the CEA for their species was affecting their stocks in ways that were more than minimal or not temporary. None of the authors recommended any change in management with regard to fishing within EFH.

4.1.5 Evaluation of Effects on EFH of BSAI Crab Species

This section evaluates whether the fisheries, as they are currently conducted off Alaska, will affect habitat that is essential to the welfare of the managed fish populations in a way that is more than minimal and not temporary. The previous statement describes the standard set in the EFH regulations which, if met, requires Councils to act to minimize such effects. Habitat features were selected as those which a) can be affected by fishing, and b) may be important to fish in spawning, breeding, feeding, and growth to maturity. This section evaluates the extent that these changes related to the EFH of each managed species and whether they constitute an effect to EFH that is more than minimal.

Two conclusions are necessary for this evaluation: (1) the definition of EFH draws a distinction between the amount of habitat necessary for a species to support a sustainable fishery and the managed species contribution to a healthy ecosystem (40 CFR 600.10) and all habitat features used by any individuals of a species; (2) this distinction applies to both the designation of EFH and the evaluation of fishing effects on EFH. If these conclusions are valid, the more than minimal standard relates to impacts that potentially affect the ability of the species to fulfill its fishery and ecosystem roles, not just impacts on a local scale. The following text summarizes the results of the analysis for each managed species.

4.1.5.1 Red King Crab

The first step in the three-tiered approach is to determine whether or not the stock is below MSST. There are three red king crab stocks in the eastern Bering Sea: Bristol Bay, Norton Sound, and Pribilof Islands. In the 2016 assessments (Hamazaki and Zheng, 2016; Turnock, Szuwalski and Foy, 2016; Zheng and Siddeek, 2016), all three stocks were determined to be above MSST.

The next step in the three-tiered approach, having determined that the stock is above MSST, is to determine whether or not the amount of habitat disturbed by commercial fishing withing the stock's 50 percent quantile Core Essential Area is greater than 10 percent. As shown in Figure 25, the percent habitat reduction with the red king crab Core Essential Area during the 2003-2016 time period has always been less than 10 percent. Because the habitat reduction within the Core Essential Area is less than 10 percent, professional judgement indicates that fisheries do not adversely affect the EFH of the red king crab stocks, and the remaining tiers are not addressed.

A concern was raised regarding the use of the 50 percent Core Essntial Area for red king crab stocks. Some habitat is much more important for red king crab spawning success than others. Even though the habitat reduction for all red king crab habitat areas is less than ten percent, the most critical area for Bristol Bay red king crab spawning is southern Bristol Bay, where the habitat reduction is over ten percent (Figure 26). Additional analysis may be beneficial for understanding fishery impacts on Bristol Bay red king crab beyond Figures 25 and 26.

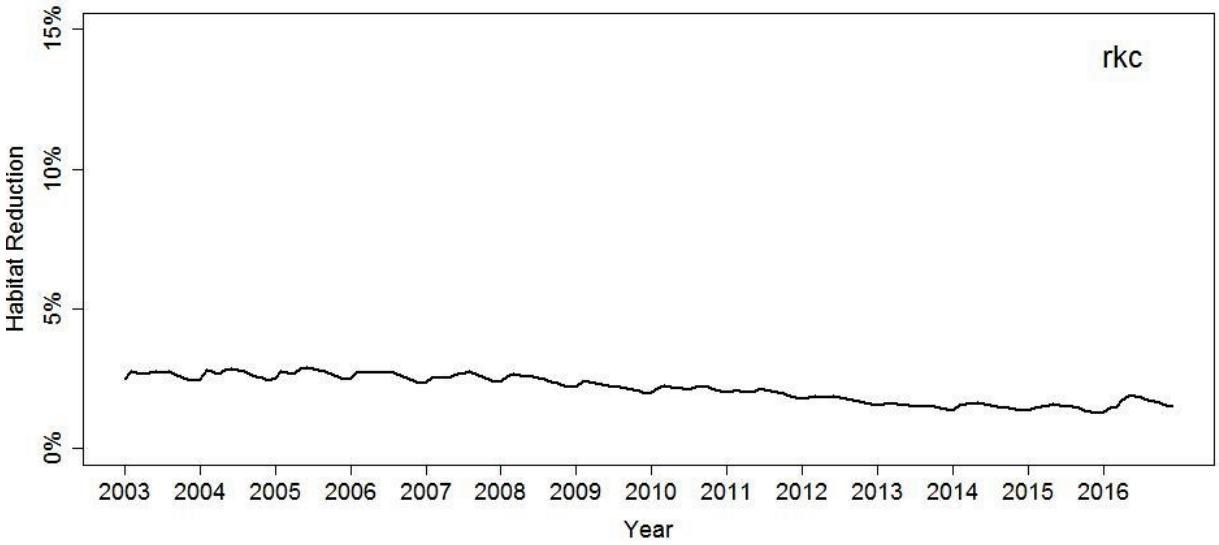

Figure 25 Estimated time series for the percent habitat reduction in the Core Essential Area for red king crab in the Bering Sea

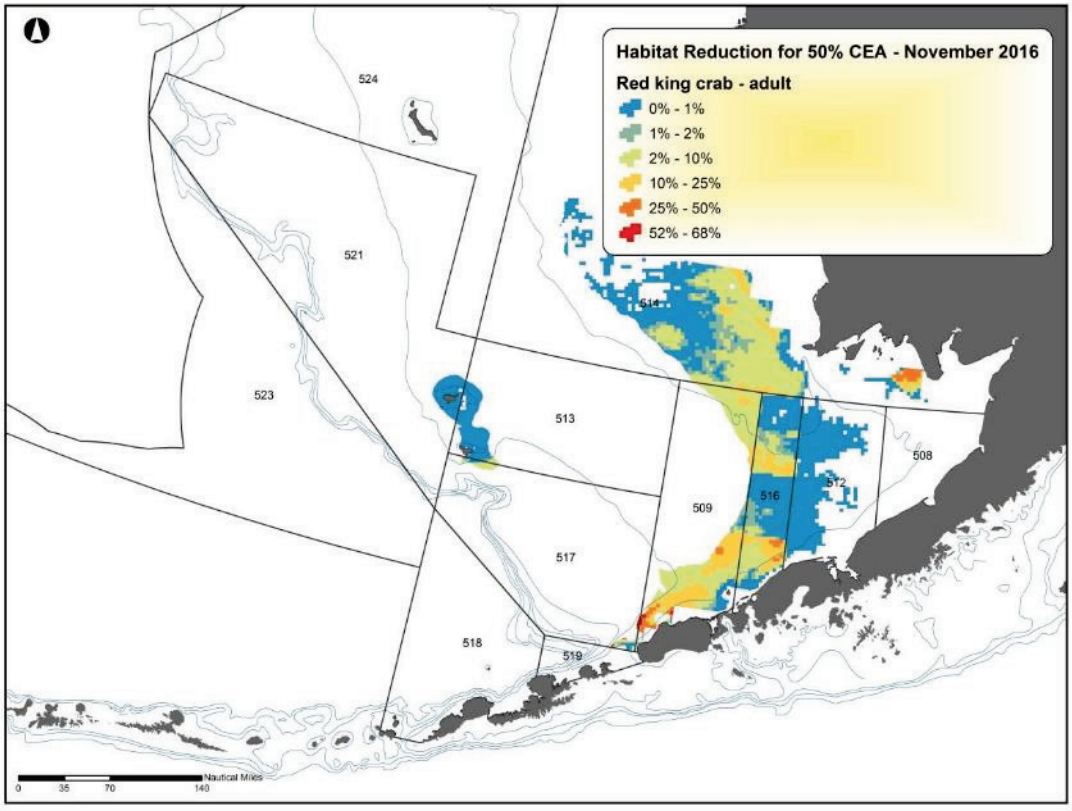

Figure 26 Estimated habitat reduction in the Core Essential Area for red king crab in the Bering Sea

4.1.5.2 Blue King Crab

4.1.5.2.1 Pribilof Islands stock

The first step in the three-tiered approach is to determine whether or not the stock is below MSST. In the 2016 assessment (Stockhausen, 2016), the Pribilof Islands blue king crab (PIBKC) stock was determined to be below MSST. The three-tiered approach is consequently terminated, and the stock should be elevated for possible mitigation. However, habitat reduction in the total Core Essential Area, as well as directly around the Pribilof Islands, appears to be (and have been) less than 1 percent (Figure 27). Thus, it is unlikely that habitat reduction due to commercial fishing plays a role in the decline of the PIBKC stock. Additionally, the Pribilof Islands Habitat Conservation Zone is closed to fishing with either non-pelagic trawl gear or Pacific cod pot gear.

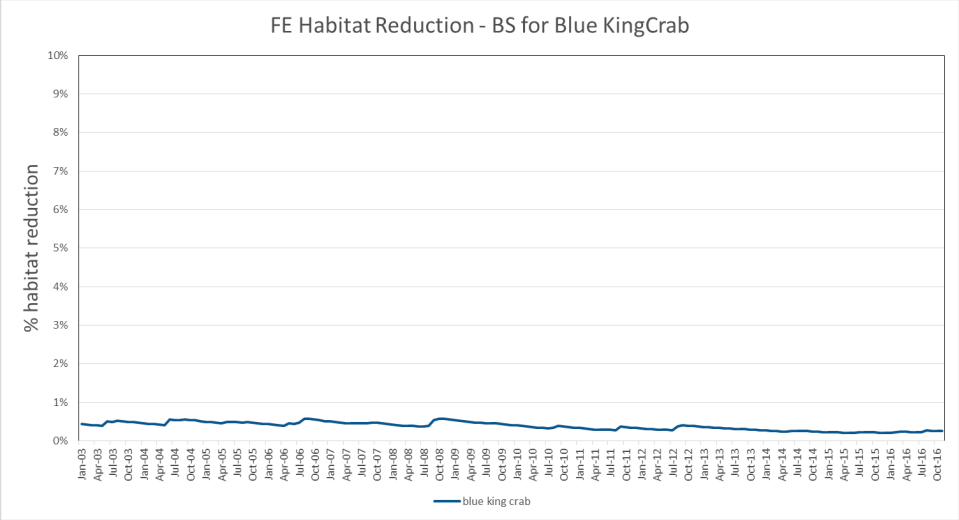

Figure 27 Estimated time series for the percent habitat reduction in the total Core Essential Area for blue king crab in the Bering Sea (of which the Pribilof Islands is one of three areas)

4.1.5.2.2 St. Matthew Island stock

The first step in the three-tiered approach is to determine whether or not the stock is below MSST. In the 2016 assessment (Webber et al., 2016), the St. Matthew Pribilof Island blue king crab (SMBKC) stock was determined to be above MSST.

The next step in the three-tiered approach, having determined that the stock is not below MSST, is to determine whether or not the amount of habitat disturbed by commercial fishing within the stock's 50 percent quantile Core Essential Area is greater than 10 percent. As shown in Figure 28, the percent habitat reduction with the SMBKC Core Essential Area during the 2003-2016 time period has always been less than 10 percent. Because the habitat reduction within its Core Essential Area is less than 10 percent, professional judgement indicates that fisheries do not adversely affect the EFH of the SMBKC stock, and the remaining tiers are not addressed.

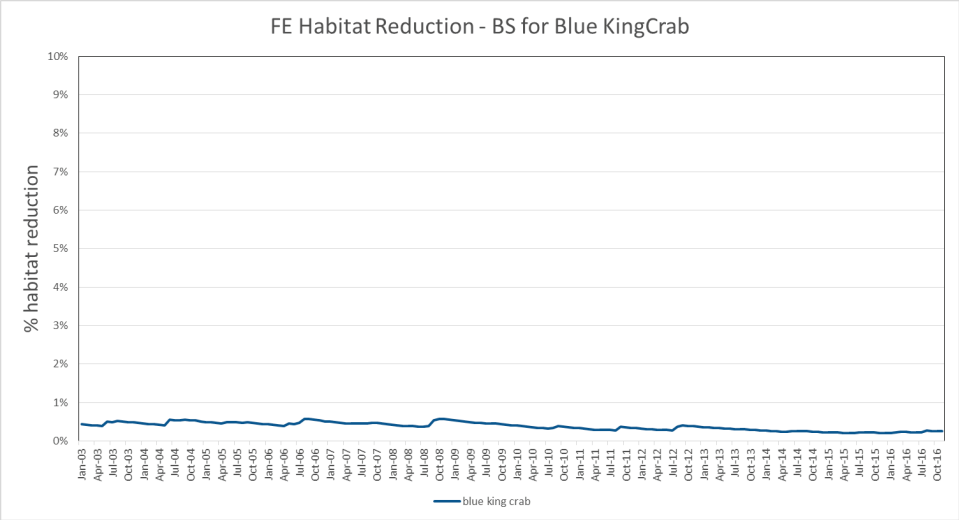

Figure 28 Estimated time series for the percent habitat reduction in the total Core Essential Area for blue king crab in the Bering Sea (of which the St. Matthew Island is one of three areas)

4.1.5.3 Golden King Crab

Issue	Evaluation
Spawning/breeding	MT (Minimal, temporary, or no effect)
Feeding	U (Unkown effect)
Growth to maturity	U (Unknown effect)

Information was insufficient to conduct the three-tiered approach for golden king crab. However, based on the analysis in the 2005 EFH EIS, fishing activities are considered to have overall minimal and temporary effects on the EFH for golden king crab. Groundfish trawl fishing in the EBS slope is of some concern; however, any effects are thought to be minimal. Professional judgement indicates that fisheries do not adversely affect the EFH of golden king crab.

4.1.5.4 Tanner Crab

The first step in the three-tiered approach is to determine whether or not the stock is below MSST. In the 2016 assessment (Stockhausen 2016a), the Tanner crab stock was determined to be above MSST.

The next step in the three-tiered approach, having determined that the stock is above MSST, is to determine whether or not the amount of habitat disturbed by commercial fishing within the stock's 50 percent quantile Core Essential Area is greater than 10 percent. As shown in Figure 29, the percent habitat reduction with the Tanner crab Core Essential Area during the 2003-2016 time period has always been less than 10 percent. Because the habitat reduction within its Core Essential Area is less than 10 percent, professional judgement indicates that fisheries do not adversely affect the EFH of the Tanner crab stock, and the remaining tiers are not addressed.

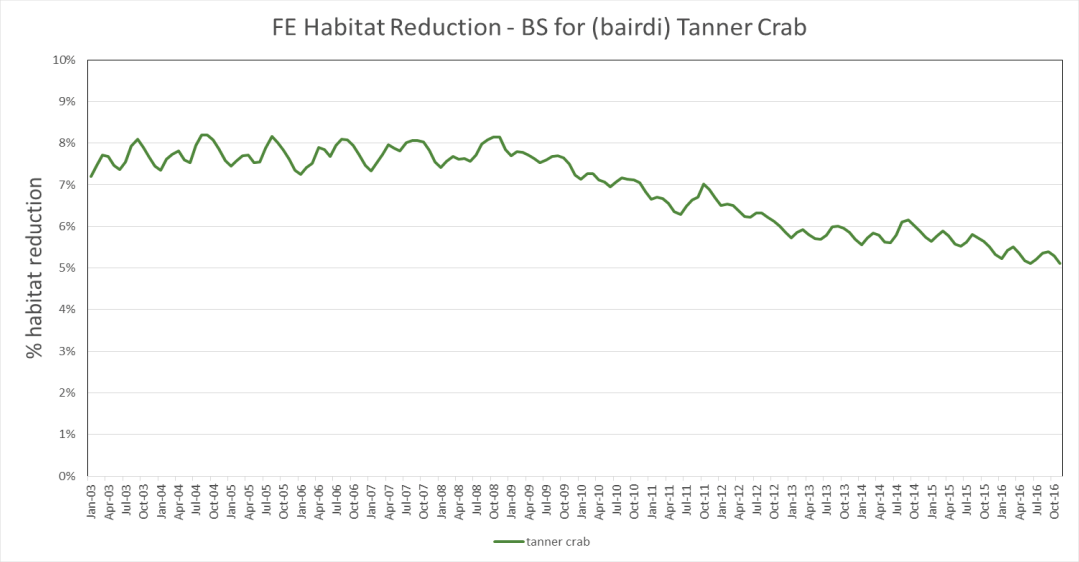

Figure 29 Estimated time series for the percent habitat reduction in the Core Essential Area for Tanner crab in the Bering Sea

4.1.5.5 Snow Crab

The first step in the three-tiered approach is to determine whether or not the stock is below MSST. In the 2016 assessment (Szuwalski and Turnock 2016), the snow crab stock was determined to be above MSST.

The next step in the three-tiered approach, having determined that the stock is above MSST, is to determine whether or not the amount of habitat disturbed by commercial fishing withing the stock's 50 percent quantile Core Essential Area is greater than 10 percent. As shown in Figure 30, the percent habitat reduction with the snow crab Core Essential Area during the 2003-2016 time period has always been less than 10 percent. Because the habitat reduction within its Core Essential Area is less than 10 percent, professional judgement indicates that fisheries do not adversely affect the EFH of the snow crab stock, and the remaining tiers are not addressed.

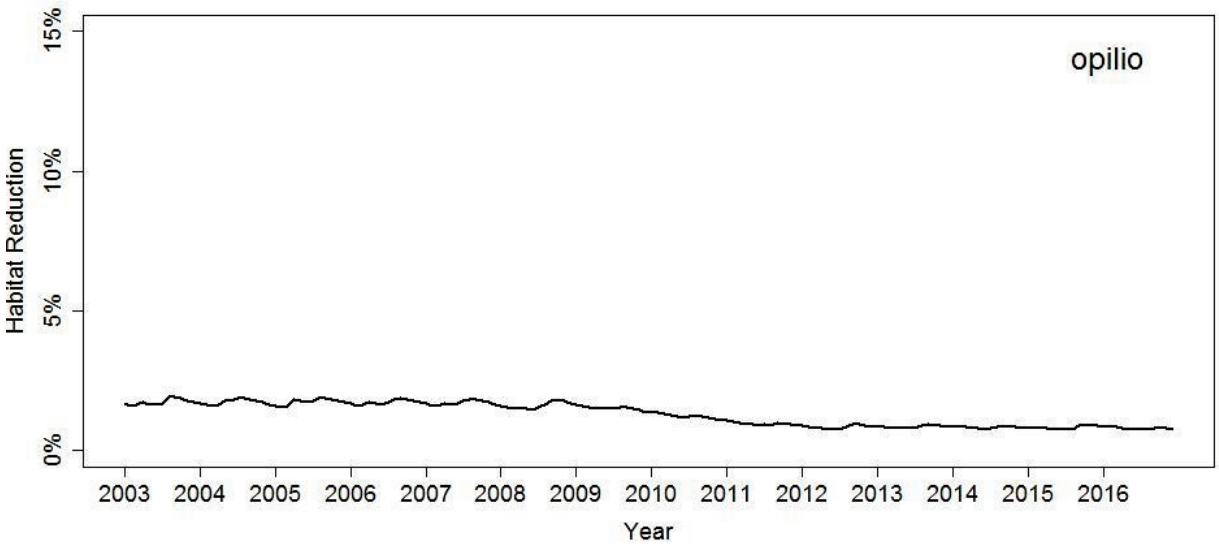

Figure 30 Estimated time series for the percent habitat reduction in the Core Essential Area for snow crab in the Bering Sea

4.1.6 Cumulative Effects of Fishing on Essential Fish Habitat

The 2005 EFH FEIS, 2010 EFH Review, and 2015 EFH Review concluded that fisheries do have long term effects on habitat, and these impacts were determined to be minimal and not detrimental to fish populations or their habitats. While the 2010 EFH Review provided incremental improvements to our understanding of habitat types, sensitivity and recovery of seafloor habitat features, these new results were consistent with the sensitivity and recovery parameters and distributions of habitat types used in the prior analysis of fishing effects for the 2005 EFH EIS. None of this new information revealed significant errors in the parameters used in that analysis; rather, it marginally increased support for their validity.

This still left the LEI model well short of a rigorously validated, predictive structure.

The previous EFH analyses, as well as the CIE review, indicated the need for improved fishing effects model parameters. With the FE model, our ability to analyze fishing effects on habitat has grown exponentially. Vessel Monitoring System data provides a much more detailed treatment of fishing intensity, allowing better assessments of the effects of overlapping effort and distribution of effort between and within grid cells. The development of literature-derived fishing effects database has increased our ability to estimate gear-specific susceptibility and recovery parameters. The distribution of habitat types, derived from increased sediment data availability, has improved. The combination of these parameters has greatly enhanced our ability to estimate fishing impacts.

In April 2016, the SSC recommended that new methods and criteria be developed to evaluate whether the effects of fishing on EFH are more than minimal and not temporary. Criteria were developed by NMFS and researchers at Alaska Pacific University, and reviewed by the Council and its advisory committees in 2016, and the stock assessment authors in 2017. In April 2017, based on the analysis with the FE model, the Council concurred with the Plan Team consensus that the effects of fishing on EFH do not currently meet the threshold of more than minimal and not temporary, and mitigation action is not needed at this time.

While these analyses found no indication that continued fishing activities at the current rate and intensity would alter the capacity of EFH to support healthy populations of managed species over the long term, the Council acknowledges that scientific uncertainty remains regarding the consequences of habitat alteration for the sustained productivity of managed species. Consequently, the Council has adopted, and NMFS has implemented, a number of management measures designed to reduce adverse impacts to habitat.

5 Non-fishing Activities that may Adversely Affect Essential Fish Habitat

The waters, substrates and ecosystem processes that provide EFH and support sustainable fisheries are susceptible to a wide array of human activities and climate related influences completely unrelated to the act of fishing. These activities range from easily identified point source anthropogenic discharges in watersheds or nearshore coastal zones to less visible influences of changing ocean conditions or increased variability in regional temperature or weather patterns. 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 Alaska, these categories of non-fishing impacts are presented and discussed in the non-fishing impacts report, which NMFS updates every five years with the 5-year EFH review.

The most recent report is *Impacts to EFH from Non-Fishing Activities in Alaska* (Limpinsel et al. 2017). This report addresses non-fishing activities requiring EFH consultations and that may adversely affect EFH. The report offers general conservation measures for a wide variety of non-fishing activities grouped into four broad categories of ecotones: (1) wetlands and woodlands; (2) headwaters, streams, rivers, and lakes; (3) marine estuaries and nearshore zones; and (4) open water marine and offshore zones. The report emphasizes the recognition that water quality and quantity are the most important EFH attributes for sustainable fisheries. It also recognizes that in Alaska, water contributes to ecosystems processes supporting EFH under the influence of three climate zones, through eight terrestrial ecoregions, and water eventually influences the character of seventeen coastal zones and four Large Marine Ecosystems (LMEs). The report also provides: (1) descriptions of ecosystem processes and functions that support EFH through freshwater and marine systems; (2) the current observations and influence of climate change and ocean acidification to our federally managed fisheries in Alaska; and (3) discussions oil spill response technologies and increasing vessel traffic in the Bering Sea and Arctic Ocean.

The purpose of this report is to assist in the identification of activities that may adversely impact EFH and provide general EFH conservation recommendations to avoid or minimize adverse impacts. Section 305(b) of the MSA requires each Federal agency to consult with NMFS on any action that agency authorizes, funds, or undertakes, or proposes to authorize, fund, or undertake, that may adversely affect EFH. Each Council shall comment on and make recommendations to the Secretary and any Federal or State agency concerning any such activity that, in the view of the Council, is likely to substantially affect the habitat, including essential fish habitat, of an anadromous fishery resource under its authority. If NMFS or the Council determines that an action authorized, funded, or undertaken, or proposed to be authorized, funded, or undertaken, by any State or Federal agency would adversely affect any EFH, NMFS shall recommend to the agency measures that can be taken to conserve EFH. Within 30 days after receiving EFH conservation recommendations from NMFS, a Federal agency shall provide a detailed response in writing to NMFS regarding the matter. If the response is inconsistent with NMFS's recommendations, the Federal agency shall explain its reasons for not following the recommendations.

EFH conservation recommendations are non-binding to Federal and state agencies. EFH consultations do not supersede regulations or jurisdictions of Federal or state agencies. NMFS has no authority to issue permits for projects or require measures to minimize impacts of non-fishing activities. Most non-fishing activities identified in this report are already subject to numerous Federal, state, and local environmental laws and regulations designed to minimize and mitigate impacts. Listing all applicable laws and management practices is beyond the scope of this FMP or the non-fishing impacts report. Environmentally sound engineering and management practices are strongly encouraged to mitigate impacts from all actions.

Table 14 identifies activities other than fishing that may adversely affect EFH and identifies known and potential adverse effects to EFH. More information on these activities and the potential adverse effects is provided in the non-fishing impacts report (Limpinsel et al. 2017).

Table 14 Summary on Non-Fishing Effects on Habitat

Threats	HABITAT ALTERATION	Alternation of original or normal habitat	Loss of offshore habitat	Loss of pelagic habitat	Loss of nearshore habitat	Loss of benthic habitat	Loss of aquatic vegetaion	Loss of wetland value	Loss of original sediment type	Detrital matter introduction	TOPOGRAPHIC ALTERATION	Change in original feature or structure	Accretion \ Overburden of original feature	Erosion \ Dispersal of feature	ORGANISM ALTERATION	Physical damage to organism	Mortality	Spatial alteration	Gene pool deterioration	Introduction of exotic species	Introduction of pathogens\disease	Change in photosynthetic regime	OCEANOGRAPHIC ALTERATION	Change in temperture regime	Change in salinity	Change in circulation pattern	WATER QUALITY ALTERATION	Change in dissolved oxygen content	Eutrophication, nutrient loading	Water contamination	Suspended sediments, turbidity	Atmospheric deposition
Excavation																															
Dredging		X			X	X	X	X	X			X	X	X		X	X					X		*	*	*		*	X	X	X	
Dredge Material Disposal		X	X		X	X	X	X	X	X		X	X			X	X	X			X	X		*	*	*		*	X	X	X	
Marine Mining		X	X			X			X	X		X	X	X		X	X				X	X		X	X	X		*	X	X	X	
Nearshore Mining		X			X	X	X		X	X		X	X	X		X	X				X	X		*	*	*		*	X	X	X	
Recreational Uses																																
Boating				X	X	X	X			X						X	X			X	X			*	*	*		*	*	X	X	X
Stream Bank Over-usage		X						X	X	X		X	X	X		X	X				X	X							X	X	X	
Fish Waste Processing																																
Shoreside Discharge		X			X	X	X		X	X		X	X								X	X		X	X			*	X	X	X	
Vessel Discharge				X		X				X											X	X						*	X		X	
Aquaculture					X		X			X								X	X	X	X	X		X	X	X		*	X	X	X	
Petroleum Production																																
Production Facility		X	X		X	X	X	X	X	X		X	X	X			X	X			X	X		X	X	X				X	X	X
Exploration		X	X		X	X	X	X				X	X	X		X	X				X	X				X				X	X	X
Oil Spill		X	X		X	X	X	X	X	X						X	X		X		X	X			*			X		X	X	X
Hydrological																																
Hydroelectric Dams									X								X				X	X						X			X	
Impoundments		X					X	X	X			X	X	X		X	X				X	X						X	X		X	
Flood Erosion/Control		X			X		X	X	X			X	X	X		X	X					X						X	X			
Agricultural																																
Agriclutural/Farming		X			X		X	X	X	X		X	X	X				X			X			*	*			X	X	X	X	
Insect Control					X		X	X								X	X				X	X								X		X
Forestry		X			X		X	X	X	X		X	X	X		X		X				X		X	*					X	X	
Water Diversion/Withdraw l		X			X		X	X				X	X	X								X		*		X		X	X	X	X	
Harbors/Ports/Marinas																																
Port Construction		X			X	X	X	X	X	X		X	X	X		X	X	X				X		*	*	X		*		X	X	
Port Development		X			X	X	X	X	X	X		X	X	X		X	X	X			X	X				*		*		X	X	
Artifical Reefs		X			X	X						X	X	X				X				X		X	X	X						
Municipal and Industrial																																
Non-point Source				X	X	X	X	X	X	X			X			X	X	X	X		X	X		X	X			X		X		X
Coastal Urbanization		X			X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X		X	X	X		X	X	X	X	X
Sew age Treatment		X			X	X				X			X			X	X		X	X	X	X		X	X			X	X	X		
Storm Water Runoff					X					X						X	X		X	X	X	X		X	X			X	X	X	X	
Environmental																																
Climatic Changes/Shifts				X	X		X						X	X								X		X	X	X						X
Toxic Algal Bloom																X	X		X		X	X			*			X				
Introduction of Exotic Species																X	X	X	X	X	X								X			
Marine Transportation																																
Vessel Groundings		X			X	X	X		X	X		X		X		X	X			X	X									X		
Ballast Water				X		X										X	X		X	X	X	X		X	X					X		
Marine Debris		X		X	X	X	X		X	X			X			X	X	X			X	X								X		
* - short term impact																																

6 Cumulative Effects of Fishing and Non-fishing Activities on EFH

This section summarizes the cumulative effects of fishing and non-fishing activities on EFH. The cumulative effects of fishing and non-fishing activities on EFH were considered in the 2005 EFH EIS, but insufficient information existed to accurately assess how the cumulative effects of fishing and non-fishing activities influence ecosystem processes and EFH. The 2015 5-year review has reevaluated potential impacts of fishing and non-fishing activities on EFH using recent technologies and literature, and the current understanding of marine and freshwater fisheries science, ecosystem processes, and population dynamics (Simpson et al. 2017).

As previously identified in Section 4.4 EFH-EIS (NMFS 2005), historical fishing practices may have had effects on EFH that have led to declining trends in some of the criteria examined (Table 4.4-1). For fishing impacts to EFH, the FE model calculates habitat reductions at a monthly time step since 2003 and incorporates susceptibility and recovery dynamics, allowing for an assessment of cumulative effects from fishing activities for the first time. As identified in Section 5, the effects of current fishing activities on EFH are considered as minimal and temporary or unknown using the new methods.

The cumulative effects from multiple non-fishing anthropogenic sources are increasingly recognized as having synergistic effects that may degrade EFH and associated ecosystem processes that support sustainable fisheries. Non-fishing activities may have potential long term cumulative impacts due to the long term additive and chronic nature of the activities combined with climate change (Limpinsel et al. 2017). However, the magnitude of the effects of non-fishing activities cannot currently be quantified with available information. NMFS does not have regulatory authority over non-fishing activities, but frequently provides recommendations to other agencies to avoid, minimize, or otherwise mitigate the effects of these activities.

Fishing and each activity identified in the analysis of non-fishing activities may not significantly affect the function of EFH. However, the synergistic effect of the combination of all of these activities may be a cause for concern. Unfortunately, available information is not sufficient to assess how the cumulative effects of fishing and non-fishing activities influence the function of EFH on an ecosystem or watershed scale. The magnitude of the combined effect of all of these activities cannot be quantified, so the cumulative level of concern is not known at this point.

7 Research Approach for EFH

The EFH EIS (NMFS 2005) identified a research approach for EFH regarding minimizing fishing impacts. The research approach was revised in 2010 following the Council's EFH 5-year Review for 2010, documented in a Final Summary Report (NPFMC and NMFS 2010).

7.1.1.1 Objectives

Establish a scientific research and monitoring program to understand the degree to which impacts have been reduced within habitat closure areas, and to understand how benthic habitat recovery of key species is occurring.

Benthic habitat recovery. Allow recovery of habitat in a large area with relatively low historic effort.

7.1.1.2 Research Questions

Reduce impacts. Does the closure effectively restrict higher-impact trawl fisheries from a portion of the GOA slope? Is there increased use of alternative gears in the GOA closed areas? Does total bottom trawl effort in adjacent open areas increase as a result of effort displaced from closed areas? Do bottom trawls affect these benthic habitats more than the alternative gear types? What are the research priorities? Are

fragile habitats in the AI affected by any fisheries that are not covered by the new EFH closures? Are sponge and coral essential components of the habitat supporting FMP species?

Benthic habitat recovery. Did the habitat within closed areas recover or remain unfished because of these closures? Do recovered habitats support more abundant and healthier FMP species? If FMP species are more abundant in the EFH protection areas, is there any benefit in yield for areas that are still fished without EFH protection?

7.1.1.3 Research Activities

- Fishing effort data from observers and remote sensing would be used to study changes in bottom trawl and other fishing gear activity in the closed (and open) areas. Effects of displaced fishing effort would have to be considered. The basis of comparison would be changes in the structure and function of benthic communities and populations, as well as important physical features of the seabed, after comparable harvests of target species are taken with each gear type.

- Monitor the structure and function of benthic communities and populations in the newly closed areas, as well as important physical features of the seabed, for changes that may indicate recovery of benthic habitat. Whether these changes constitute recovery from fishing or just natural variability/shifts requires comparison with an area that is undisturbed by fishing and otherwise comparable.

- Validate the LEI model and improve estimates of recovery rates, particularly for the more sensitive habitats, including coral and sponge habitats in the Aleutian Islands region, possibly addressed through comparisons of benthic communities in trawled and untrawled areas.

- Obtain high resolution mapping of benthic habitats, particularly in the on-shelf regions of the Aleutian Islands.

- Time series of maturity at age should be collected to facilitate the assessment of whether habitat conditions are suitable for growth to maturity.

- In the case of red king crab spawning habitat in southern Bristol Bay, research the current impacts of trawling on habitat in spawning areas and the relationship of female crab distribution with respect to bottom temperature.

7.1.1.4 Research Time Frame

Changes in fishing effort and gear types should be readily detectable. Biological recovery monitoring may require an extended period if undisturbed habitats of this type typically include large or long-lived organisms and/or high species diversity. Recovery of smaller, shorter-lived components should be apparent much sooner.

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Appendix E Areas Described in the Fishery Management Plan

The following descriptions of the registration areas are adopted from Alaska State regulations. In the case of the Bering Sea king crab Registration Area (Registration Area Q) and some of its districts, the boundary descriptions extend into the Chukchi Sea to Point Hope. The FMP's jurisdiction ends at the southern boundary of the Chukchi Sea. Updated information surrounding shellfish management can be found in the Annual management report for shellfish of the BS/AI management area.

Current Registration Areas

King Crab

Bering Sea Registration Area (Area Q): The southern boundary is a line from 54°36′ N lat., 168° W long., to 54°36′ N lat., 171° W long., to 55°30′ N lat., 171° W long., to 55°30′ N lat., 173°30′ E long. The northern boundary is the latitude of Point Hope (68°21′ N lat.). The eastern boundary is a line from 54°36′ N lat., 168° W long., to 58°39′ N lat., 168° W long., to Cape Newenham (58°39′ N lat.). The western boundary is the United States–Russia Maritime Boundary Agreement Line of 1990. Area Q is divided into 2 districts:

1. Pribilof District Q_1: waters of Registration Area Q south of the latitude of Cape Newenham (58°39' N lat.).
2. Northern District: waters of Registration Area Q north of latitude of Cape Newenham (58°39' N lat.). The Northern District is subdivided into three sections:

    Saint Matthew Island Section Q_2: waters north of the latitude of Cape Newenham (58°39' N lat.) and south of the latitude of Cape Romanzof (61°49' N lat.);

    Norton Sound Section Q_3: waters north of latitude of Cape Romanzof (61°49' N lat.) and south of the latitude of Cape Prince of Wales (66° N lat.); and

    Kotzebue Sound Section Q_4: all remaining waters of the district.

Bristol Bay Registration Area (Area T): has as its northern boundary the latitude of Cape Newenham (58°39'N lat), as its southern boundary the latitude of Cape Sarichef (54°36' N lat.), as its western boundary 168° W long. and includes all waters of Bristol Bay.

Aleutian Islands Registration Area (Area O): has as its eastern boundary the longitude of Scotch Cap Light (164°44.72' W long.), its western boundary the U.S.–Russia Maritime Boundary Agreement Line of 1990, and its northern boundary a line from the latitude of Cape Sarichef (54°36' N lat.) to 171° W long., north to 55°30' N lat., and west to the U.S.–Russia Maritime Boundary Agreement Line of 1990. The Aleutian Islands golden king crab (AIGKC) stock is managed as two separate fisheries, east and west of 174° W long., with a separate TAC set for each fishery.

Tanner Crab

Bering Sea District of the Westward Registration Area (Bering Sea District of Area J): all Bering Sea waters east of the U.S.–Russia Maritime Boundary Agreement Line of 1990 and north of 54°36' N lat.

Western Subdistrict: all waters of the Bering Sea District west of 173° W long.

Eastern Subdistrict: all waters of the Bering Sea District east of 173° W long., including the waters of Bristol Bay. The Eastern Subdistrict is further divided into two sections:

1. Norton Sound Section: all waters of the Eastern Subdistrict north of the latitude of Cape Romanzof (61°49′ N lat.) and east of 168° W long., and
2. General Section: all waters of the Eastern Subdistrict not included in the Norton Sound Section.

Historic Registration Areas

King Crab

Historic Adak Registration Area (Area R): has as its eastern boundary 171° W long., as its western boundary the U.S.–Russia Maritime Boundary Line of 1990, and as its northern boundary 55°30’ N lat.
Historic Dutch Harbor Registration Area (Area O): has as its northern boundary the latitude of Cape Sarichef (54°36’ N lat.), and its eastern boundary the longitude of Scotch Cap Light (166°44.72’ W long.), and as its western boundary 171° W long.

Appendix F Research Needs

Although research needs are expressed in this appendix to the Fishery Management Plan (FMP), ongoing research and research needs are constantly being updated. It may therefore be useful to the reader to access other sources in order to obtain the North Pacific Fishery Management Council (Council)'s most current description of research and research needs on BS/AI crab fisheries. A complete discussion of up-to-date sources is included in Section 6 of the FMP. In particular, the Council's Science and Statistical Committee regularly updates the Council research needs, and these can be found on the Council's website. Additionally, ongoing research by National Marine Fisheries Service (NMFS)'s Alaska Fisheries Science Center (AFSC) is also accessible through their website. Website addresses are in Section 6.

The FMP management policy identifies several research programs that the Council would like to encourage. The Council relies on its Scientific and Statistical Committee (SSC) to assist the Council in interpreting biological, sociological, and economic information. The SSC also plays an important role in providing the Council with recommendations regarding research direction and priorities based on identified data gaps and research needs.

Management Policy Research Programs

The management objectives of the FMP (see Section 2.2) include several objectives that provide overarching guidance as to research programs that the Council would like to encourage.

1. Biological Conservation Objective. Ensure the long-term reproductive viability of king and Tanner crab populations.
2. Economic and Social Objective. Maximize economic and social benefits to the nation over time.
3. Gear Conflict Objective. Minimize gear conflict among fisheries.
4. Habitat Objective. Preserve the quality and extent of suitable habitat.
5. Vessel Safety Objective. Provide public access to the regulatory process for vessel safety considerations.
6. Due Process Objective. Ensure that access to the regulatory process and opportunity for redress are available to interested parties.
7. Research and Management Objective. Provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions.

Other objectives in the management policy also contain research elements without which they cannot be achieved. Research initiatives that would support other FMP management objectives are discussed in Section H.1.2 below.

Council Research Priorities

The Magnuson-Stevens Fishery Conservation and Management Act (MSA) requires that regional fishery management councils develop "multi-year research priorities for fisheries, fisheries interactions, habitats, and other areas of research that are necessary for management purposes" (16 U.S.C. 1852(h)(7)). This includes research to support fishery management plans and associated regulations for fisheries requiring conservation and management to prevent overfishing, rebuild depleted fish stocks, and ensure sustainable fishing practices. Research priorities should be established and updated as necessary.

At its April 2021 meeting, the SSC reviewed the list of research priorities as developed by the Council's BS/AI Crab Plan Team, and contributed to the ongoing research priorities for crabs in the BS/AI. The regional database is frequently updated based on plan team/SSC and Council input. Research projects are classified among four priority categories. Projects classified as "Critical Ongoing Monitoring" either (1)

provide an essential management function; (2) cannot be achieved through other means; or (3) are required by regulation. These essential projects include the surveys that provide fishery independent data to stock assessments, among other things. Urgent projects are similarly essential to the fulfillment of the Council's mission and obligations but are time-limited in duration. Important and Strategic projects are associated with less pressing Council concerns. Research priorities designated as Critical Ongoing Monitoring are of the highest priority level for the Council. These monitoring activities create and maintain indispensable data that substantially contribute to the understanding and management of fish populations, fisheries, and the communities dependent upon those fisheries.

The Council's Top Ten List for 2022-2024 is given below and is also provided in the attached table along with the Council's rationale for selecting these projects. Projects in the table are listed in chronological order – the Council did not assign differential ranks to projects within the top ten. NPFMC Top Ten Research Priorities for 2022-2024

1. Spatial distribution and movement of crabs relative to life history events and fishing.
2. Conduct routine fish, crab, and oceanographic surveys in the Arctic Ocean.
3. Develop a framework and collect economic information.
4. Develop stock-specific ecosystem indicators and incorporate into stock assessments.
5. Cooperative research efforts to supplement existing at-sea surveys that provide seasonal, species specific information on upper trophic levels.
6. Develop tools for analyzing coastal community vulnerability to fisheries management changes.
7. Maturity estimates for Bering Sea and Aleutian Island crab stocks.
8. Collection of socio-economic information.
9. Gap Analyses on loss of biological samples due to implementation of Electronic Monitoring.
10. Norton Sound Red King Crab case study.

Curation of Council research priorities is done within a publicly accessible online database (https://research.psmfc.org/) that includes a query tool and report generating functional.