Responsible Fishery Management (RFM)

U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries

Full Assessment Report

Certification Body (CB):	Global Trust Certification
Assessment team:	Ivan Mateo, Lead Assessor Wes Toller, Assessor Gerald P. Ennis, Assessor
Fishery client:	Bering Sea Crab Client Group
Assessment Type:	2nd Re-assessment
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Foreword

The Responsible Fisheries Management (RFM) Certification program is a third-party sustainable seafood certification program for wild capture fisheries owned by the Certified Seafood Collaborative (CSC), a 501(c)(3) non-profit foundation led by a diverse board of seafood and sustainability industry experts.

The program was previously owned by the Alaska Seafood Marketing Institute (ASMI) when it was known as the Alaska RFM program but when ownership passed to the CSC in July 2020 scope of the program was expanded to include other North American fisheries outside the State of Alaska.

The Responsible Fisheries Management (RFM) Standard is composed of Conformance Criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO. Further information on the RFM program may be found at: https://www.alaskaseafood.org/rfm-certification/

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2 Glossary

Acronym	Full Name
AAC	Alaska Administrative Code
ABC	Allowable Biological Catch
ADFG	Alaska Department of Fish and Game
AFA	American Fisheries Act
AFSC	Alaska Fisheries Science Center
ASMI	Alaska Seafood Marketing Institute
BOF	Board of Fisheries
BSAI	Bering Sea and Aleutian Islands
BSFRF	Bering Sea Fisheries Research Foundation
CCRF	Code of Conduct for Responsible Fisheries
CDQ	Community Development Quota
CFEC	Commercial Fisheries Entry Commission
CFR	Code of Federal Regulations
CPT	Crab Plan Team
CPUE	Catch per Unit Effort
EIS	Environmental Impact Statement
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESP	Ecosystem and Socioeconomic Profile
FAO	Food and Agriculture Organization of the United Nations
FEP	Fishery Ecosystem Plan
FMP	Fishery Management Plan
GOA	Gulf of Alaska
GHL	Guideline Harvest Level
IFQ	Individual Fishing Quota
IPHC	International Pacific Halibut Commission
IRFA	Initial Regulatory Flexibility Analysis
IRIU	Improved Retention/Improved Utilization
LLP	License Limitation Program
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Fisheries Management and Conservation Act
MSE	Management Strategy Evaluation
mt	Metric tons
MSY	Maximum Sustainable Yield
NC	Non-conformity
NEPA	National Environmental Policy Act
nm	Nautical miles
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOV	Notice of Violation
NPFMC	North Pacific Fishery Management Council
OFL	Overfishing Level
OLE	Office for Law Enforcement
OY	Optimum Yield

Acronym	Full Name
PSC	Prohibited Species Catch
RACE	Resource Assessment and Conservation Engineering
REFM	Resource Ecology and Fisheries Management
RFM	Responsible Fisheries Management
SAFE	Stock Assessment and Fishery Evaluation (Report)
SSC	Scientific and Statistical Committee
SSL	Steller Sea Lion
TAC	Total Allowable Catch
USCG	U.S. Coast Guard

3 Executive Summary

Brief intro and description of assessment process.

The U.S. Alaska Bering Sea and Aleutian Islands King and Snow crab commercial fisheries [Bristol Bay Red King crab (*Paralithodes camtschaticus*), St. Matthew Island Blue King crab (*Paralithodes platypus*), Eastern Bering Sea Snow crab (*Chionoecetes opilio*), Eastern Bering Sea Tanner Crab (*Chionoecetes bairdi*), Aleutian Islands Golden King Crab (*Lithodes aequispinus*)] fishery was reassessed against the requirements of the AK-RFM Certification Program. The request for reassessment was made by Bering Sea Crab Client Group LLC, and was conducted by Global Trust Certification Ltd. The U.S. Alaska Bering Sea and Aleutian Islands King and Snow crab commercial fisheries was originally certified on 16th of April 2012, and recently certified on December 7th 2017.

This 2nd reassessment report documents the reassessment procedure for the continuing certification of U.S. Alaska Bering Sea and Aleutian Islands King and Snow crab commercial fisheries, to the Alaska RFM Certification Program. This is a voluntary program for Alaska fisheries and has been supported by ASMI who wish to provide an independent, third-party certification program that can be used to verify that Alaska fisheries are responsibly managed according to the FAO Code of Conduct for Responsible Fisheries.

The reassessment was conducted according to the Global Trust procedures for Alaska RFM Certification in accordance with EN45011/ISO/IEC Guide 65 accredited certification procedures. The reassessment is based on the criteria specified in the Alaska Responsible Fisheries Management (AKRFM) Standard Version 2.1. The Alaska RFM Standard is composed of conformance criteria based on the 1995 FAO Code of Conduct for Responsible Fisheries and the FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Marine Capture Fisheries adopted in 2005 and amended/extended in 2009; hereafter generally referred to as the FAO Criteria. The Standard also includes full reference to the 2011 FAO Guidelines for the Eco-labelling of Fish and Fishery Products from Inland Fisheries which in turn are now supported by a suite of guidelines and support documents published by the UN FAO.

The assessment is based on 4 major components of responsible management derived from the FAO Code of Conduct for Responsible Fisheries (1995) and Guidelines for the Eco-labelling of products from marine capture fisheries (2009); including:

A. **The Fisheries Management System**
B. **Science and Stock Assessment Activities, The Precautionary Approach**
C. **Management Measures, Implementation, Monitoring and Control**
D. **Serious Impacts of the Fishery on the Ecosystem**

These four major components are supported by 12 fundamental clauses (+ 1 in case of enhanced fisheries) that guide the AK RFM Certification Program surveillance assessment.

The reassessment process included a desktop review of relevant new documentary information including but not limited to: the most current fishery assessment and stock evaluation reports; Crab Plan team reports and meeting minutes; Council publications; relevant scientific publications; ecosystem status reports; fishery management plans and amendments thereof; changes to state and federal regulations; fishery enforcement statistics; environmental impact statements; marine mammal stock assessments; and strategic plans (see Section 10 - References for a more complete listing of documents reviewed).

The reassessment process also included substantive meetings with representatives from each of the key fishery management agencies charged with management of the BSAI King, Tanner and Snow Crab commercial fisheries.

Assessment team meetings included: North Pacific Fishery Management Council (NPFMC); Alaska Department of Fish & Game (ADFG); Alaska Fisheries Science Center (Alaska FSC); and NOAA National Marine Fisheries Alaska Regional Office (NOAA Regional). The assessment team also met with the Bering Sea Crab Client Group (BSCCR) – fishery client and certificate holder. Owing to constraints imposed by COVID-19, all meetings were held remotely via videoconferencing.

The Draft Report will also be available for comment by stakeholders who have registered interest with Global Trust during a 30-day period (http://www.GTCert.com).

A summary of the site meetings is presented in Section 5. Assessors included both externally contracted fishery experts and Global Trust internal staff (Appendix 1). Peer Reviewers were comprised of external contracted fisheries consultants

This report documents each step in the reassessment process and the recommendation to the Certification Committee of Global Trust who will preside over the certification decision according to the requirements of ISO/IEC Guide 65 accredited certification

Main strengths and weaknesses of the fishery.

Strengths	Weaknesses
• Well-defined reference points and harvest control rules are in place • Robust Habitat Management Strategy is demonstrated • Robust governance and policy are demonstrated.	• Saint Mathew Island Blue King Crab SSB is below Limit Reference Point • There are concerns about potential impact of Aleutian Islands Golden King Crab fishery on corals and other sensitive habitats (i.e., Sponges)

Recommendation of the Team with respect to Certification.

The Assessment Team recommends that the management system of the applicant fishery, U.S. Alaska Bering Sea and Aleutian Islands King, Tanner, and Snow crab commercial fisheries [Bristol Bay Red King crab (*Paralithodes camtschaticus*), St. Matthew Island Blue King crab (*Paralithodes platypus*), Eastern Bering Sea Tanner Crab (*Chionoecetes bairdi*), Aleutian Islands Golden King Crab (*Lithodes aequispinus*), and Eastern Bering Sea Snow crab (*Chionoecetes opilio*)] legally employing pot gear within Alaska jurisdiction (200 nautical miles EEZ) subject to a federal [National Marine Fisheries Service (NMFS)/North Pacific Fishery Management Council (NPFMC)] and state [Alaska Department of Fish and Game (ADFG) & Board of Fisheries (BOF)] joint management regime is certified against the FAO-Based Responsible Fisheries Management Certification Program

3.1 Assessment Team Details

The Assessment Team for this assessment was as follows; further details are provided in Appendix 1):

- Ivan Mateo – Lead Assessor, Responsible for Fundamental Clauses 1, 2, 3, 8, 9, 10, 11
- Wes Toller – Assessor 1, Responsible for Fundamental Clause 12
- Gerald P. Ennis – Assessor 2, Responsible for Fundamental Clauses 4, 5, 6, 7

3.2 Details of Applicable RFM Documents

This assessment was conducted according to the relevant program documents outlined in Table 1 below.

Table 1. Relevant RFM program documents including applicable versions

Document title	Version number, Issue Date	Usage
RFM Procedure 2: Application to Certification Procedures for the RFM Fishery Standard	Version 6, September 2020	Process
Responsible Fisheries Management Certification Program Fisheries Standard.	Version 2.1, September 2020	Standard
Responsible Fisheries Management Certification Program Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in North America	Version 2.1, January 2021	Guidance to Standard

4 Fishery Applicant Details

Table 2. Fishery Applicant details and key contact information.

Applicant Information		
Organization/Company Name:		Bering Sea Crab Client Group
Address:	Street:	23929 22ND Drive, SE, Bothell
	City:	Seattle
	State:	Washington
	Country:	United States of America
	Zip code	98199
Applicant Key Contact Information		
Name:		Scott Goodman
Position:		General manager
E-mail:		sgoodman@nrccorp.com

5 Units of Assessment and Proposed Units of Certification

5.1 Units of Assessment

The proposed Units of Assessment are as described in Table 3**Error! Reference source not found.** below.

Table 3. Units of Assessment details.

Unit of Assessment 1 (of 5)		
Species:	Common name:	Red King crab
	Latin name:	*Paralithodes camtschaticus*
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Stock(s):		Bristol Bay Red King crab
Management system:		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)
Fishing gear/method:		Baited pot/trap gears
All eligible fishery participants:		
Unit of Assessment 2 (of 5)		
Common name:		Snow crab
Latin name:		*Chionocetes opilio*
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Stock(s):		Eastern Bering Sea Snow crab
Management system:		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)
Fishing gear/method:		Baited pot/trap gears
All eligible fishery participants:		
Unit of Assessment 3(of 5)		
Common name:		Blue King crab
Latin name:		*Paralithodes platypus*
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Stock(s):		St. Matthew Island Blue King crab
Management system:		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)
Fishing gear/method:		Baited pot/trap gears
All eligible fishery participants:		
Unit of Assessment 4 (of 5)		
Common name:		Tanner Crab
Latin name:		*Chionoecetes bairdi*
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska

Stock(s):	Eastern Bering Sea Tanner Crab
Management system:	U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)
Fishing gear/method:	Baited pot/trap gears
All eligible fishery participants:	
Unit of Assessment 5 (of 5)	
Common name:	Golden King Crab
Latin name:	*Lithodes aequispinus*
Geographical area:	U.S. Federal and State waters off the U.S. State of Alaska
Stock(s):	Aleutian Islands Golden King crab
Management system:	U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)
Fishing gear/method:	Baited pot/trap gears
All eligible fishery participants:	

5.2 Potential Unit(s) of Certification

Based on the above Units of Assessment, the Units of Certification (i.e., what would be covered by any resulting certificate if the fishery is ultimately certified) are as described in Table 4 below.

Table 4. Proposed Units of Certification details.

Unit of Certification 1 (of 5)		
Species:	Common name:	Red King crab
	Latin name:	*Paralithodes camtschaticus*
Stock(s):		Bristol Bay Red King crab
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Fishing gear/method:		Baited pot/trap gears
Client group:		Bering Sea Crab Client Group LLC
Unit of Certification 2 (of 5)		
Species:	Common name:	Snow crab
	Latin name:	*Chionocetes opilio*
Stock(s):		Eastern Bering Sea Snow crab
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Fishing gear/method:		Baited pot/trap gears
Client group:		Bering Sea Crab Client Group LLC
Unit of Certification 3 (of 5)		
Species:	Common name:	Blue King crab
	Latin name:	*Paralithodes platypus*
Stock(s):		St. Matthew Island Blue King crab
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Fishing gear/method:		Baited pot/trap gears

Client group:		Bering Sea Crab Client Group LLC
Unit of Certification 4 (of 5)		
Species:	Common name:	Tanner Crab
	Latin name:	*Chionoecetes bairdi*
Stock(s):		Eastern Bering Sea Tanner crab
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Fishing gear/method:		Baited pot/trap gears
Client group:		Bering Sea Crab Client Group LLC
Unit of Certification 5 (of 5)		
Species:	Common name:	Golden King Crab
	Latin name:	*Lithodes aequispinus*
Stock(s):		Aleutian Islands Golden King crab
Geographical area:		U.S. Federal and State waters off the U.S. State of Alaska
Fishing gear/method:		Baited pot/trap gears
Client group:		Bering Sea Crab Client Group LLC
Management system: (All Units of Certification)		U.S. Federal and State fisheries within the Gulf of Alaska and the Bering Sea & Aleutian Islands managed by: - National Marine Fisheries Service (NMFS) - North Pacific Fishery Management Council (NPFMC) - Alaska Department of Fish and Game (ADFG) - Alaska Board of Fisheries (BOF)

6 Background to the Fishery

6.1 Species Biology

Golden King Crab (*Lithodes aequispinus*)

Golden, or brown, king crab (GKC) occur from the Japan Sea to the northern Bering Sea, around the Aleutian Islands, on various sea mounts, and as far south as northern British Columbia (Figure 1). In the Bering Sea and Aleutian Islands, they are found at depths from 200 m to 1,000 m, generally on high relief, rocky habitat where strong currents and abundant epifauna are prevalent[1].

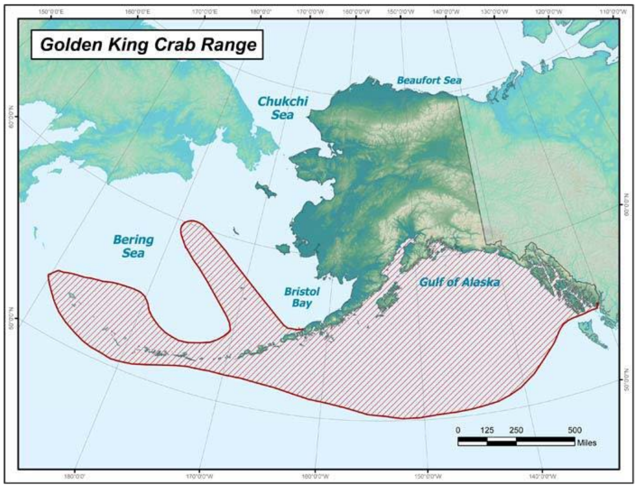

Figure 1. Golden King crab distribution in Alaska waters.

Size at sexual maturity varies with latitude, with crabs in the northern areas maturing at smaller sizes. In the St. Matthew Island area, males and females attain 50% maturity at 92 mm and 98 mm carapace length, respectively while in the eastern Aleutian Islands these sizes are 130 mm and 111 mm. Mature GKC 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 males are most abundant between 274 and 639 m, abundance of sub-legal males increases at depths >364 m and females are most abundant at intermediate depths between 274 and 364 m.

Females molt and mate year-round and brood their eggs for about 12 months. Spawning is asynchronous and aseasonal. Because larvae can develop without eating (lecithotrophic), eggs are larger with more yolk and fewer, typically between 10,000 and 30,000, than in other king crab species. The intermolt period for males' averages > 1 year, at 139 mm carapace length only about 50% molt annually.

The diet of GKC is mostly unknown but is likely similar to other king crab species. As opportunistic omnivores, they likely eat bivalves, sea stars, polychaete worms, sand dollars, crabs and other crustaceans, sponges, and sea urchins.

Tanner Crab (*Chionoecetes bairdi*)

Chionocoetes bairdi is one of five species in the genus Chionoecetes. The common name "Tanner crab" for *C. bairdi* was recently modified to "southern Tanner crab". Prior to this, the term "Tanner crab" had also been used to refer to other members of the genus, or the genus as a whole. Hereafter, the common name "Tanner crab" will be used in reference to "southern Tanner crab".

[1] http://www.adfg.alaska.gov/index.cfm?adfg=goldenkingcrab.main

Tanner crabs are found in continental shelf waters of the north Pacific. In the east, their range extends as far south as Oregon and in the west as far south as Hokkaido, Japan. The northern extent of their range is in the Bering Sea, where they are found along the Kamchatka Peninsula to the west and in Bristol Bay to the east[2].

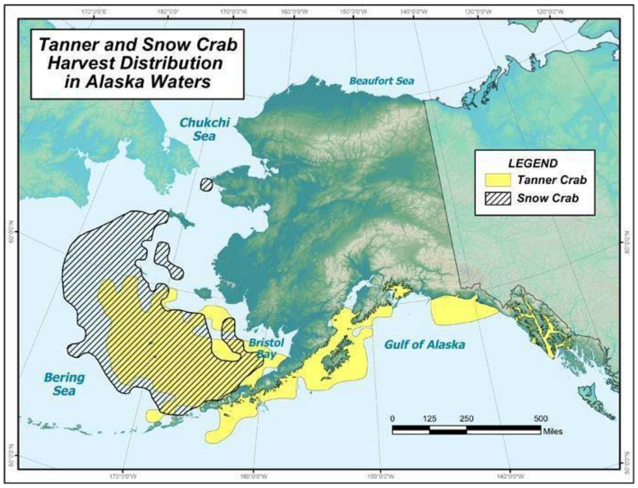

Figure 2. Tanner and snow crab distributions in Alaska waters.

In the eastern Bering Sea, the Tanner crab distribution may be limited by water temperature. *C. bairdi* is common in the southern half of Bristol Bay, around the Pribilof Islands, and along the shelf break, although males smaller than the industry-preferred size (>125 mm carapace width (CW)) and ovigerous and immature females of all sizes are distributed broadly from southern Bristol Bay northwest to St. Matthew Island. The southern range of the cold-water congener the snow crab, *C. opilio*, in the EBS is near the Pribilof Islands. The distributions of snow and Tanner crab overlap on the shelf from approximately 56° to 60°N, and in this area, the two species hybridize (Figure 2).

Although the State of Alaska's (SOA) harvest strategy and management controls for this stock are different east and west of 166° W, the unit stock of Tanner crab in the EBS appears to encompass both regions and comprises crab throughout the geographic range of the NMFS bottom trawl survey and for assessment, it is treated as a single unit.

Crabs grow through molting. Newly-molted crabs are soft-shelled and harden gradually. Growth in immature Tanner crab larger than 25 mm CW proceeds by a series of annual molts up to a final (terminal) molt to maturity. Females usually undergo their terminal molt from their last juvenile, or pubescent, instar while being grasped by a male. Subsequent mating takes place annually in a hard-shell state after the female's clutch of eggs has hatched. Fertile egg clutches can be produced in the absence of mating by using sperm stored in the spermathacae. Two or more consecutive egg fertilization events can follow a single copulation using stored sperm to self-fertilize the new clutch although egg viability decreases with time and age of the stored sperm.

In males, physiological maturity refers to the presence or absence of spermataphores in the gonads whereas morphometric maturity refers to the presence or absence of a large claw. During the terminal molt to morphometric maturity, there is a disproportionate increase in the size of the chelae in relation to the carapace. A consequence of the terminal molt in male Tanner crab is that a substantial portion of the population may never achieve legal size.

[2] http://www.adfg.alaska.gov/index.cfm?adfg=tannercrab.main

Differences have been observed between mating periods for pubescent and multiparous females in the Gulf of Alaska and Prince William Sound. There, pubescent molting and mating takes place over a protracted period from winter through early summer, whereas multiparous mating occurs over a relatively short period during mid-April to early June. Egg condition for multiparous females in the EBS observed between April and July also suggest that hatching of old and extrusion of new clutches began in April and ended in mid-June.

A variety of factors affect fecundity, female size being the most important. For females 75 to 124 mm CW fecundity ranges from 89 to 424 x 103 eggs. Primiparous females are only about 70% as fecund as multiparous females of the same size. From data collected in the NMFS bottom trawl survey, size at 50% maturity for females (all shell classes combined) has been estimated at 68.8 mm CW and for males (all shell classes combined) at 91.9 mm CW.

Snow Crab (*Chionoecetes opilio*)
Snow crab 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 about 200 meters (Figure 2). In the Bering Sea, smaller crabs tend to occupy more inshore northern regions and mature crabs inhabit deeper areas to the south of the juveniles. The eastern Bering Sea population within U.S. waters is managed as a single stock, however, distribution of the population may extend into Russian waters to an unknown degree. Snow crab are found on soft bottoms at depths of 60-400 m where temperature remains below 5°C.

Maturity is attained at about 5-6 years. There is a large size disparity between the sexes. Maximum size is about 95 mm carapace width (CW) in females and 160 mm in males. Males and females undergo a terminal molt to maturity. In females this molt occurs while being grasped by a mature male and they mate for the first time while in soft shell condition – these females are referred to as primiparous. Subsequent mating of multiparous females takes place annually in a hard-shell state after the female's clutch of old eggs has hatched. Fertile egg clutches can be produced in the absence of mating by using sperm stored in the spermathecae. Two or more consecutive egg fertilization events can follow a single copulation using stored sperm to self-fertilize the new clutch, although egg viability decreases with time and age of the stored sperm.

In males, physiological maturity refers to the presence or absence of spermatophores in the gonads whereas morphometric maturity refers to the presence or absence of a large claw. During the terminal molt to morphometric maturity, there is a disproportionate increase in the size of the chelae in relation to the carapace. Morphometrically mature males readily copulate, however, morphometrically immature, or juvenile, males that have not undergone terminal molt can have fully formed spermatophores in their vas deferens and can mate with both primiparous and multiparous females. A consequence of the terminal molt in males is that a substantial portion of the population may never achieve legal size.

Snow crab mate in late winter to early spring. Females carry between 6000 and 140,000 eggs. Hatching occurs during April to June in the year following mating. Hatching usually coincides with peak of the spring plankton bloom, resulting in high availability of food for the larvae. The free-swimming larvae molt and grow through several distinct stages over a 2-month period before settlement.

Snow crab diet changes with life stage. Larvae feed primarily on phytoplankton. Juveniles and adults are opportunistic omnivores and will eat almost anything. Major components of their diet include bivalves, polychaete worms, gastropods, crabs (including other snow crab), shrimp, and fish. In turn, they are consumed by a wide variety of predators, including groundfish, bearded seals, Pacific cod, halibut or other flatfish, eelpouts, sculpins, and many skate species.

Red King Crab (*Paralithodes camtschaticus*)

Red king crab inhabit intertidal waters to depths >200 m of the North Pacific Ocean from British Columbia to the Bering Sea, and south to Hokkaido, Japan, and are found in several areas of the Aleutian Islands, eastern Bering Sea, and the Gulf of Alaska[3] (Figure 3).

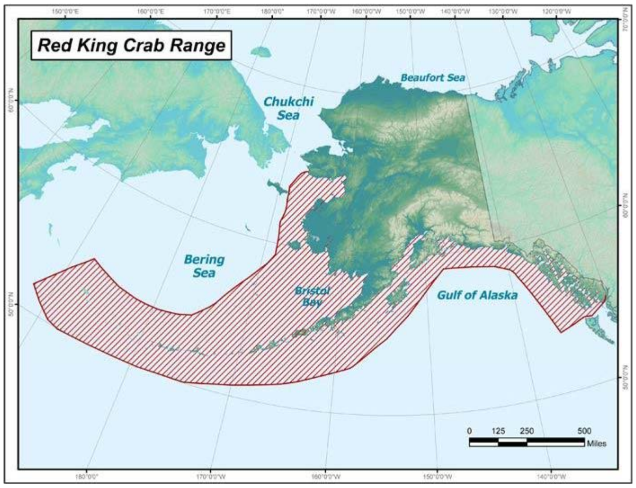

Figure 3. Red king crab distribution in Alaska waters.

Red king crabs are a species of large crab that appear dark red or burgundy in color. They are closely related to the blue king crab (*Paralithodes platypus*) and the golden (brown) king crab (*Lithodes aequispinus*). Juveniles molt multiple times per year until age 3 or 4, thereafter, molting continues annually in females for life and in males until attaining functional maturity, after which molt frequency declines. Male red king crabs can grow to very large sizes with carapace lengths up to 11 inches and a five-foot leg span. Both sexes reach sexual maturity at 5–12 years of age, may live >20 years and attain maximum sizes of 227 mm carapace length (CL) in males and 195 mm CL in females. Adult females must molt in order to mate but males do not.

Primiparous females mate a few weeks earlier in the spring than multiparous females. The eggs are extruded and carried externally for about 11 months and hatched during April-June the following year. Fecundity ranges from several tens of thousands to a few hundreds of thousands depending on female size. Adults undertake shallow to deep annual migrations. They move to shallow water in late winter and by spring the hatching of old eggs occurs. Adult females and some adult males molt and mate before moving back to deeper water to feed and where they tend to segregate. In the Kodiak area, adult males have been known to migrate up to 100 miles round-trip annually, moving at times as fast as a mile per day.

Red king crab diet varies with crab size and depth inhabited. Larval crab consume phytoplankton and zooplankton, juveniles feed on diatoms, protozoa, hydroids, crab, and other benthic organisms while adults prey on an assortment of worms, clams, mussels, snails, brittle stars, sea stars, sea urchin, sand dollars, barnacle, fish and algae. King crabs fall prey to a wide variety of species, including Pacific cod, rock sole, yellowfin sole, pollock, octopus and other king crab.

[3] http://www.adfg.alaska.gov/index.cfm?adfg=redkingcrab.main

Blue King Crab (*Paralithodes platypus*)
Blue king crab range throughout the North Pacific Ocean from Hokkaido, Japan to southeastern Alaska. Their distribution is discontinuous (Figure 4). In the eastern Bering Sea small populations are distributed around St. Matthew Island, the Pribilof Islands, St. Lawrence Island, and Nunivak Island. Isolated populations also exist in some other cold-water areas of the Gulf of Alaska[4].

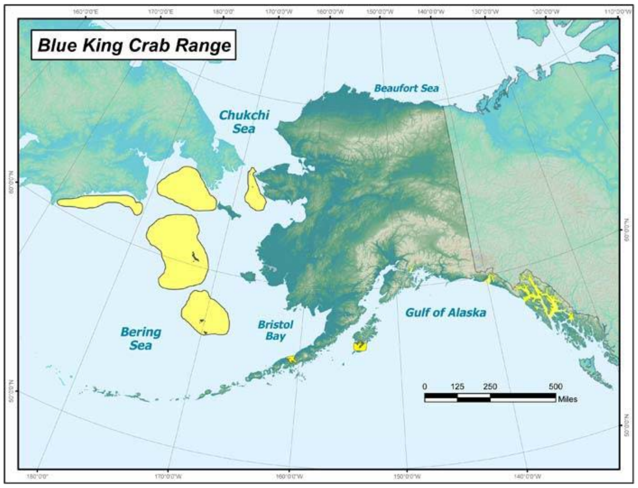

Figure 4. Blue king crab distribution in Alaska waters.

Like the red king crab, the blue king crab is considered a shallow water species by comparison with other lithodids such as golden king crab, *Lithodes aequispinus*, and the scarlet king crab, *Lithodes couesi*. Adults undergo an annual deep to shallow water migration. They move to shallow water in late winter and, after hatching of old eggs in spring, the females and some males molt and mate before moving back to deeper water where they feed and tend to segregate by sex. Adult males are found at an average depth of 70 m.

Unlike red king crab, juvenile blue king crab do not form pods, but instead rely on cryptic coloration for protection from predators and require suitable habitat such as cobble and shell hash. They molt frequently as juveniles, growing a few millimeters in size with each molt. They reach sexual maturity at 5-6 years of age. In the St. Matthew Island population, spermatophores are present in the vas deferens of 50% of males at sizes of 40-49 mm CL and in 100% of the males > 100 mm CL. Although spermatophore presence indicates physiological sexual maturity, it may not be an indicator of functional sexual maturity. For management purposes, 105 mm CL is used to define the lower bound of functional maturity in males. The reproductive cycle appears to be annual for the first two reproductive cycles and biennial thereafter. Longevity is unknown but estimates indicate this species may live 20 to 30 years.

Females release an average of 110,000 larvae over a 29-day period in late March through mid-April. The larval period lasts for 2.5 to 4 months and, following metamorphosis, settlement occurs during July through early September.

Food eaten by king crabs varies by species, size, and depth inhabited. They are omnivorous and their diet includes worms, clams, mussels, snails, brittle stars, sea stars, sea urchins, sand dollars, barnacles, crabs, other crustaceans, fish parts, sponges, and algae. They are preyed upon by a wide variety of organisms including Pacific cod, sculpins, halibut, yellowfin sole, octopuses, other king crabs, and sea otters.

[4] http://www.adfg.alaska.gov/index.cfm?adfg=bluekingcrab.main

The foregoing summaries of species biology have been adapted from several sources, primarily the stock assessment documents included in SAFE 2020[5] and the species factsheets found at the links provided.

6.2 Fishery Location and Method

Management Area

The Fishery Management Plan (FMP)[6] for BSAI king and Tanner crabs 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 Bering Sea and Aleutian Islands area (BSAI), 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. Each of the five stocks under assessment here is managed under the FMP for BSAI king and Tanner crabs.

The BSAI area is defined in the FMP as those waters of the EEZ lying south of the Chukchi Sea statistical area as described in the coordinates to Figure 1 to 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 (164E44'36"W. longitude). The 1988 agreement between the two parties shifted the boundary westward from the convention line of 1867. Boundaries of the BSAI management area are shown in below.

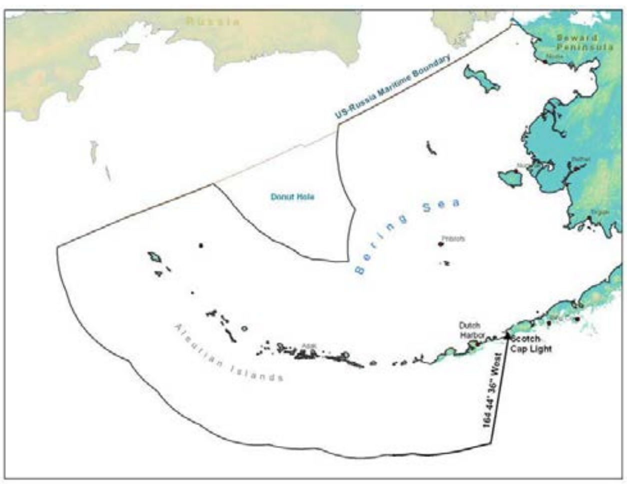

Figure 5. The Bering Sea and Aleutian Islands (BSAI) management area.

Stock Structure – Bristol Bay Red King Crab

Genetically, it is possible to distinguish between populations of red king crab in Alaska. This was demonstrated in 1989 with work completed by the ADF&G's Gene Conservation Lab[7]. The technique used determined the genetic relationships of reproductively isolated stocks, thereby contributing to optimal management of any self-recruiting stocks. The lab examined collections of red king crab from thirteen localities in Southeast Alaska, the Aleutian Islands, and the eastern Bering Sea. The eastern Bering Sea collections from Bristol Bay and Norton Sound were very different from all other collections. Further, southeast Alaska collections appear to form a stock unit discrete from the Kenai, Alaska Peninsula, and Aleutian collections. The State of Alaska divides the Aleutian Islands and eastern Bering Sea into three management registration areas to manage RKC fisheries: Aleutian Islands, Bristol

[5] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/
[6] https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf
[7] https://www.adfg.alaska.gov/index.cfm?adfg=fishinggeneconservationlab.main

Bay, and Bering Sea. The Aleutian Islands area covers two stocks, Adak and Dutch Harbor, and the Bering Sea area contains two other stocks, the Pribilof Islands and Norton Sound. The largest stock is found in the Bristol Bay area, which includes all waters north of the latitude of Cape Sarichef (54° 36' N lat.), east of 168° 00' W long., and south of the latitude of Cape Newenham (58° 39' N lat.). Grant *et al*. (2014) recently reviewed the phylogeography and population genetics of red king crab, providing a synopsis of our current understanding of population structure of this species in the North Pacific.

Stock Structure – St. Matthew Blue King Crab

Two discrete stocks of blue king crab are actively managed in the BSAI region: the Pribilof Islands and St. Matthew Island stocks. Other smaller populations of blue king crab are found in the vicinity of St. Lawrence Island and Nunivak Island, as well as isolated populations in the Gulf of Alaska. Blue king crab stocks are managed separately to accommodate different life histories and fishery characteristics.

The ADF&G Gene Conservation Laboratory has detected regional population differences between blue king crab collected from St. Matthew Island and the Pribilof Islands. NMFS tag-return data from studies on blue king crab in the Pribilof Islands and St. Matthew Island support the idea that legal-sized males do not migrate between the two areas (Otto and Cummiskey, 1990). St. Matthew Island blue king crab tend to be smaller than their Pribilof conspecifics, and the two stocks are managed separately, with legal sizes of 5.5 in carapace width (CW) in the St. Matthew Island Section and 6.5 in CW in the Pribilof District.

Stock Structure – EBS Snow Crab

Little is known about *C. opilio* genetic population structure within the Pacific/Arctic range of the species. The Eastern Bering Sea stock is managed as a single unstructured (random-mating) population. The goal of current research is to better define population structure by using microsatellite analysis techniques. Genetic analysis of approximately 600 specimens from numerous locations throughout their range was conducted and results are currently being combined with ecological knowledge of the stock to identify whether or not distinct population subunits occur. Snow crab have a long larval dispersal phase lasting from approximately 2-4 months, which would support the hypothesis of a large degree of genetic mixing; however, areas of potential larval retention have recently been hypothesized which may support population divergence. Deciphering population structure throughout the highly exploited Bering Sea populations is not only important for proper management of the current fishery, but for areas of the arctic which are "downstream" and may see fishing pressures in the future.

Research conducted by the ADF&G Gene Conservation Lab found low levels of geographic differentiation among populations of *C. bairdi* and *C. opilio*, and data suggest that subpopulations of *C. bairdi* exist within the Bering Sea. Further, evidence of gene introgression was found between *C. bairdi* and *C. opilio* in the Bering Sea. The lab also included a geographic isolate, North Atlantic *C. opilio*, in the analyses. Little differentiation was found, and no private alleles were detected in North Atlantic *C. opilio* despite significant geographic separation from Alaskan *C. opilio* (see Merkouris *et al*., 1998).

Parada *et al*. (2010) used biophysical modelling to develop a new hypothesis for the spatial dynamics of the Bering Sea snow crab population: the mature snow crabs which are sampled in the surveys for stock assessment purposes do not move outside US waters, rather they remain within the EBS shelf up to depths of 200 m and are generally found between isobaths of 50 m (juveniles) and 200 m (mature adults). Ontogenic migration carries snow crab south from a northerly direction within the EBS shelf. Results from simulations provided objective criteria to bound the region of interest for modelling the snow-crab population of the EBS. Lack of (i) southward transport along the middle and outer domains, (ii) eastward transport into Bristol Bay, and (iii) westward transport off the outer domain effectively leaves IBM areas 9, 10, and 11 (*i.e.*, southern- and westernmost areas of the Bering Sea) out of the geographic region of interest.

Stock Structure – EBS Tanner Crab

The Crab FMP identifies a single stock of Tanner crab, *C. bairdi*, within the eastern Bering Sea and these are considered to be a separate stock distinct from Tanner crabs in the eastern and western Aleutian Islands. Although the State of Alaska's (SOA) harvest strategy and management controls for this stock are different east and west of 166° W, the unit stock of Tanner crab in the EBS appears to encompass both regions and comprises crab throughout the geographic range of the NMFS bottom trawl survey. Simulated patterns of larval dispersal suggest that Tanner crab in Bristol Bay may be somewhat isolated from other areas on the shelf, and that this component of the stock relies heavily on local retention of larvae for recruitment, suggesting that Tanner crab on the shelf may exist as a metapopulation of weakly-connected sub-stocks (Richar *et al*., 2015). However, recent genetic analysis has failed to distinguish multiple non-intermixing, non-interbreeding sub-stocks on the EBS shelf (Johnson, 2019), suggesting that Tanner crab in the EBS form a single unit stock.

Stock Structure – Aleutian Islands Golden King Crab

Several discrete stocks of golden king crab are thought to exist in the BSAI region. Until 1996, the Aleutian Islands GKC stock was separated into two management areas, Adak and Dutch Harbor. The entire area is now managed as one area; Dutch Harbor Area O. Based on historic landing data, two golden crab stocks have been identified and are managed as the Sequam and Adak stocks separated at 174° W longitude. They are also referred to as eastern Aleutian golden (EAG) and western Aleutian golden (WAG) stocks.

Given the expansiveness of the Aleutian Islands Area and the existence of deep (>1,000 m) canyons between some islands, at least some weak structuring of the stock within the area would be expected. Data for making inferences on stock structure of golden king crab within the Aleutian Islands are largely limited to the geographic distribution of commercial fishery catch and effort. Catch data by statistical area from fish tickets and catch data by location from pots sampled by observers suggest that habitat for legal-sized males may be continuous throughout the waters adjacent to the islands in the Aleutian chain. However, regions of low fishery catch suggest that availability of suitable habitat, in which golden king crab are present at only low densities, may vary longitudinally. Catch has been low in the fishery in the area between 174° W longitude and 176° W longitude (the Adak Island area) in comparison to adjacent areas. In addition to longitudinal variation in GKC density, there is also a gap in fishery catch and effort between the Petrel Bank-Petrel Spur area and the Bowers Bank area.

Recoveries of tagged golden king crab provide no evidence of substantial movements by crab in males and females ≥ 90 mm carapace length. Maximum straight-line distance between release and recovery location of 90 golden king crab released prior to the 1991/92 fishery and recovered through the 1992/93 fishery was 61.2 km.

Of 4,567 recoveries reported through 12 April 2016 for the male and female golden king crab tagged and released between 170.5° W longitude and 171.5° W longitude during 1991 to 2006 pot surveys, none of the 3,807 with recovery locations specified by latitude and longitude were recovered west of 173° W longitude and only fifteen were recovered west of 172° W longitude. Similarly, of 139 recoveries in which only the statistical area of recovery was reported, none were recovered in statistical areas west of 173° W longitude and only one was in a statistical area west of 172° W longitude. The foregoing is summarized from the 2020 AIGKC SAFE.

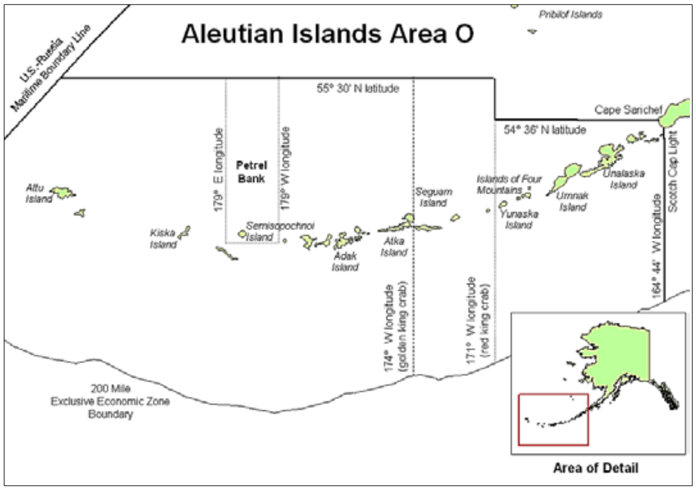

Figure 6. Aleutian Islands Management Area O and its subdivisions**.**

Fishing Method

The five king and Tanner crab stocks under consideration here are harvested using twine or wire meshed steel pots (traps)[8]. The Federal BSAI Crab FMP authorizes the use of pot gear (and ring nets, although not used) to harvest the crab resources. Trawls and tangle nets are specifically prohibited because of the high mortality rates which they inflict on non-legal crab. Title 5 of Fish and Game, Chapter 34 and 35 of the Alaska Administrative Code (5 AAC 34 and 35) specify "lawful gear" (*i.e*., size, dimension, internal structure, *etc.*) for king and tanner crab respectively[9]. Mesh sizes are specified to allow escapement of sublegal-sized crabs and females. The pots must have escape rings located on the sides of the pots to aid in the escape of smaller crabs.

In addition, regulation 5 AAC 39.145 Escape Mechanism for Shellfish and Bottomfish Pots[10] was put in place to limit the potential for ghost fishing and the needless death of crabs and other animals. This regulation stipulates, in part, that crab pots must contain an appropriately located opening at least 18 in long that is then "laced, sewn, or secured together by a single length of untreated, 100 percent cotton twine, no larger than 30 thread," which may be knotted only at the ends. If a pot becomes lost, the length of cotton twine will eventually decay through a process of biodegradation, permitting captured animals to escape. The regulation also allows for an alternative mechanism using a galvanic timed-release device designed to release within 30 days.

Pots are baited with herring or other fresh bait such as Pacific cod. Bait is placed within the trap, usually in a "bait bag," which is then secured to the trap so that it does not float away. Usually additional bait referred to as "hanging bait" is also attached to the inside of the pot. The bait attracts crabs, who circle around to partake of it. Most crab pots used in Alaskan waters have sides that do not collapse, but are designed to allow for a crab to climb in via doors and eat the bait. Once inside the cage, the design of the pot is such crab cannot climb back out. There are several configurations for the pots, though in general, the smaller round pots are fished for Dungeness in shallow bays and estuaries, and the large, heavy, rectangular pots are fished in waters deeper than 100 feet for king and Tanner crab in the Bering Sea. A conical pot has become almost the standard pot for the Tanner and snow crab fishery and is gaining more widespread usage in the king crab fishery in the Gulf of Alaska.

[8] https://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_king_tanner_crab.pdf
[9] http://www.touchngo.com/lglcntr/akstats/aac/title05.htm
[10] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section145.htm

Pot soak time is variable and depends on a number of factors including the fishery and species targeted. Typically, pots are soaked for one or more days however in the Aleutian Islands GKC fishery soak times may exceed 20 days. Once aboard, a pot is opened and the catch is sorted. Females, and undersized males are discarded alive down inclined ramps over the side and legal-sized males are retained in aerated seawater tanks (live-holds). The inclined ramps prevent the crabs from receiving damage that would have occurred if the crabs had fallen and impacted the water.

Crab boats in the Bering Sea are usually 100 feet or more in length. When heading to a fishing ground, pots are usually stacked on the decks. In some situations, pots may be stored at sea in designated areas in an inactivated (*i.e.*, non-fishing) state with all doors fully open and with all bait containers removed (*e.g.*, 5 AAC 34.627[11]). Typically, catcher vessels deliver crab live to shore stations where they are cooked and then either canned or sold as fresh or frozen product. A lesser number of catcher-processor vessels also operate in the BSAI crab fisheries.

Single-Buoy Pots and Longline Pots

Four of the five fisheries under assessment here utilize a pot fishing method whereby a line extends from each pot to a surface buoy that marks its location (Figure 7). This single-buoyed pot arrangement is used exclusively in the Bristol Bay Red King crab fishery, St. Matthew Island blue king crab fishery, EBS Tanner crab fishery, and EBS snow crab fishery.

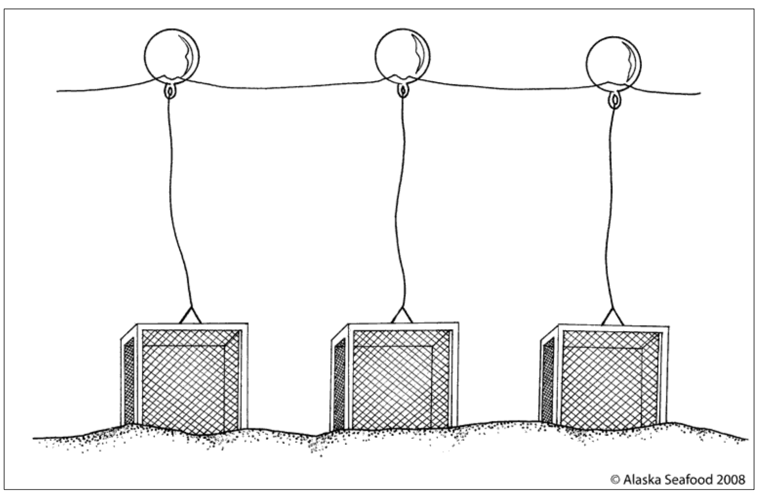

Figure 7. Single-buoy pot fishing method.

In the Aleutian Islands golden king crab fishery, pots are set attached to a longline (the "shellfish longline" method). Golden king crab inhabit depths greater than where other commercially exploited king crabs are typically found. In addition, strong currents are typical of the Aleutian Islands region. The depths and steep bottom topography in the inter-island passes inhabited by golden king crabs necessitates the use of longlined rather than single pot gear. The longline pot fishing method facilitates pot retrieval in high current areas and may reduce pot loss.

Use of longline pot gear for AIGKC is set forth in the Alaska Administrative Code 5 AAC 34.625 Lawful gear for Registration Area O[12]: (b) Pots used to take golden king crab (2) may be operated only from a shellfish longline; a buoy is not required for each pot, but each end of the longline must be marked by a cluster of four buoys; one

[11] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section627.htm
[12] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section625.htm

buoy in the cluster must be marked in accordance with 5 AAC 34.051 and have the initials "SL" to identify it as a shellfish longline; for purposes of this subsection "a shellfish longline" is a stationary, buoyed, and anchored line with at least 10 shellfish pots attached.

In the AIGKC fishery, vessels set 400 to 1,800 pots (700 pots each on average). Pots used in this fishery are constructed with a steel bar frame and covered with nylon mesh netting. A variety of pots sizes is used, largely depending on vessel size and area fished. Pots range from 5 feet by 5 feet by 32 inches high to 6 feet by 7 feet by 34 inches high. Pots are set in a string of 20 to 80 pots, each pot connected to the other by 80 to 100 fathoms of floating polypropylene line. Therefore, a single string may be 2 to 5 miles long. The ends of each string are marked with four buoys. Pots are baited with chopped herring or other bait placed in hanging bait bag in the center of the pot. The average soak time to allow maximum fishing is 10 to 23 days. Three to four pots may hang in the catenary as the gear is hauled up, with the vessel positioned directly above the pot that is next to leave the bottom.

6.3 Fishery Management History and Organization

NPFMC

The North Pacific Fishery Management Council (NPFMC) is one of eight regional councils established by the Magnuson-Stevens Fishery Conservation and Management Act [short Magnuson-Stevens Act (MSA)] in 1976 to oversee management of the nation's fisheries. Pursuant to the MSA, the Council has responsibility for preparing Fishery Management Plans (FMP) and amendments to FMPs for the conservation and management of fisheries in the Alaskan EEZ. 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.

The king and Tanner crab FMP attempts to avoid unnecessary duplication of effort and defers much of the management to the State (already managing crab resources throughout the BSAI prior to inception and implementation of the MSA), while the most controversial measures are fixed in the FMP and require Plan amendment to change. The management measures are ones that have been used in managing the king and Tanner crab fisheries of the BS/AI area and have evolved over the history of the fishery. Federal management oversight to determine if a management action is consistent with the FMP, the MSA, 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.

The FMP contains three types of management measures: (1) specific Federal management measures that require an FMP amendment to change (i.e., legal gear, permit requirements, federal observer requirements, limited access, essential fish habitats, habitat areas of particular concern), (2) framework type management measures, with criteria set out in the FMP that the State must follow when implementing changes in State regulations (*i.e.*, minimum size limits, guideline harvest levels, in-season adjustments, fishing seasons and areas, sex restrictions and pot limits, registration areas and closed waters) and (3) measures that are neither rigidly specified nor frame worked in the FMP, and which may be freely adopted or modified by the State (*i.e.*, reporting requirements, gear placement, removal and storage, gear modifications, vessel tank inspections, bycatch limits in crab fisheries, state observer requirements, *etc*.) subject to an appeals process or other Federal law.

A key feature of the Council is expertise provided by Plan Teams. The primary function of the Crab Plan Team (CPT) is to provide the Council with the best available scientific information, including scientifically based recommendations regarding appropriate measures for the conservation and management of the Bering Sea and Aleutian Islands (BS/AI) king and Tanner crab fisheries. The CPT is composed of scientists from ADF&G (HQ, Kodiak and Dutch Harbor), the AFSC (Kodiak and Seattle), NMFS/Regional Office, the NPFMC, and the universities: UAF, UBC and UW. The CPT normally meets 2 to 3 times a year.

NMFS

The NOAA National Marine Fisheries Service (NMFS) is responsible for the management, conservation, and protection of living marine resources within the US EEZ. The NMFS Alaska Regional Office oversees fisheries in federal waters (3-200 nm) that produce about half the fish caught in US waters, with responsibilities covering 842,000 square nautical miles off Alaska. NOAA's Alaska Fisheries Science Center (AFSC) conducts yearly trawl survey in the eastern Bering Sea (EBS) to determine the distribution and abundance of crab and groundfish resources. Surveys are conducted in three legs throughout the summer with two vessels dedicated to each leg. The EBS survey is augmented every year by the addition of special projects. The cumulative data collected during each annual survey help fisheries managers regulate commercial crab fishing activities.

NMFS and ADF&G use this information to determine the status of the stocks and to set the harvest levels. In addition to biological studies, stock survey and stock assessment reports, NMFS is charged with carrying out the federal mandates of the U.S. Department of Commerce with regard to commercial fisheries such as approving and implementing FMPs and FMP amendments recommended by the Council. The U.S. Coast Guard partners with the NMFS’s Office for Law Enforcement (OLE) and the State’s Alaska Wildlife Troopers (AWT) for effective monitoring, control and enforcement of crab fisheries regulations.

ADF&G

The Alaska Department of Fish and Game (ADF&G) has responsibility for developing the information upon which to base State fishing regulations, with continued assistance from NMFS. In carrying out this responsibility, ADF&G consults actively with the NMFS (Alaska Regional Office and Northwest and Alaska Fisheries Center), NOAA General Counsel, the Council’s 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. 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 authorized under State regulations.

An annual area management report to the Alaska Board of Fisheries (BOF) discussing current biological and economic status of the fisheries, GHL ranges, and support for different management decisions or changes in harvest strategies is prepared annually by ADF&G, with NMFS and Crab Plan Team input incorporated as appropriate. This report is available for public comment and presented to the Council on an annual basis. GHLs are revised whenever new information is available, and made available to the public. Federal enforcement agents (NOAA) and the U.S. Coast Guard (USCG) work effectively in cooperation with the State’s Alaska Wildlife Troopers to enforce king and Tanner crab regulations in the BS/AI area.

The annual cycle of management decision making for king and Tanner crab stocks and its interaction with fisheries and resources assessments is shown in Figure 8 below. Regulatory proposals are addressed every three years by the BOF. An overview of fishery management is shown in the organizational chart below (Figure 9).

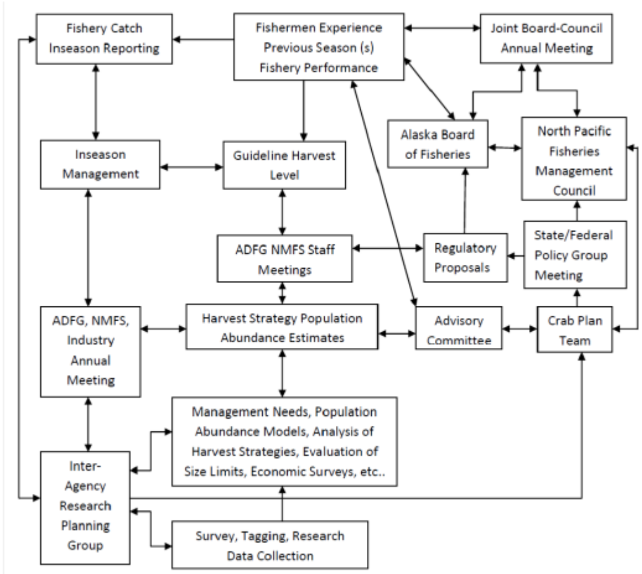

Figure 8. Annual cycle of management decision making for BSAI king and Tanner crab stocks (from BSAI crab FMP).

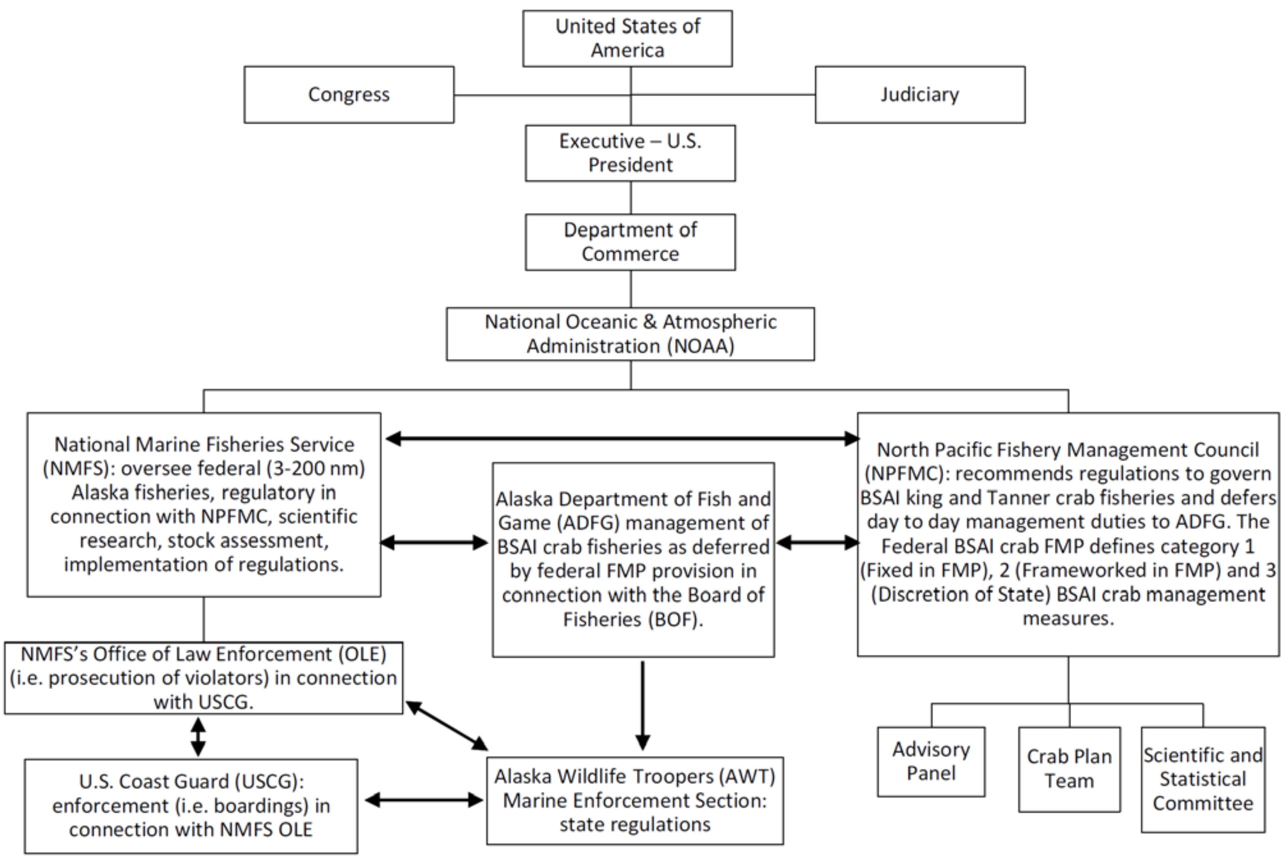

Figure 9. Fishery management organizational chart for BSAI king and Tanner crab fisheries.

6.4 Stock Assessment Activities

Surveys

NMFS has conducted an annual fishery-independent bottom trawl survey of the eastern Bering Sea since 1975 to collect data on the distribution and abundance of crab, groundfish, and other benthic resources in the region (Figure 10). This survey provides key fishery-independent indices of abundance/biomass, size/sex composition and shell condition used in assessments of four of the five BSAI stocks under consideration. The AI Golden King crab stock is not covered in this survey. Details of survey design/methods, crab biological sampling and results for the 2021 survey for each crab species are available at: https://www.afsc.noaa.gov/Documents/Temp-for-NOAA-IR/2021_EBS_Crab_SurveyTech_Memo_approved_draft.pdf.

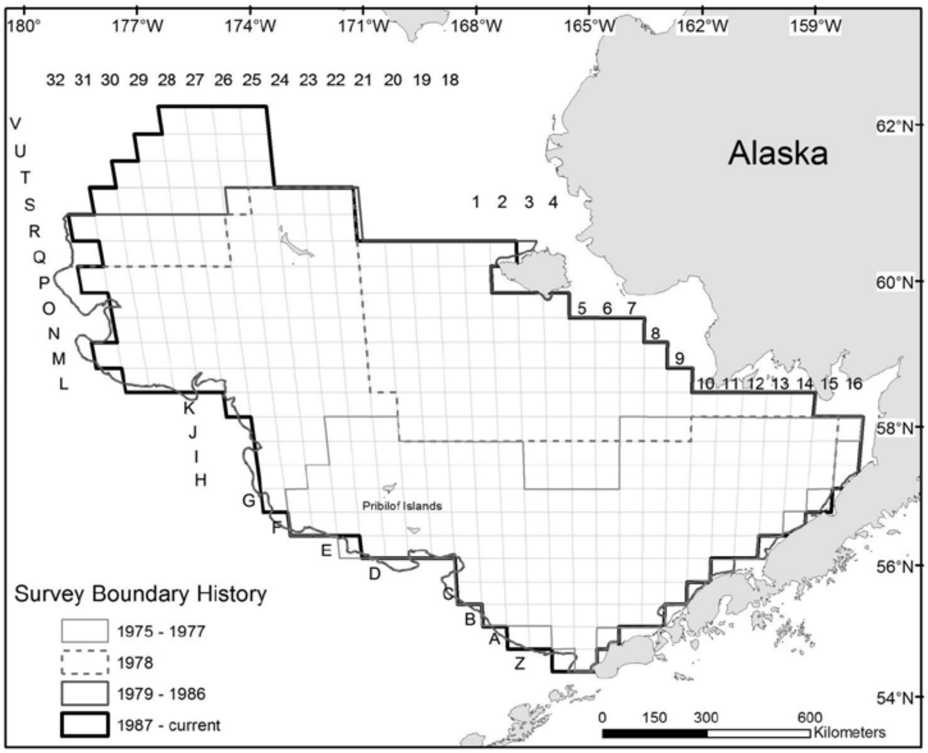

Figure 10. National Marine Fisheries Service eastern Bering Sea bottom trawl survey boundary from 1975 to present indicating four major stanzas in total coverage.

The Bering Sea Fisheries Research Foundation (BSFRF) has conducted supplementary surveys within the NOAA survey area. The location and extent of these has varied as goals changed but they generally include higher density sampling designed to address current stock assessment issues.

ADF&G conducted pot surveys in a limited area of the EAG (east of 174° W longitude) AI Golden King crab distribution in 1997, 2000, 2003 and 2006. This survey was too limited in geographic scope and too infrequent to provide a reliable index of AI GKC abundance. Starting in 2015, a cooperative effort by the Aleutian Islands King Crab Foundation (an industry group) and ADF&G established a consistent time series of pot surveys with increased spatial coverage. The EAG was surveyed in 2015 and 2016 during the eastern Aleutian Islands fishery but the survey planned for the WAG in 2016 did not go ahead. This survey has been conducted annually in EAG from 2015 and in WAG starting in 2018. ADF&G also conducts a triennial pot survey of the Bristol Bay red king crab which is also an important component of the data sets used in its stock assessment. ADF&G conducted triennial pot surveys in the Saint Matthew Island Section from 1995 to 2013, with a focus on the nearshore waters with bottom topography unsuitable to trawl surveys. From 2013 to 2018, in response to a request for more detailed information from the stock assessment authors, the survey was conducted on an annual basis (Nichols *et al.*, 2019).

Ecosystem and Socioeconomic Profiles

In 2018, when the stock was declared overfished, the Crab Plan Team requested an evaluation of ecosystem factors to inform the SMBKC stock rebuilding plan. An Ecosystem and Socioeconomic Profile (ESP) was prepared and appended to the 2019 SAFE. This ESP was updated and appended to the 2020 SAFE. A separate ESP was done for BBRKC and also appended to the 2020 SAFE.

These ESPs are based on a recently developed framework designed to test for potential ecosystem and socioeconomic drivers on a given stock (Fedewa *et al*., 2020a). The profile evaluates a broad suite of physical and biological as well as socioeconomic indicators. The first stage of the indicator analysis is a simple assessment of the most recent year relative value and a traffic-light evaluation of the most current year based on one standard deviation from the long-term mean of the time series. The second stage quantifies the association between hypothesized predictors and mature male biomass to assess the strength of support for each hypothesis. At present, these ESPs replace the ecosystem considerations section of stock-specific SAFE reports but have not been integrated into the assessment of stock status. Rather, they have contributed to risk evaluation in the management decision-making process for the SMBKC and BBRKC stocks. However, review of these ESPs highlighted a need for some way to aggregate ecosystem indicators into a score that could be estimated over time and compared to stock history.

One approach, developed in Morrison *et al.* (2015), assesses vulnerability to climate-related environmental change by quantifying a species' exposure and sensitivity to expected climate change. Vulnerability refers to a reduction in a species' productivity and/or abundance and the assessment provides a relative rank of vulnerability as well as information about why a species may or may not be vulnerable. The approach was applied to 36 Bering Sea fish and invertebrate stocks, including Bristol Bay and Norton Sound RKC, snow and Tanner crabs by Spencer *et al*. (2019). The 2020 ESP for BBRKC (Fedewa *et al.*, 2020b) follows a template for ESPs used in a paper by Shotwell *et al.* (Submitted), which introduces a framework for including stock-specific ecosystem and socioeconomic considerations within next generation stock assessments. This framework appears to offer an opportunity to address the need for some form of aggregated indicator scoring. Progress with its application to BSAI crab stocks should be monitored going forward.

Aleutian Islands Golden King Crab

Since 1996, the Alaska Department of Fish and Game (ADF&G) has divided management of the Aleutian Islands golden king crab fishery at 174° W longitude. 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. There is no direct evidence of separate golden king crab stock structure in the Aleutian Islands between areas west and east of 174° W longitude. However, given the expansiveness of the Aleutian Islands Area and the existence of deep (>1,000 m) canyons between some islands, at least some weak structuring of the stock within the area would be expected. Data for making inferences on stock structure of golden king crab within the Aleutian Islands are largely limited to the geographic distribution of commercial fishery catch and effort, which suggests that habitat for legal-sized males may be continuous throughout the waters adjacent to the islands in the Aleutian chain. However, regions of low fishery catch suggest that availability of suitable habitat, in which golden king crab are present at only low densities, may vary longitudinally.

During winter 2017 meetings, the CPT and SSC recommended using the Tier 3 method to compute OFL and ABC. A size-based assessment model was first used for setting OFL and ABC for the 2017/18 fishing season and has been since. Separate models are available for EAG and WAG hence, OFLs and ABCs by area are summed to calculate OFL and ABC for the entire stock. See the 2020 SAFE report for details of assessment methodology and evidence in supporting clause 6.3 for a summary of current stock status.

Eastern Bering Sea Tanner Crab

Tanner crabs in the EBS are considered to be a separate stock distinct from Tanner crabs in the eastern and western Aleutian Islands. Recent genetic analysis failed to distinguish multiple non-intermixing, non-interbreeding sub-stocks on the EBS shelf (Johnson, 2019), suggesting that Tanner crab in the EBS form a single unit stock. The unit stock is that defined across the geographic range of the EBS continental shelf and it is managed as a single unit.

The stock remained in Tier 3b for the 2020 assessment because the ratio of projected MMB to B_{MSY} is below 1. The model is a stage/size-based population dynamics model that incorporates sex (male, female), shell condition (new shell, old shell), and maturity (immature, mature) as different categories into which the overall stock is divided on a size-specific basis. It is described in detail in an appendix to the 2019 SAFE report. The model accepted for the 2019 assessment differed substantially from the 2017 and 2018 assessment models by: 1) adding a likelihood component to fit annual male maturity ogives determined from chela height-to-carapace width ratios in the NMFS survey; 2) eliminating fits to survey biomass and size composition data for male crab classified as mature/immature based on a maturity ogive determined outside the model; and 3) instead fitting to time series of undifferentiated male survey biomass, abundance, and size compositions. In addition, this scenario fit revised time series data for retained and total catch biomass since 1990/91 provided by ADF&G for the directed Tanner crab, snow crab and Bristol Bay red king crab fisheries. The model scenario 19.03 is the base model for the 2020 assessment. It represents the 2019 model with the addition of fishery data for 2019/20. See the 2020 SAFE report for details of assessment methodology and evidence in supporting clause 6.3 for a summary of current stock status.

Eastern Bering Sea Snow Crab

In the Bering Sea, snow crab populations are distributed widely over the shelf and are common at depths less than ~200 meters. Smaller crabs tend to occupy more inshore northern regions and mature crabs occupy deeper areas to the south. 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.

EBS snow crab is a Tier 3 stock so the OFL is determined by the F_{OFL} control rule using F35% as the proxy for F_{MSY}. The proxy for B_{MSY} is the mature male biomass at mating based on average recruitment over 1982 to 2018. The stock assessment is based on a size- and sex-structured model which tracks the number of crabs of each sex, shell condition, and maturity state. A terminal molt is included in which crab move from an immature to a mature state, after which no further molting occurs. The assessment author provided the CPT and SSC with a preliminary version of a model implemented using GMACS (General Model for Assessing Crustacean Stocks) in May 2020, and the CPT endorsed its use for the 2020 assessment. The assessment author developed GMACS further after the May 2020 CPT meeting to enable reference points to be calculated. See the 2020 SAFE report for details of assessment methodology and evidence in supporting clause 6.3 for a summary of current stock status.

Bristol Bay Red King Crab

Red king crab inhabit intertidal waters to depths >200 m and are found in several areas of the Aleutian Islands, eastern Bering Sea, and the Gulf of Alaska. The State of Alaska divides the Aleutian Islands and eastern Bering Sea into three management registration areas to manage RKC fisheries: Aleutian Islands, Bristol Bay, and Bering Sea. The Bristol Bay area includes all waters north of the latitude of Cape Sarichef (54°36' N lat.), east of 168°00' W long., and south of the latitude of Cape Newenham (58°39' N lat.) Red king crab in the Bristol Bay area are assumed to be a separate stock and the fishery in this area is managed separately from fisheries for RKC elsewhere.

Bristol Bay RKC is currently a Tier 3b stock for which estimated biological reference points include $B_{35\%}$ (proxy for B_{MSY}) and $F_{35\%}$ (proxy for F_{MSY}). Estimated model parameters are used to conduct mature male biomass-per-recruit analysis. The stock assessment is based on a sex- and size-structured population dynamics model which combines multiple sources of survey, catch, and bycatch data using a maximum likelihood approach to estimate abundance, recruitment, selectivities, catches, and bycatch of the commercial pot fisheries and groundfish trawl fisheries. Since 2019, GMACS has been used for assessments. See the 2020 SAFE report for details of assessment methodology, including a full model description, and evidence in supporting clause 6.3 for a summary of current stock status.

St. Matthew Island Blue King Crab

Two discrete stocks of blue king crab are actively managed in the BSAI region: the Pribilof Islands and St. Matthew Island stocks. Other smaller populations of blue king crab are found in the vicinity of St. Lawrence Island and Nunivak Island, as well as isolated populations in the Gulf of Alaska. Blue king crab stocks are managed separately to accommodate different life histories and fishery characteristics.

The SMBKC stock is currently managed as Tier 4, the overfishing level (OFL) is the total catch associated with the F_{OFL} fishing mortality. A B_{MSY} proxy is defined in terms of average MMB at time of mating. In 2016 the accepted SMBKC assessment model made use of the modeling framework GMACS encompassing a three-stage model structure. In that assessment, an effort was made to match the 2015 model to bridge a framework which provided greater flexibility and opportunity to evaluate model assumptions more fully. The 2020 assessment model again uses the modeling framework GMACS. See the 2020 SAFE report for details of assessment methodology, including a full model description, and evidence in supporting clause 6.3 for a summary of current stock status.

6.5 Historic Biomass and Removals in the Fishery

Aleutian Islands Golden King Crab

The first commercial landing of golden king crab in the Aleutian Islands was in 1975/76 but directed fishing did not occur until 1981/82. The 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. 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.

Retained catch peaked in 1986/87 at 2,686 t and 3,999 t, respectively, for EAG and WAG, but the retained catch dropped sharply from 1989/90 to 1990/91 (Figure 11 and Figure 12). Guideline Harvest Levels (GHLs) of 1,452 t for EAG and 1,225 t for WAG were introduced into management for the first time in 1996/97. The management specification changed from GHL to TAC (Total Allowable Catch) with adoption of the Crab Rationalization Program in 2005/06. TACs were increased to 1,501 t for EAG and 1,352 t for WAG beginning with the 2012/13 fishing season. A revised state harvest strategy was implemented in 2019 with TACs of 1,302 t for WAG and 1,955 t for EAG.

Catches have been steady under the GHL/TAC and the fishery has harvested close to allowable levels since 1996/97. In addition to the retained catch allotted as TAC, there was retained catch in a cost-recovery fishery towards a $300,000 goal in 2013/14 and 2014/15 to fund an onboard observer program, and towards a $500,000 goal in 2015/16 to 2019/20 in order to fund an onboard observer program and stock survey.

Total mortality of Aleutian Islands golden king crab includes retained catch in the directed fishery, mortality of discarded catch, and bycatch in fixed-gear and trawl groundfish fisheries, though bycatch in other fisheries is low compared to mortality in the directed fishery. Total retained catch in the post-rationalized fishery (2005/06–2019/20) has ranged from 2,498 t and total mortality ranged from 2,506 t to 3,693 t for the same period.

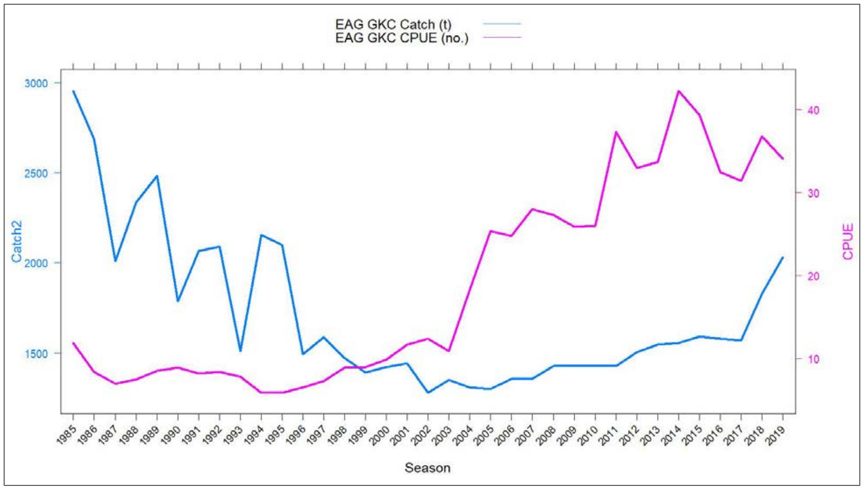

Figure 11. Historical commercial harvest (from fish tickets; metric tons) and catch-per-unit effort (CPUE, number of crabs per pot lift) of golden king crab in the EAG, 1985/86–2019/20 fisheries (note: 1985 refers to the 1985/86 fishing year).

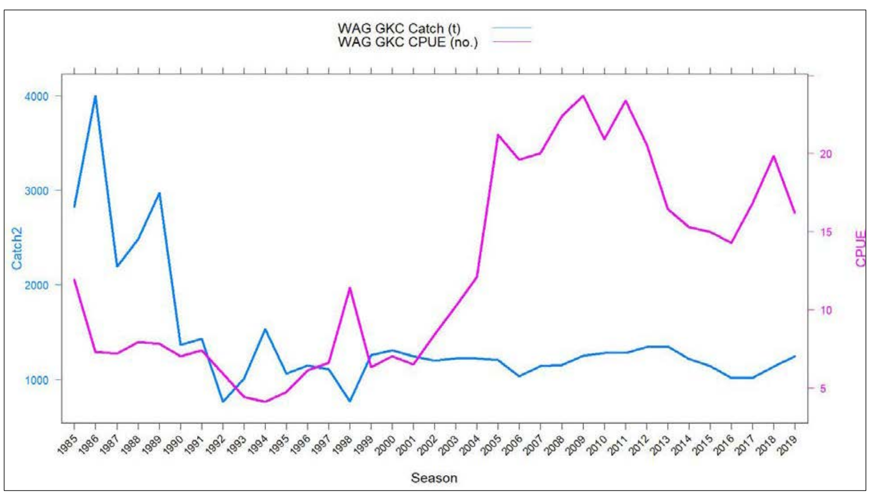

Figure 12. Historical commercial harvest (from fish tickets; metric tons) and catch-per-unit effort (CPUE, number of crabs per pot lift) of golden king crab in the WAG, 1985/86–2019/20 fisheries (note: 1985 refers to the 1985/86 fishing year).

Estimated mature male biomass (MMB) for EAG under all model scenarios decreased from the 1980s to the 1990s, then increased during the 2000s and sharply increased since 2014. Estimated MMB for WAG decreased during the late 1980s and 1990s, increased during the 2000s, decreased for several years since 2009 and has increased since 2014 (Figure 13).

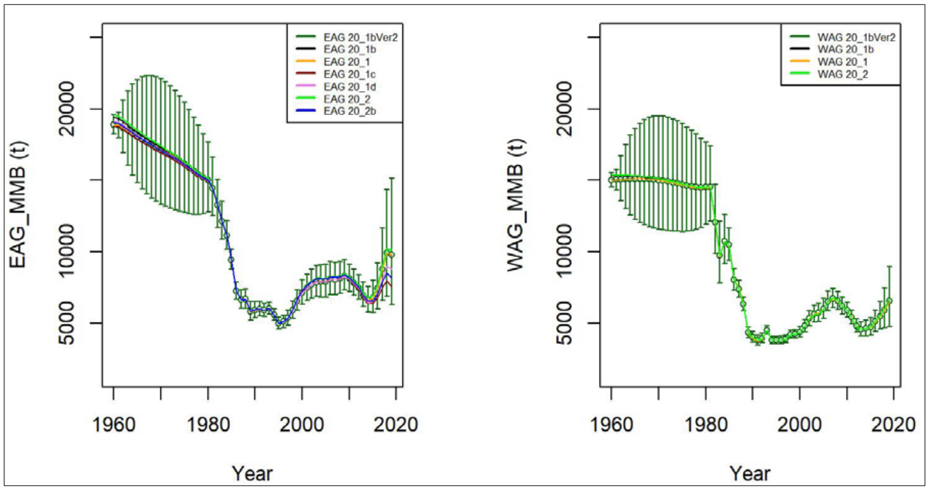

Figure 13. Trends in golden king crab mature male biomass for models 20_1, 20_1b, 20_1bVer2, 20_1c, 20_1d, 20_2, and 20_2b fits to EAG (left) and models 20_1, 20_1b, 20_1bVer2, and 20_2 fits to WAG (right) data, 1960/61–2019/20. Model 20_1bVer2 estimate has two standard error confidence limits.

Eastern Bering Sea Tanner Crab

Landings of Tanner crab in the Japanese fishery (1965-1978) peaked at 19,950 t and in the Russian fishery (1965-1971) landings peaked at 7,080 t. Both the Japanese and Russian Tanner crab fisheries were displaced by the domestic fishery by the late-1970s and foreign fishing for Tanner crab ended in 1980.

The domestic Tanner crab pot fishery developed rapidly in the mid-1970s (Figure 14). US landings were first reported for Tanner crab in 1968 at 460 t taken incidentally to the EBS red king crab fishery. Tanner crab was targeted thereafter by the domestic fleet and landings rose sharply in the early 1970s, reaching a high of 30,210 t in 1977/78. Landings fell sharply after the peak and fishing was closed in 1985/86 and 1986/87 due to depressed stock status. In 1987/88, the fishery reopened and landings rose again in the late-1980s to a second peak in 1990/91 at 18,190 t, and then fell sharply through the mid-1990s. The Tanner crab fishery was closed between 1996/97 and 2004/05 as a result of conservation concerns regarding depressed stock status.

Following rationalization of the BSAI crab fisheries in 2005/06, the directed fishery for Tanner crab was open through 2009/10, after which time it was determined that the stock was overfished in the EBS and directed fishing was closed. Prior to the closure, the retained catch averaged 770 t per year between 2005/06-2009/10. ADF&G determines the TAC separately for areas east and west of 166° W longitude in the Eastern Subdistrict of the Bering Sea District Tanner crab Registration Area J. The directed fishery was re-opened in 2013/14 following determinations in 2012 that the stock was rebuilt and no longer overfished and that the stock met state harvest guidelines for opening the fishery. TACs increased from 746 t to 3,808 t in the western area and from 664 t to 5,113 t in the eastern area for the 2013/14 to 2015/16 seasons.

Although an OFL of almost 25,000 t was determined based on the 2016 assessment, mature female Tanner crab biomass fell below the threshold set in the State of Alaska's harvest strategy for opening the fishery and the directed fishery was closed in 2016/17. In 2017/18, ADF&G determined that a directed fishery could occur in the area west of 166° W longitude and the TAC was set at 1,130 t. A similar situation occurred in 2018/19, with only the area west of 166° W open to directed fishing with a TAC of 1,106 t. Mature female biomass again fell below State of Alaska's threshold for opening the 2019/20 Tanner crab fishery.

Eastern Bering Sea (EBS) Tanner crab are caught in directed Tanner crab fisheries, as bycatch in the groundfish and scallop fisheries, as bycatch in the directed Tanner crab fishery (mainly as non-retained females and sublegal males), and other crab fisheries (notably, eastern Bering Sea snow crab and, to a lesser extent, Bristol Bay red king crab). During the 2017/18 and 2018/19 seasons in the area west of 166° W, total catch mortality was 2,370 t (retained catch of 1,130 t) and 1,900 t (retained catch of 1,110 t), respectively.

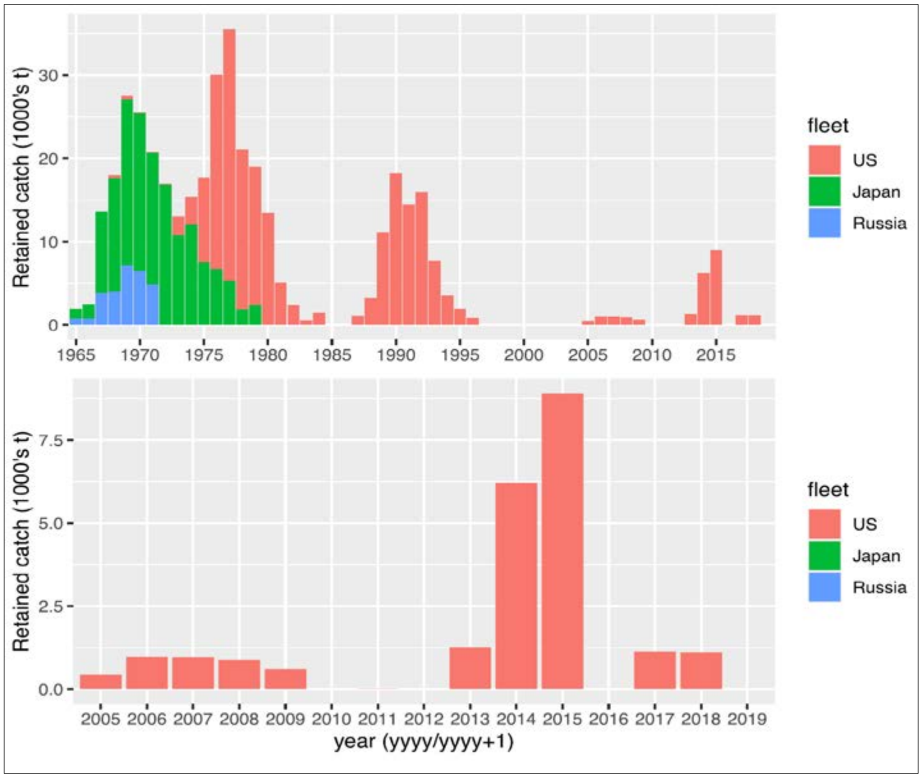

Figure 14. Upper: retained catch (males, 1000's t) in the directed fisheries (US pot fishery [green bars], Russian tangle net fishery [red bars], and Japanese tangle net fisheries [blue bars]) for Tanner crab since 1965/66. Lower: Retained catch (males, 1000's t) in directed fishery since 2001/02. The directed fishery was closed in 1984/85 and 1985/86, from 1996/97 to 2004/05, from 2010/11 to 2012/13, and 2016/17 and 2019/20.

Time series trends from the NMFS EBS bottom trawl survey suggest the Tanner crab stock in the EBS has undergone decadal-scale fluctuations (Figure 15). Estimated biomass of mature crab in the survey started at its maximum (281,000 t) in 1975, decreased rapidly to a low (14,000 t) in 1986, and rebounded quickly to a smaller peak (134,000 t) in 1991. After 1991, mature survey biomass decreased again, reaching a minimum of 10,500 t in 1998. Recovery following this decline was slow and mature biomass did not peak again until 2008 (67,000 t), after which it has fluctuated more rapidly—immediately decreasing the following year by almost 50% and reaching a minimum in 2012 (36,000 t), followed by an increase of almost 50% in 2013 and reaching a peak in 2014 (82,000 t). The most recent trend (2014-2020) has been a declining one (Figure 15). Trends in the male and female components of mature survey biomass, as well as legal male abundance, have primarily been in synchrony with one another.

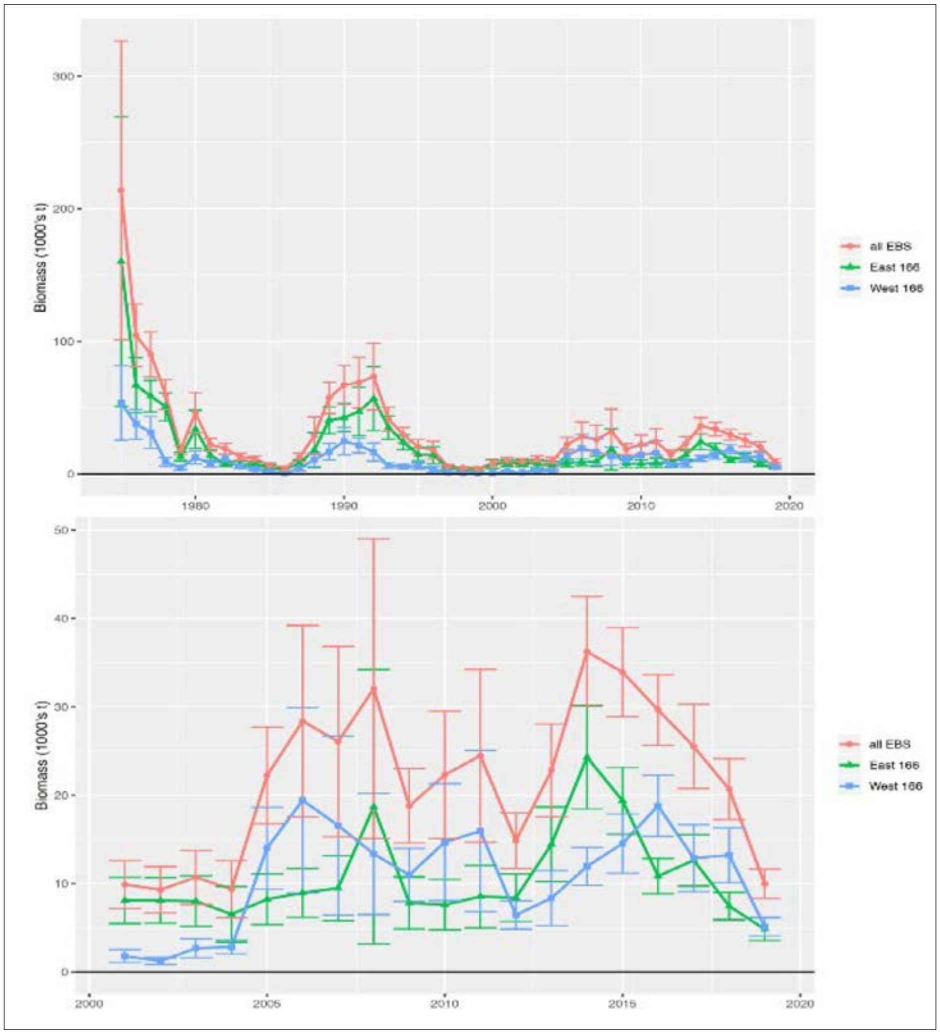

Figure 15. Annual estimates of area-swept biomass from the NMFS EBS bottom trawl survey for preferred-size (>125 mm CW) legal males. Red lines: total biomass; green lines: biomass in the eastern area; blue: biomass in the western area.

Eastern Bering Sea Snow Crab

Snow crab were harvested in the Bering Sea by the Japanese from the 1960s until 1980 when foreign fishing was prohibited. Thereafter, retained catches increased from low levels in the early 1980s to a high of 143,020 t in 1991. Retained catch declined to 88,090 t in 1998 and in 1999 the stock was declared overfished, at which time retained catches dropped to levels similar to the early 1980s. Retained catches have slowly increased since 1999 as the stock rebuilt, although retained catch during 2019 was low at 15,430 t.

Discard mortality is the next largest source of mortality after retained catch and approximately tracks the retained catch. Since 1992, discards from the directed pot fishery estimated from observer data has ranged from 11% to 64% (average 33%) of the retained catch of male crab. The highest estimated discard mortality occurred during 1992 at 17,060 t. The most recent estimated discard mortality was 5,070 t. Female discard catch is very low and not a significant source of mortality. Discard of snow crab in groundfish fisheries is significant but much less than in the directed fishery.

Observed mature male biomass (MMB) at the time of the survey increased from an average of 234,140 t in the early to mid-1980s to historical highs in the 1990s (observed MMB in 1991 was 466,610 t). In 1999, the total mature biomass dropped to 95,850 t, below the minimum stock size threshold, and the stock was declared overfished. Observed MMB slowly increased after 1999, and the stock was declared rebuilt in 2011 when estimated MMB at mating was above $B_{35\%}$. However, after 2011, the stock declined and the observed MMB at the time of survey dropped to an all-time low in 2016 of 63,210 t. Recently, MMB is increasing again as a large recruitment moves through the size classes and is currently estimated to be above $B_{35\%}$ (Figure 16).

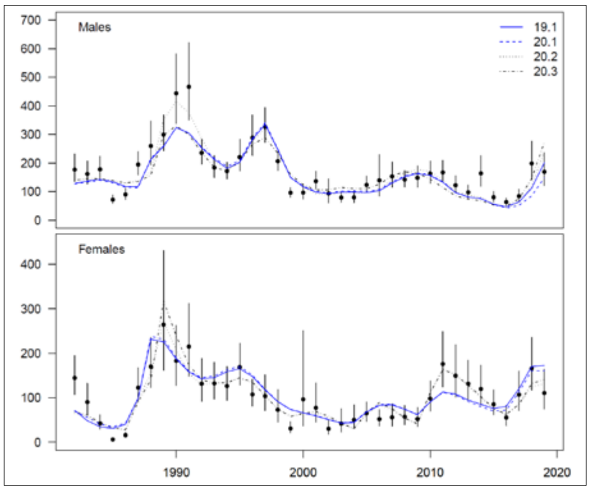

Figure 16. Model fits to the observed mature biomass at time of trawl survey for EBS snow crab.

Bristol Bay Red King Crab

The Japanese fleet started the Bristol Bay red king crab fishery in the early 1930s, stopped fishing from 1940 to 1952, and resumed the fishery from 1953 until 1974. The Russian fleet fished the stock from 1959 to 1971. U.S. trawlers started fishing in 1947, but the effort and catch declined in the 1950s. The U.S. fishery began to expand in the late 1960s and peaked in 1980 with a catch of 58,943 t (Figure 17). The catch declined dramatically in the early 1980s and has remained at low levels during the last three decades. After rationalization beginning with the 2005/2006 season, catches were relatively high before the 2010/11 season but have been on a declining trend since 2014. The retained catch in 2019/20 was 1,780 t, compared to 2,030 t in 2018/19, following a reduction in TAC.

The magnitude of bycatch from groundfish trawl and fixed gear fisheries has been stable and small relative to stock abundance during the last 10 years. During the 2019/20 season, total catch mortality was 2,220 t (retained catch of 1,780 t).

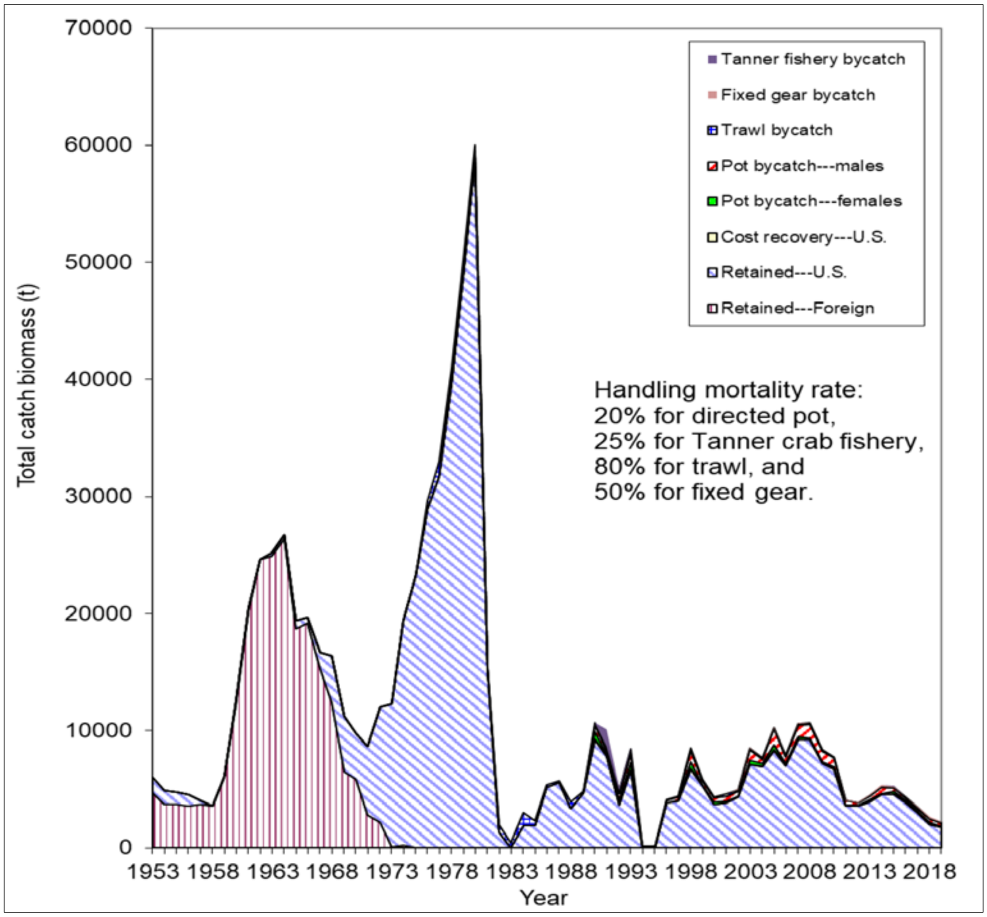

Figure 17. Retained catch biomass and bycatch mortality biomass (t) for Bristol Bay red king crab from 1953 to 2019. Directed pot bycatch data were not available from the observer program before 1990 and are not included in this figure.

Estimated population biomass increased dramatically in the mid-1970s then decreased precipitously in the early 1980s. Estimated mature crab abundance had increased during 1985-2009 with mature females being about three times more abundant in 2009 than in 1985 and mature males being about two times more abundant in 2009 than in 1985. Estimated mature abundance has steadily declined since 2009 (Figure 18). Estimated recruitment was high during the 1970s and early 1980s and has generally been low since 1985 (1979-year class). During 1984-2019, estimated recruitment was above the historical average (1976-2019 reference years) only in 1984, 1986, 1995,1999, 2002 and 2005. Estimated recruitment was extremely low during the last 12 years.

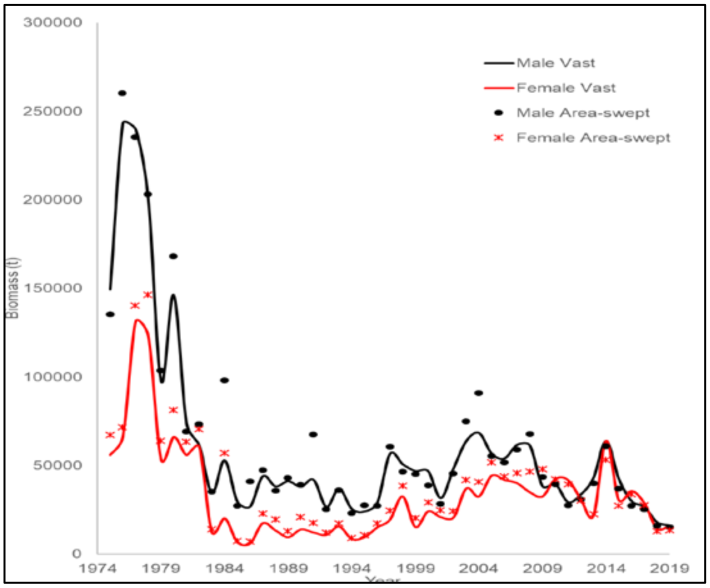

Figure 18. Comparison of area-swept and VAST-estimated survey biomasses for Bristol Bay red king crab from 1975 to 2019.

St. Matthew Island Blue King Crab

The fishery was prosecuted as a directed fishery from 1977 to 1998. Landings peaked in 1983/84 at 4,288 t. From 1986/87 to 1990/91, landings were fairly stable averaging 568 t annually. Landings increased to an average of 1,496 t 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 2000, Amendment 15 to the FMP was approved to implement a rebuilding plan for the stock. The rebuilding plan included a harvest strategy established in regulation by the Alaska Board of Fisheries, an area closure to control bycatch, and gear modifications. In 2008/09 and 2009/10, the MMB was estimated to be above B_{MSY} for two years and the stock was declared rebuilt in 2009. Fishing resumed in 2009/10 with a fishery-reported retained catch of 209 t, less than half the 529.3 t TAC.

Following three more years of modest harvests, the fishery was again closed in 2013/14 due to declining trawl-survey estimates of abundance and concerns about the health of the stock. The directed fishery resumed again in 2014/15 with a TAC of 300 t but the fishery performance was relatively poor with a retained catch of 140 t. The retained catch in 2015/16 was even lower at 48 t and the fishery has remained closed since then. The stock was found to be below MSST in 2017/18 and was declared overfished, and the Council's recommended rebuilding plan became effective on October 22, 2020 (see evidence for supporting clause 6.3).

Bycatch of non-retained blue king crab has been observed in the St. Matthew blue king crab fishery, the eastern Bering Sea snow crab fishery, and trawl and fixed-gear groundfish fisheries. Based on limited observer data, bycatch of sublegal male and female crabs in the directed blue king crab fishery off St. Matthew Island was relatively high when the fishery was prosecuted in the 1990s, and total bycatch (in terms of number of crabs captured) was often twice as high or higher than total catch of legal crabs.

The 2019 NMFS trawl survey biomass estimate of $\geq$ 90 mm carapace length (CL) male crab is 3,170 t, which is 57% of the long-term mean (Figure 19). The most recent 3-year average is 40% of the mean value, indicating a decline in biomass compared to historical survey estimates, notably in 2010 and 2011, that were over four times the current average. However, the 2019 value is substantially larger than the two previous years (1,731 t in 2018 and 1,794 t in 2017).

Because little information about the abundance of small crab is available for this stock, recruitment has been assessed in terms of the number of male crabs within the 90-104 mm carapace length (CL) size class in each year. The 2019 estimate of 0.403 million is the twelfth lowest in the 42 years since 1978 and follows two of the lowest previously observed values in 2017 and 2018. The recent six-year (2014 -2019) average recruitment is only 47% of the long-term mean.

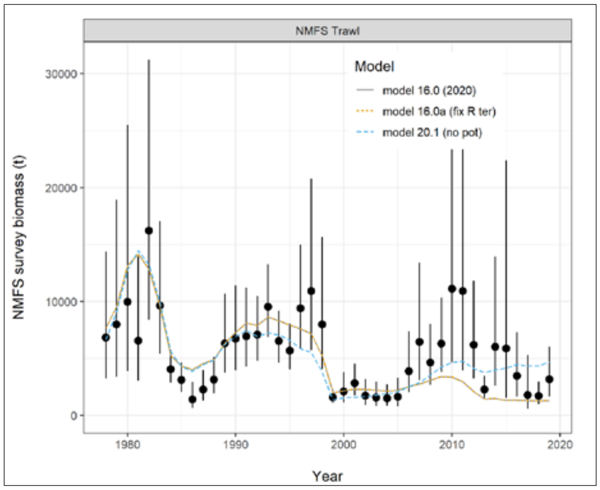

Figure 19. Comparisons of area-swept estimates of total (90+ mm CL) male survey biomass (tons) and model predictions for the model scenarios. The error bars are plus and minus 2 standard deviations.

6.6 Economic Value of the Fishery

The Economic Status Report for BSAI Crab Fisheries, 2019 (Crab Economic SAFE)[13] provides detailed information regarding production, sales, revenue, and price indices in the harvesting and processing sectors, income, employment, and demographics of labor in both sectors, capital and operating expenditures in the fishery, quota share lease and sale market activity, changes in distribution of quota holdings, productivity in the harvesting sector, U.S. imports and exports of king and Tanner crab, and other information regarding data collection and ongoing economic and social science research related the BSAI crab fisheries and related communities. Summaries below focus on the first of three sets of primary indicators in the report: 1) aggregate changes in gross volume and value of production; 2) labor earnings and employment in the crab processing and harvesting sectors; and 3) crab harvest quota leasing activity.

The BSAI crab fisheries managed under the NPFMC's FMP are currently (as of calendar year 2018) prosecuted by an active fleet of 99 catcher vessels and two catcher processors, and landed and processed at 12 processing facilities throughout the region. Across all fisheries managed under the BSAI Crab FMP during 2018, the total volume of ex-vessel landings was 31.9 million pounds (14.5 thousand metric tons), a 9% decrease from the previous year. Processing sector finished production volume during 2018 was 20.9 million pounds (9.5 thousand mt) aggregated over all BSAI crab species and product forms, also declining 9% from the previous year. The effect of fishery closures and a net reduction in production volume across crab fisheries, combined with changes in market prices, produced an aggregate 10% decrease in ex-vessel revenue over all fisheries in 2018, totaling $169 million for the year, and with aggregate first wholesale revenues also declining by 10% to $201 million (Figure 20).

As of 2018, allowable catch quantities in all BSAI crab fisheries currently open to targeted fishing are fully exploited (> 98% of total allocation landed), and recent inter-annual variation in commercial landings largely reflects the

[13] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

results of stock assessments and the State of Alaska's specified catch limits rather than changes in fishing capacity or exploitation rates. The decrease in aggregate production during 2018 reflected declines across two of the three largest crab fisheries compared to 2017. The total catch of 18.9 million pounds landed in the Bering Sea snow crab (BSS) fishery was a decline of 11.6% from 21.3 million pounds in 2017, and reflected a historical low for the fishery. Landings in the western portion of the Bering Sea Tanner (BST) fisheries during 2018 increased relative to 2017 levels, to 2.3 million pounds, and landings in the Bristol Bay red king crab (BBR) fishery declined 35% to 4.2 million pounds. The 6.5 million pounds landed in the Aleutian Islands golden king crab (AIG) fisheries during 2018 was an increase of 17% from 2017 production.

Similar to ex-vessel production, the 9% decrease in processing sector output aggregated over all active crab fisheries was driven in the largest part by the reduction to 12.3 million pounds of finished production in the BSS fishery, 2.3 million pounds (12%) less than 2017, as well as the 35% decline in finished volume in the BBR fishery to 2.9 million pounds.

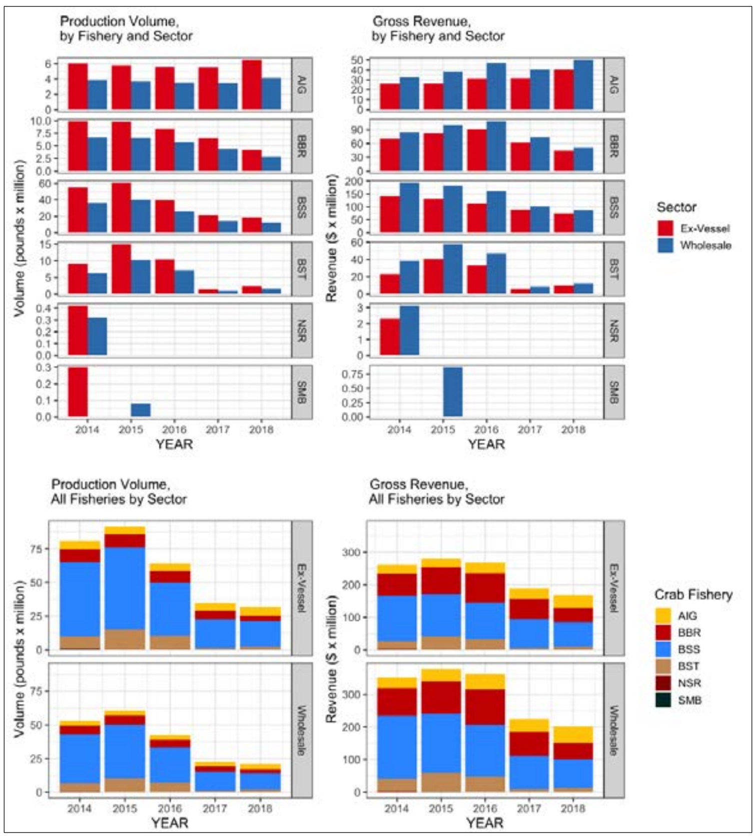

Figure 20. BSAI Crab Ex-vessel and First Wholesale Production, 2014 -2018.

Crab rationalization had a number of important economic consequences. One result of rationalization has been the consolidation of catch onto a much smaller number of vessels, from a peak during this period of 244 in 2004 to 96 in 2008, including both catcher vessels and catcher processors. In addition to a substantial reduction in the number of active vessels, consolidation in the crab-harvesting sector following rationalization in 2005/06 resulted in longer seasons. Correspondingly, the number of crew positions was reduced and working conditions changed, resulting in longer periods of active work in the fisheries for a smaller number of remaining crab crew participants. Another important feature of the CR program is the implementation of the Economic Data Report (EDR) program, which requires mandatory submission of detailed operational and financial information by owners of participating vessels and processing plants. Broadly speaking, the purpose of the EDR is to permit monitoring the economic performance of the rationalization program in terms of changes in the efficiency and profitability of the fisheries, and economic stability for harvesters, processors, and coastal communities, as a result of the rationalization of the fisheries and in response to ongoing management decision making.

Stock by stock summaries of basic economic conditions during the 2018/19 fishing season are provided below[14].

Bristol Bay Red King Crab

The 2018/19 TAC of 4,308,000 pounds was allocated as 90% IFQ and 10% CDQ, with all six of the CDQ groups participating. Fifty-five vessels participated in the fishery and harvested 4,307,946 pounds, of which 0.6% was dead loss. On average, vessels were active in the fishery for 12 days. Harvesters were paid an initial average ex-vessel price of $8.45 per pound. Total ex-vessel fishery value was estimated to be $36,176,631. Total effort for the 2018/19 fishery was 30,722 pot lifts. CPUE was 20 legal crab per pot, below the post-rationalization (2005/06–2017/18) average CPUE of 27 (Figure 21).

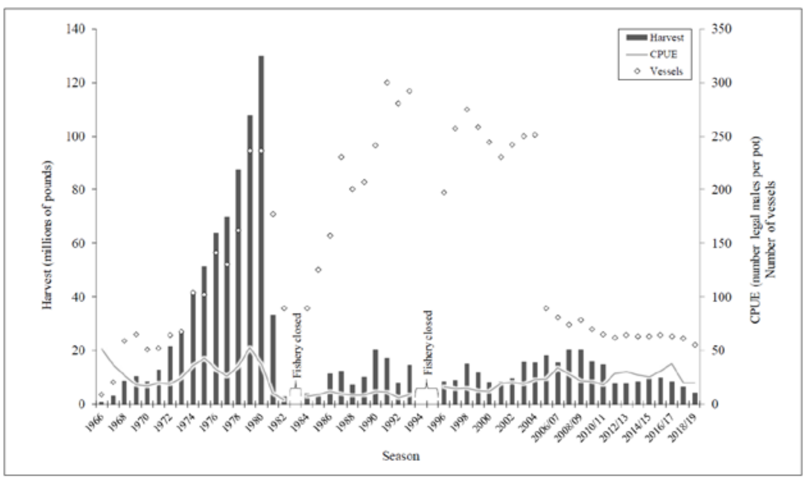

Figure 21. Bristol Bay red king crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1966–2018/19.

St Matthew Island Blue King Crab

This stock was declared overfished in fall 2018. The fishery was closed for the 2018/19 season and has remained closed ever since (see evidence for supporting clause 6.3 for details of the rebuilding plan). The fishery was last open in the 2015/16 season when 3 vessels participated and harvested 106,449 pounds from a 411,000 pound TAC. Total ex-vessel fishery value was estimated to be $423,508. Total effort for the 2015/16 fishery was 5,475 pot lifts. CPUE was 4 legal crab per pot (Figure 22).

[14] https://www.adfg.alaska.gov/FedAidPDFs/FMR19-33.pdf

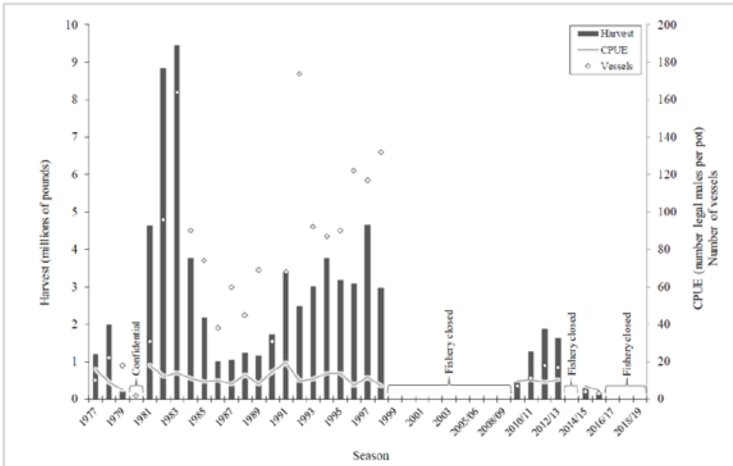

Figure 22. Saint Matthew Island section blue king crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1977–2018/19.

Eastern Bering Sea Snow Crab

The 2018/19 TAC of 27,581,000 pounds was allocated as 90% IFQ and 10% CDQ, with all six of the CDQ groups participating. Sixty-one vessels participated in the fishery and harvested 27,578,244 pounds, of which 1% was deadloss. On average, vessels were active in the fishery for 55 days. Harvesters were paid an initial average ex-vessel price of $3.00 per pound. Total ex-vessel fishery value was estimated to be $82,036,383. Total effort for the 2018/19 fishery was 127,432 pot lifts. CPUE was 176 legal crab per pot, below the post-rationalization (2005/06–2017/18) average CPUE of 222 (Figure 23).

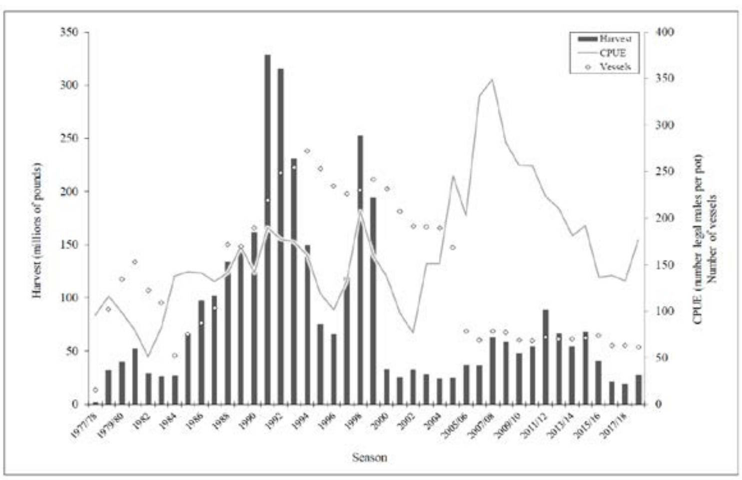

Figure 23. Bering Sea Snow crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1977/78–2018/19.

Eastern Bering Sea Tanner Crab

The fishery east of 166°W long was closed for the 2018/19 season because the mature male biomass estimate was below the regulatory threshold required to open the fishery. Prior to 2018-19, the fishery in this area was last open during the 2015/16 season when 49 vessels participated and harvested 11,263,562 pounds from a 11,272,000-pound TAC. Total ex-vessel fishery value was estimated to be $24,554,565.

The 2018/19 TAC of 2,439,000 pounds for the fishery west of 166°W long was allocated 90% IFQ and 10% CDQ, with all six of the CDQ groups participating. Thirty-six vessels participated in the fishery and harvested 2,441,201 pounds, of which 1.7% was deadloss. On average, vessels were active in the fishery for 34 days. Harvesters were paid an initial average ex-vessel price of $3.30 per pound. Total ex-vessel fishery value was estimated to be $7,913,588. Total effort for the 2018/19 fishery was 41,922 pot lifts. CPUE was 33 legal crab per pot, well above the post-rationalization (2005/06–2017/18) average CPUE of 18 (Figure 24).

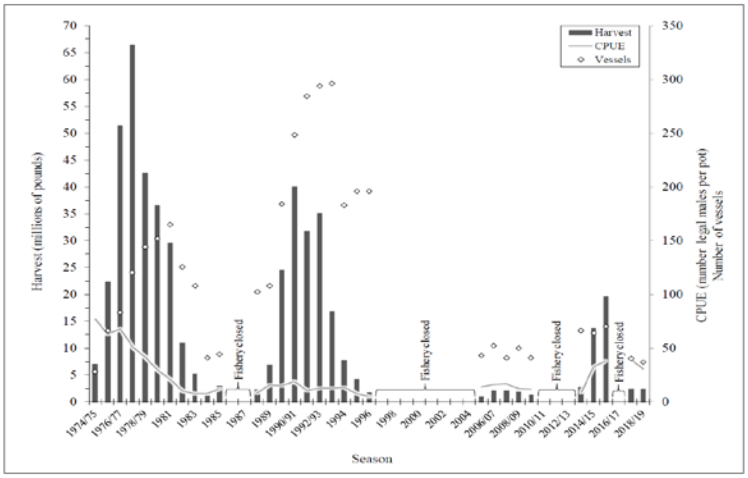

Figure 24. Bering Sea Tanner crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1974/75–2018/19.

Aleutian Islands Golden King Crab

The 2018/19 Aleutian Islands Golden king crab fishery east of 174°W long (EAG) TAC of 3,856,000 pounds was allocated as 90% IFQ and 10% CDQ, with five of the six CDQ groups participating. Three vessels participated in the fishery and harvested 3,854,105 pounds, of which 1.3% was deadloss. On average, vessels were active in the fishery for 101 days. Harvesters were paid an initial average price of $4.50 per pound. Total ex-vessel fishery value was estimated to be $17,118,842. Total effort for the 2018/19 fishery was 24,481 pot lifts. CPUE was 37 legal crab per pot, above the post-rationalization (2005/06–2017/18) average CPUE of 31 (Figure 25).

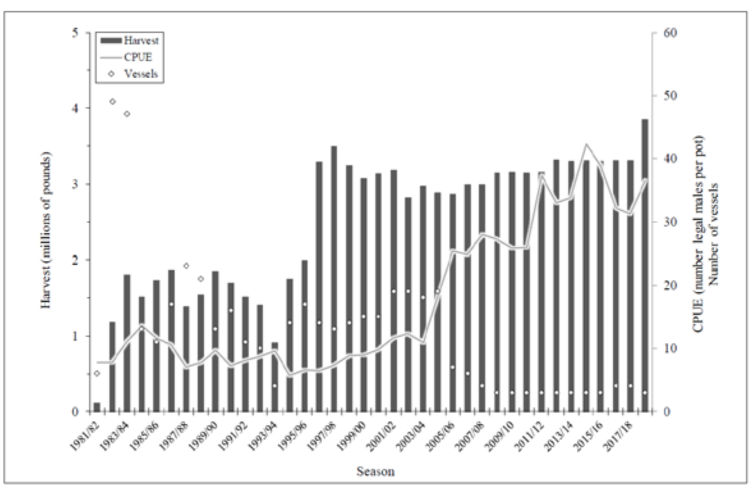

Figure 25. Eastern Aleutian Islands golden king crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1981/82–2018/19.

The 2018/19 Aleutian Islands Golden king crab fishery west of 174°W long (WAG) TAC of 2,500,000 pounds was allocated as 90% IFQ and 10% Adak Community Allocation. Three vessels participated in the fishery and harvested 2,501,344 pounds, of which 2.1% was deadloss. On average, vessels were active in the fishery for 154 days. Harvesters were paid an initial average price of $4.49 per pound. Total ex-vessel fishery value was estimated to be $10,987,299. Total effort for the 2018/19 fishery was 29,156 pot lifts. CPUE was 20 legal crab per pot, above the post-rationalization (2005/06–2017/18) average CPUE of 19 (Figure 26).

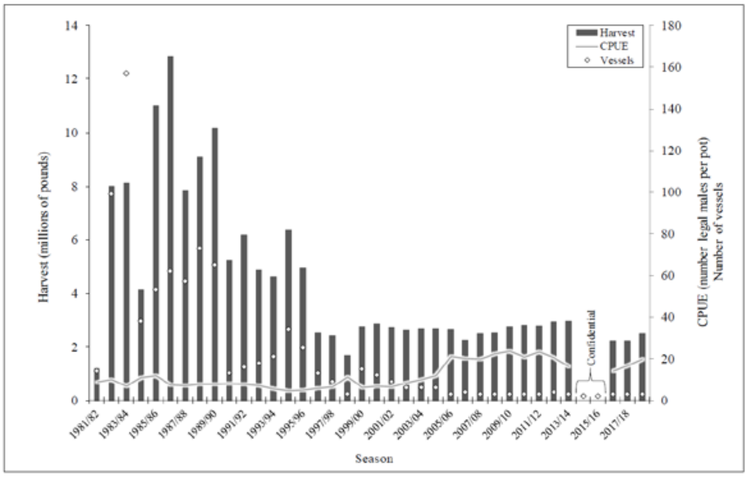

Figure 26. Western Aleutian Islands golden king crab commercial fishery harvest, catch per unit effort (CPUE; number legal males per pot), and number of vessels, 1981/82–2018/19.

7 Assessment Process

This Assessment constitutes an evaluation of the applicant fisheries' management systems against the conformance criteria outlined in the Responsible Fisheries Management Certification Program Fisheries Standard Version 2.1.

7.1 Scoring

Each clause of the RFM Fishery Standard is scored based on defined process which Certification Bodies are required to follow. The process is described in brief below and is also outlined in detail in the relevant scheme documents (See Details of Applicable RFM Documents for further details).

7.1.1 Evaluation Parameters

Evaluation Parameters (described below), which effectively break down each clause using defined performance related parameters, form the basis of scoring.

Process Evaluation Parameter

Requires that evidence is provided outlining the process or system used by a fishery management organization to implement or maintain key aspects of fishery management practices, such as systems for data collection, laws and regulations, stock assessments, and enforcement. If evidence on the current process/system of a given process-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Current Status/Appropriateness/Effectiveness Evaluation Parameter

Requires that the current status, appropriateness, or effectiveness of an element of fisheries management practices (depending on which one of these attributes is most relevant to a given clause) is demonstrated, such as data collected, results of stock assessment including stock status, and enforcement data. If evidence on the current status, appropriateness, or effectiveness of a given output-based requirement is scarce or non-existent, then this Evaluation Parameter is not satisfied.

Evidence Basis EP

Requires that the availability, quality, or adequacy of the evidence that is the base for scoring a given clause is assessed. If evidence availability (such as studies, reports, other data, and regulations) is scarce, low quality or non-existent, then this Evaluation Parameter is not satisfied.

7.1.2 Numerical Scoring based on Evaluation Parameters

Confidence Ratings and Conformance Levels for each Clause are determined based on the following process:

1. Numerical scoring is effectively a reverse process with each applicable Clause starting out the maximum possible overall score of 10.
2. The Assessment Team is then required to subtract 3 from that total for each Evaluation Parameter not met to reach an overall numerical score for that Clause
3. The Clause is then assigned both a Confidence Rating and an overall Conformance Level based on its overall numerical score as follows:

Overall Score	Confidence Rating	Conformance Level
10	High	Full Conformance
7	Medium	Minor Non-conformance
4	Medium	Major Non-conformance
1	Low	Critical Non-conformance

7.1.3 Confidence Ratings and Non-conformances

Based on the numerical scoring process described above, clauses of the fisheries standards are assigned Confidence Ratings and Conformance Levels—these are intended to reflect the below descriptions.

- **Critical Non-Conformance – Low Confidence Rating**
  Information/evidence is completely absent or contradictive to demonstrate conformance to a clause. Absence of information/evidence results in a low confidence rating. In these cases, a critical non-conformance is assigned.
- **Major Non-Conformance – Medium Confidence Rating**
  Information/evidence to demonstrate conformance to a clause is limited. In these cases, a major improvement is needed to achieve full conformance. A medium confidence rating with a major non-conformance is assigned.
- **Minor Non-Conformance – Medium Confidence Rating**
  Information/evidence is broadly available to demonstrate conformance to a clause although there are limited gaps in information that, if available, could clarify aspects of conformance and allow the assessment team to assign a high confidence rating. In these cases, a minor improvement is needed to achieve full conformance. A medium confidence rating with a minor non-conformance is assigned.
- **Full Conformance – High Confidence Rating**
  Sufficient information/evidence is available to demonstrate full conformance to a clause. In these cases, a high confidence rating is assigned. Sufficient evidence is that which allows objective determination by the assessment team that a fishery fully complies with a given clause in the RFM Fishery Standard.

Where a non-conformance (regardless of type) is assigned, the assessment team requests further information/clarification from the Client to confirm the non-conformance. The non-conformance is then re-considered in light of any further evidence provided; this may result in a non-conformance being upgraded, downgraded or closed.

7.1.4 Overall Assessment Scoring

RFM Fishery Standard clauses are categorized into four sections:

- **A.** The Fishery Management System
- **B.** Science and Stock Assessment Activities, and the Precautionary Approach
- **C.** Management Measures, Implementation, Monitoring and Control
- **D.** Serious Impacts of the Fishery on the Ecosystem

Any more than one (1) major non-conformance or three (3) minor non-conformances assigned to any Section will result in the assignment of a critical non-conformance at section level.

A critical non-conformance for any clause or section stops the assessment, unless/until the Client is able to provide additional information/evidence that demonstrates a higher level of conformity.

7.2 Consultation Meetings

Table 5. Summary of Assessment meetings, August 8-24 2021.

Meeting Date and Location	Personnel	Areas of discussion
Date: 08/03/2021 Location: Remote [video call]	NOAA Regional Office: Krista Milani Alicia Miller Molly Zaleski Doug Duncan Abby Jahn Assessment Team Members: Ivan Mateo, Lead Assessor Wes Toller, Assessor	Topics Discussed: ▪ Overview/2020 Update on Stock Status ▪ The Fisheries Management System ▪ Stock Assessment and Precautionary Approach ▪ Management Measures ▪ Serious Impacts of the Fishery on the Ecosystem
Date: 08/04/2021 Location: Remote [video call]	Alaska Department of Fish & Game: Forrest Bowers Mark Stichert Ben Daly Jie Zheng Assessment Team Members: Ivan Mateo, Lead Assessor Wes Toller, Assessor	Topics Discussed: ▪ Overview/2020 Update on Stock Status ▪ The Fisheries Management System ▪ Stock Assessment and Precautionary Approach ▪ Management Measures ▪ Serious Impacts of the Fishery on the Ecosystem ▪ Enhancement
Date: 08/11/2021 Location: Remote [video call]	North Pacific Fishery Management Council: Jim Armstrong Katie Palov Diana Evans Sara Marrinan Assessment Team Members: Ivan Mateo, Lead Assessor Wes Toller, Assessor	Topics Discussed: ▪ Overview/2020 Update on Stock Status ▪ The Fisheries Management System ▪ Stock Assessment and Precautionary Approach ▪ Management Measures ▪ Serious Impacts of the Fishery on the Ecosystem
Date: 08/12/2021 Location: Remote [video call]	Alaska Fisheries Science Center William Stockhausen Cody Szuwalski Assessment Team Members: Ivan Mateo, Lead Assessor Wes Toller, Assessor	Topics Discussed: ▪ Overview/2020 Update on Stock Status ▪ The Fisheries Management System ▪ Stock Assessment and Precautionary Approach ▪ Management Measures ▪ Serious Impacts of the Fishery on the Ecosystem
Date: 08/24/2021 Location: Remote [video call]	Bering Sea Crab Client Group Scott Goodman Jamie Goen Madison Shipley Assessment Team Members: Ivan Mateo, Lead Assessor Wes Toller, Assessor	Topics Discussed: ▪ Stock Assessment and Precautionary Approach ▪ Serious Impacts of the Fishery on the Ecosystem ▪ Progress on Non conformances

8 Summary of Assessment Outcomes

8.1 Assessment Outcomes by Clause

Table 6 below presents Confidence Ratings and Conformance Levels for each applicable Clause resulting from this Assessment. Note supporting evidence specific to each Clause is outlined in Section 9 (Assessment Outcomes).

Table 6. Confidence ratings and conformance levels for each clause of the RFM Standard.

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
Topics that will trigger immediate assessment failure				Yes	n/a	High	Full	
A	The Fisheries Management System	1	1.1	Yes	10	High	Full	
			1.2	Yes	10	High	Full	
			1.2.1	Yes	10	High	Full	
			1.3					
			1.3.1	Yes	10	High	Full	
			1.4					
			1.4.1	Yes	10	High	Full	
			1.5					
			1.6	Yes	10	High	Full	
			1.6.1					
			1.7	Yes	10	High	Full	
			1.8	Yes	10	High	Full	
			1.9	Yes	10	High	Full	
		2	2.1	Yes	10	High	Full	
			2.1.1	Yes	10	High	Full	
			2.1.2	Yes	10	High	Full	
			2.2	Yes	10	High	Full	
			2.3	Yes	10	High	Full	
			2.4	Yes	10	High	Full	
			2.5	Yes	10	High	Full	
			2.6	Yes	10	High	Full	
			2.7	Yes	10	High	Full	
		3	3.1	Yes	10	High	Full	
			3.1.1	Yes	10	High	Full	
			3.1.2	Yes	10	High	Full	
			3.1.3	Yes	10	High	Full	
			3.2	Yes	10	High	Full	
			3.2.1	Yes	10	High	Full	
			3.2.2	Yes	10	High	Full	
			3.2.3	Yes	10	High	Full	
			3.2.4	Yes	10	High	Full	
B	Science, Stock Assessment Activities and the Precautionary Approach	4	4.1	Yes	10	High	Full	
			4.1.1	Yes	10	High	Full	
			4.1.2	No				
			4.2	Yes	10	High	Full	
			4.2.1	Yes	10	High	Full	
			4.3	Yes	10	High	Full	
			4.4	Yes	10	High	Full	
			4.5	Yes	10	High	Full	
			4.6	Yes	10	High	Full	

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
C			4.7	No				
			4.8	No				
			4.9	No				
			4.10	No				
			4.11	No				
		5	5.1	Yes	10	High	Full	
			5.1.1	Yes	10	High	Full	
			5.1.2	Yes	10	High	Full	
			5.2	Yes	10	High	Full	
			5.3	Yes	10	High	Full	
			5.4	No				
			5.5	Yes	10	High	Full	
		6	6.1	Yes	10	High	Full	
			6.2	Yes	10	High	Full	
			6.3	Yes	7	Medium	Minor	2
			6.4	Yes	10	High	Full	
			6.5	Yes	10	High	Full	
		7	7.1	Yes	10	High	Full	
			7.1.1	Yes	10	High	Full	
			7.1.2	Yes	10	High	Full	
			7.2	Yes	10	High	Full	
C	Management measures, implementation, monitoring, and control	8	8.1	Yes	10	High	Full	
			8.1.1	Yes	10	High	Full	
			8.1.2	Yes	10	High	Full	
			8.2	Yes	10	High	Full	
			8.3	Yes	10	High	Full	
			8.4	Yes	10	High	Full	
			8.4.1	Yes	10	High	Full	
			8.5	Yes	10	High	Full	
			8.5.1	Yes	10	High	Full	
			8.6	Yes	10	High	Full	
			8.7	Yes	10	High	Full	
			8.8	Yes	10	High	Full	
			8.9	Yes	10	High	Full	
			8.10	Yes	10	High	Full	
			8.11	Yes	10	High	Full	
			8.12	Yes	10	High	Full	
			8.13	Yes	10	High	Full	
		9	9.1	Yes	10	High	Full	
			9.2	Yes	10	High	Full	
			9.3	Yes	10	High	Full	
		10	10.1	Yes	10	High	Full	
			10.2	Yes	10	High	Full	
			10.3	No				
			10.3.1	No				
			10.4	No				
			10.4.1	No				
		11	11.1	Yes	10	High	Full	

Section		Fundamental Clause	Supporting Clause	Applicable?	Numerical score	Confidence Rating	Conformance Level	NC No.
			11.2	Yes	10	High	Full	
			11.3	Yes	10	High	Full	
			11.4	No				
D	Serious Impacts of the Fishery on the Ecosystem	12	12.1	Yes	10	High	Full	
			12.2	Yes	10	High	Full	
			12.2.1	Yes	10	High	Full	
			12.2.2	Yes	10	High	Full	
			12.2.3	Yes	10	High	Full	
			12.2.4	Yes	10	High	Full	
			12.2.5	Yes	10	High	Full	
			12.2.6	Yes	7	Medium	Minor	3
			12.2.7	Yes	10	High	Full	
			12.2.8	Yes	10	High	Full	
			12.2.9	Yes	10	High	Full	
			12.2.10	Yes	10	High	Full	
			12.2.11	Yes	10	High	Full	
			12.3	Yes	10	High	Full	
			12.4	Yes	10	High	Full	
			12.5	Yes	10	High	Full	
			12.6	Yes	10	High	Full	
			12.7	Yes	10	High	Full	
		13	13.1	No				
			13.1.1	No				
			13.2	No				
			13.2.1	No				
			13.3	No				
			13.4	No				
			13.5	No				
			13.6	No				
			13.7	No				
			13.7.1	No				
			13.7.2	No				
			13.7.3	No				
			13.8	No				
			13.9	No				
			13.10	No				
			13.11	No				
			13.12	No				
			13.13	No				

8.2 Certification Recommendation

The Assessment Team makes a Recommendation as to whether an applicant fishery should be certified.

Following this Assessment, the Assessment Team recommends that the applicant fishery;

- **U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries**

be certified against RFM Certification Program Fisheries Standard Version 2.1.

8.3 Certification Determination

Global Trust's internal Fishery Certification Committee, which is comprised of both internal and external fishery experts as well as certification experts, makes the ultimate determination as to whether an applicant fishery is granted certification.

Following a meeting on March 10th 2022, the Certification Committee has determined that the applicant fishery in this instance;

- **U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries;**

be certified against RFM Certification Program Fisheries Standard Version 2.1.

9 Assessment Outcomes

9.1 Topics that will trigger immediate assessment failure

According to the RFM Standard Version 2.1, the following fisheries management issues will cause a fishery to immediately fail assessment:

- Dynamiting, poisoning, and other comparable destructive fishing practices.
- Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.
- Shark finning (i.e., removal and retention of shark fins while the remainder of the shark is discarded in the ocean).
- Slavery and slave labor on board fishing vessels.
- Any significant lack of compliance with the requirements of an international fisheries agreement to which the U.S. is signatory. A fishery will have to be formally cited by the International Governing body that has competence with the international Treaty in question, and that the US has been notified of that citation of non-compliance.

The Assessment Team has, as part of this Assessment, carried out a review of the available evidence with respect to these issues. The results of this review are presented below.

Table 7. Topics that will trigger immediate assessment failure.

Dynamiting, poisoning, and other comparable destructive fishing practices.						
Confidence that this is NOT occurring:	**Low**	☐	**Medium**	☐	**High**	☑
SUPPORTING EVIDENCE:	**There is no evidence of such methods being employed in the fishery under assessment.**					
Significant illegal, unreported, and unregulated (IUU) fishing activities in the country jurisdiction.						
Confidence that this is NOT occurring:	**Low**	☐	**Medium**	☐	**High**	☑
SUPPORTING EVIDENCE:	**There is no evidence of significant (or otherwise) illegal, unreported, and unregulated (IUU) fishing activities within State and Federal jurisdictions of Alaska**					
Shark finning.						
Confidence that this is NOT occurring:	**Low**	☐	**Medium**	☐	**High**	☑
SUPPORTING EVIDENCE:	**There is no evidence of shark finning in the fishery under assessment and such a practice is highly unlikely given the lack of shark bycatch**					
Slavery and slave labor on board fishing vessels.						
Confidence that this is NOT occurring:	**Low**	☐	**Medium**	☐	**High**	☑
SUPPORTING EVIDENCE:	**There is no evidence of incidences of successful prosecutions of entities involved in the fishery under assessment for slavery and/or slave labor offences**					
Significant lack of compliance with the requirements of an international fisheries agreement.						
Confidence that this is NOT occurring:	**Low**	☐	**Medium**	☐	**High**	☑

Dynamiting, poisoning, and other comparable destructive fishing practices.						
Confidence that this is NOT occurring:	Low	☐	Medium	☐	High	☑
SUPPORTING EVIDENCE:	The fishery under assessment is entirely State managed and as such is not subject to international fisheries agreements					

9.2 Section A: The Fisheries Management System

9.2.1 Fundamental Clause 1. Structured and legally mandated management system

There shall be a structured and legally mandated management system based upon and respecting international, State, and local fishery laws, for the responsible utilization of the stock under consideration and conservation of the marine environment.

9.2.1.1 Supporting Clause 1.1.

1.1.	**There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.**
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *Management agencies are physically and legally established at international, State and local levels.*	☑

EVIDENCE:

At the regional and national levels, an effective legislative and administrative framework for fishing resource conservati management has been developed. The fisheries and management system are in accordance with all applicable laws, includ MSA. The crab fisheries in Alaska's Bering Sea and Aleutian Islands (BSAI) are governed by the Fishery Management Plan for Commercial King and Tanner Crab, which was authorized by the US Secretary of Commerce on June 2, 1989. The North Fishery Management Council (NPFMC) and their Crab Plan Team (CPT) prepared the FMP, which was then submitted National Marine Fisheries Service (NMFS) for public review and comment before being approved by the Secretary of Com (see Crab FMP; NPFMC 2011).

The Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA or MSA) established the NPFMC as one o regional fishery management councils to oversee management of the nation's fisheries. The MSA is the main legal docume governs the BSAI crab fisheries. The Act establishes ten national standards for fishery conservation and management (1 1851), which must be followed by all FMPs. Within the MSA, the NPFMC is permitted to develop an FMP and any nec revisions for each fishery under its jurisdiction and submit them to the Secretary of Commerce for approval, disapproval, or approval. While the NPFMC is in charge of crab management in the BSAI, the FMP creates a State/Federal coop management regime that defers crab management to the State of Alaska with limited Federal control.

Current status: *The output of the management organization(s) is in line with fishery resource management needs. Examples may include rule making, scientific research, stock and ecosystem assessments, implementation of rules and regulations, and enforcement activities.*	☑

EVIDENCE:

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

Crab Stock assessment Reports. https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/2020/SAFE_2020_Complete.pdf

Crab FMP. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf

Appropriateness/Effectiveness: *The management framework is appropriate for managing the resource. For example, the larger the exploitation, vulnerability, or risks of a fish stock, the more work and precision (assessment of the resource ensuring the risks related to overfishing and equivalent negative effects) shall be focused in managing the resource. This shall be done in compliance with legislative and regulatory requirements at the local, national, and international level,*	☑

1.1.	**There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.**

including the requirements of any regional fisheries management agreement. The management system shall not be subject to continual unresolved or repeated disputes or political instability.	

EVIDENCE:

The crab fisheries in Alaska's Bering Sea and Aleutian Islands (BSAI) are governed by the Fishery Management Plan (FMP) for Commercial King and Tanner Crab, which was authorized by the US Secretary of Commerce on June 2, 1989. The North Pacific Fishery Management Council (NPFMC) and their Crab Plan Team (CPT) prepared the FMP, which was then submitted to the National Marine Fisheries Service (NMFS) for public review and comment before being approved by the Secretary of Commerce (see Crab FMP; NPFMC 2011).

The Magnuson-Stevens Fishery Management and Conservation Act (MSFMCA or MSA) established the NPFMC as one of eight regional fishery management councils to oversee management of the nation's fisheries. The MSA is the main legal document that governs the BSAI crab fisheries. The Act establishes ten national standards for fishery conservation and management (16 USC 1851), which must be followed by all FMPs. Within the MSA, the NPFMC is permitted to develop an FMP and any necessary revisions for each fishery under its jurisdiction and submit them to the Secretary of Commerce for approval, disapproval, or partial approval. While the NPFMC is in charge of crab management in the BSAI, the FMP creates a State/Federal cooperative management regime that defers crab management to the State of Alaska with limited Federal control.

The NMFS also supports the legal and administrative framework for managing BSAI crab fisheries. The Alaska Fisheries Science Center (AFSC) in Seattle and the Kodiak Fisheries Research Center (KFRC) in Kodiak produce scientific data and analysis needed for the protection, management, and use of the region's crab resources[15]. The Alaska Fisheries Science Center's RACE Shellfish Assessment Program uses the KFRC as its major facility.

The BSAI King and Tanner Crab FMP is a “framework” plan meant to allow for long-term fishery management without the need for regular changes (BSAI Crab FMP; NPFMC 2011). All fisheries activities and decisions are subject to MSA conditions, as well as actions taken by the Alaska Board of Fisheries (BOF) for all management Category 2 and 3 measures (such as size, season, sex, reporting requirements, and so on) under the FMP. The FMPs are created and changed in accordance with MSA. Alaska State rules and regulations apply to Category 2 and 3 management measures[16].

The BSAI King and Tanner Crab FMP development process exemplifies the efficiency of the administrative structure at both the local and national levels. The BOF, Alaska Department of Fish and Game (ADF&G), NPFMC, CPT, and the public/stakeholders collaborated on the 1989 FMP. The first draft of the plan was rejected by the BOF, and the plan was not implemented until the state agreed on what it deemed to be the right State/Federal management balance. The BSAI crab administrative framework continues to be dominated by ADF&G. Crab research initiatives are run by the Department at three locations: headquarters (HQ), Dutch Harbor, and Kodiak, with about 30 people involved in management and research. The majority of the exploitation models utilized by the CPT, for example, were developed by ADF&G scientists.

Local and national governments apply the legislative framework. The NMFS Office of Law Enforcement (OLE) is primarily responsible for enforcing crab restrictions at sea, using the US Coast Guard's at-sea platforms, while the NMFS OLE and the State of Alaska's Division of Wildlife Troopers (AWT) share that responsibility ashore. The majority of IFQ/IPQ breaches, as well as size, sex, and season violations, are enforced at offloading since the fisheries was rationalized in 2005. Prior to each fishing season, Wildlife Troopers inspect pots and vessel holding tanks.

[15] https://www.fisheries.noaa.gov/region/alaska#fisheries
[16] http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2020_2021_cf_king_tanner_crab.pdf

1.1.	There shall be an effective legal and administrative framework established at international, State and local levels appropriate for fishery resource conservation and management. The management system and the fishery operate in compliance with the requirements of international, State, and local laws and regulations, including the requirements of any regional and/or international fisheries management agreement.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an effective legal and administrative framework established at the local and national level is appropriate for fishery resource conservation and management. In addition, the management system and the fishery operate in compliance with the requirements of local, national, and international laws and regulations, including the requirements of any regional fisheries management agreement. Examples may include fishery management plans or other relevant information.*	☑

EVIDENCE:
Crab FMP. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.1.2 Supporting Clause 1.2.

1.2.	Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Current status/Appropriateness: *If a stock is subject to two or more jurisdictions (nations, states, etc.) (either by distribution or migration), then exploitation by all jurisdictions shall be considered when defining exploitation levels and determining stock status to avoid overfishing/depletion of the resource. The scoring of this parameter shall consider that significant migration may take a species outside the jurisdiction of the managing agency (e.g., for significant feeding or ontogenetic migration).*	☑

EVIDENCE:

For each of the five crab stocks under assessment, management measures consider the whole stock biological unit over it area of distribution, the area through which the species migrates during its life cycle, and other biological characteristic stock. The Council and the National Marine Fisheries Service (NMFS) produce a Stock Assessment and Fishery Evaluatior report every year that covers all crab stocks in the BSAI King and Tanner Crab Fishery Management Plan (FMP). At NPFI Team meetings, state and federal assessment biologists communicate assessment information and harvest techniques to conservation management across the whole stock distribution.

Effectiveness: *Managers shall have an understanding of stock structure and composition as these relate to stock resilience over its entire distribution area. The underlying objective is to preserve genetic diversity between and within species and avoid localized depletions (overall affecting the stock contributing to its resilience and stability). This assessment shall consider, when appropriate, demographic independence of populations or stocks (i.e., if a component stock of a species is demographically independent from another because it is genetically different, has significant difference in age structure, or if there is insignificant exchange among groups due to distance, environmental barriers, or other reasons).*	☑

EVIDENCE:

1. Consideration of whole stock biological unit over its entire area of distribution

The Council and the National Marine Fisheries Service (NMFS) produce a Stock Assessment and Fishery Evaluation (SAFE) report every year that covers all crab stocks in the BSAI King and Tanner Crab Fishery Management Plan (FMP). At NPFMC Plan Team meetings, state and federal assessment biologists communicate assessment information and harvest techniques to ensure conservation management across the whole stock distribution.

The biological and environmental parameters of crab resources are summarized in Appendix D of the Crab FMP (2011), which also includes descriptions of the management area and BSAI crab stocks. The next sections provide FMP descriptions of stock biological units for each of the crabs under consideration.

1.1 Area of Stock Distribution - Red King Crab

In the BSAI region, three distinct red king crab stocks are actively managed: Bristol Bay, Norton Sound, and Adak stocks. Other red king crab populations can be found in the Pribilof Islands, St. Matthew, and St. Lawrence Island areas, however these are managed alongside blue king crab fisheries. To accommodate diverse life histories and fisheries features, red king crab stocks are managed independently (Crab FMP, 2011).

The State of Alaska separates the Aleutian Islands and the eastern Bering Sea into three management registration areas to manage RKC fisheries, according to the 2016 Crab SAFE report: Aleutian Islands, Bristol Bay, and Bering Sea (Alaska Department of Fish and Game (ADF&G) 2012). The Bristol Bay area encompasses all waters north of Cape Sarichef (54°36' N lat.), east of 168°00' W long., and south of Cape Newenham (58°39' N lat.), and the RKC fishery in this area is managed

1.2.	Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

separately from RKC fisheries outside of this area; i.e., red king crab in the Bristol Bay area are assumed to be a separate stock from red king crab outside of the Bristol Bay area.

It is feasible to identify distinct red king crab populations in Alaska based on genetics. This was proved in 1989, when the ADFG's Gene Conservation Lab completed work. Protein electrophoresis on a horizontal starch-gel has shown to be a useful tool in the management of many marine organisms. This method gives information on the genetic links between reproductively isolated stocks, allowing scientists to better manage these self-recruiting stocks. Additionally, when major genetic differences between stocks are discovered, collections of unknown provenances can be genetically screened and identified without ambiguity. The team looked for genetic variation at 42 protein coding loci in red king crab collected from thirteen locations in Southeast Alaska, the Aleutian Islands, and the eastern Bering Sea. Pgdh (Phosphogluconate dehydrogenase) and Alp (Alkaline phosphatase), two highly polymorphic loci, were beneficial for distinguishing stock differences between significant geographic areas. The eastern Bering Sea collections from Bristol Bay and Norton Sound differed significantly from the rest. Furthermore, the southeast Alaska collections appear to be separate from the Kenai, Alaska Peninsula, and Aleutian collections. Additional polymorphic loci appear to be effective in further separating stocks, and the group is continuing its research.

1.2 Area of Stock Distribution - St Matthews Blue King Crab

Two discrete stocks of blue king crab are actively managed in the BSAI region: the Pribilof Islands and St. Matthew Island stocks. Other smaller populations of blue king crab are found in the vicinity of St. Lawrence Island and Nunivak Island, as well as isolated populations in the Gulf of Alaska. Blue king crab stocks are managed separately to accommodate different life histories and fishery characteristics (Crab FMP 2011).

According to the 2016 Crab SAFE report, the Alaska Department of Fish and Game (ADF&G) Gene Conservation Laboratory division has detected regional population differences between blue king crab collected from St. Matthew Island and the Pribilof Islands. NMFS tag-return data from studies on blue king crab in the Pribilof Islands and St. Matthew Island support the idea that legal-sized males do not migrate between the two areas (Otto and Cummiskey 1990). St. Matthew Island blue king crab tend to be smaller than their Pribilof conspecifics, and the two stocks are managed separately.

1.3 Area of Stock Distribution - Aleutian Islands Golden King Crab

The BSAI region is likely to have several distinct stocks of golden king crab. The Aleutian Islands stock was divided into two management zones, Adak and Dutch Harbor, until 1996. The entire area is currently known as Dutch Harbor Area O, and it is managed as such. Two golden crab stocks have been discovered based on past landings data and are managed as the Sequam and Adak stocks, which are separated at 174° W longitude (Crab FMP 2011).

The evidence supporting golden king crab stock structure is examined in depth in the 2016 Crab SAFE report. Given the size of the Aleutian Islands Area and the presence of deep (>1,000 m) valleys connecting some of the islands, at least some weak stock structure would be predicted. Within the Aleutian Islands, data for inferring stock structure of golden king crab is largely restricted to the spatial distribution of commercial fishery catch and effort. Catch data from fish tickets by statistical region and catch data from pots sampled by observers indicate that habitat for legal-sized males may be continuous throughout the waters adjacent to the Aleutian chain's islands. However, low fishing capture zones show that the availability of suitable habitat, where golden king crab can be found in low concentrations, may vary longitudinally. In comparison to adjacent areas, catch has been low in the fishery between 174° W longitude and 176° W longitude (the Adak Island area), a pattern that is consistent with low CPUE for golden king crab between 174° W longitude and 176° W longitude during the NMFS Aleutian Islands bottom trawl surveys in 2002, 2004, 2006, 2010, and 2012. (Von Szalay *et al.*, 2011). There is a gap in fishery catch and effort between the Petrel Bank-Petrel Spur area and the Bowers Bank area, despite the fact that both locations, separated by Bowers Canyon, have recorded effort and catch. Recovery of golden king crab tagged during ADF&G studies during commercial fishing (Blau and Pengilly 1994; Blau *et al.*, 1998; Watson and Gish 2002; Watson 2004, 2007) revealed no evidence of significant migration by crab in the size classes tagged (males and females 90-mm carapace length

1.2.	Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

[CL]). The maximum straight-line distance between the release point and the recovery location of 90 golden king crab released prior to the 1991/92 season and recovered during the 1992/93 fishery was 61.2 km (Blau and Pengilly 1994). The male and female golden king crabs were tagged and released between 170.5° W longitude and 171.5° W longitude during the 1991, 1997, 2000, 2003, and 2006 ADF&G Aleutian Island golden king crab pot surveys. None of the 3,807 with recovery locations specified by latitude and longitude were recovered west of 173° W longitude, and only fifteen were recovered east of 173° W longitude (V. Vanek, ADF&G, Kodiak, pers. comm.). Similarly, of the 139 recoveries for which only the statistical region of recovery was recorded, none were located west of 173° W longitude and only one was located west of 172° W longitude.

In the BSAI area, snow crabs are assumed to be one stock throughout their range. The area is separated into two subdistricts for management, and NMFS estimates abundance and establishes GHL by subdistrict (Crab FMP 2011).

Snow crab (*Chionoecetes opilio*) is found on the continental shelf of the Bering Sea, the Chukchi Sea, and the western Atlantic Ocean as far south as Maine, according to the 2016 Crab SAFE report. Snow crabs are found over the Bering Sea shelf and are common at depths of less than 200 meters. Smaller crabs prefer the inshore northern areas, whereas mature crabs prefer the deeper areas to the south of the juveniles (Zheng *et al.*, 2001). Within US waters, the eastern Bering Sea population is managed as a single stock; nevertheless, the population's range may extend into Russian waters to an unknown extent.

As stated in the initial evaluation (GTC 2012), little is known about the genetic population structure of C. opilio in the Pacific/Arctic region of the species. The stock in the Eastern Bering Sea is managed as a single, unstructured (random-mating) population. The purpose of the study is to use microsatellite analysis techniques to better define population structure. The results of a genetic investigation of roughly 600 specimens collected from various sites across their range are currently being integrated with ecological knowledge of the stock to see if discrete population subunits exist. Snow crabs have a long larval dispersal period that lasts around 2-4 months, which supports the concept of widespread genetic mixing; however, areas of potential larval retention have recently been suggested, which could support population divergence. Understanding population structure in the intensively exploited Bering Sea populations is critical not just for efficient management of the current fishery, but also for sections of the arctic that are "downstream" and may face future fishing pressures.

The ADFG's Gene Conservation Lab discovered low levels of spatial differentiation among *C. bairdi* and *C. opilio* populations, and results suggest that *C. bairdi* subpopulations occur within the Bering Sea. In the Bering Sea, evidence of gene introgression between *C. bairdi* and C. opilio was also discovered. The team also looked at a geographical isolate called North Atlantic *C. opilio*. Despite great geographic separation from Alaskan C. opilio, no difference was found and no private alleles were discovered in North Atlantic C. opilio (see Merkouris *et al.*, 1998).

Parada *et al.* (2010) used biophysical modeling to develop a new hypothesis for the spatial dynamics of the Bering Sea snow crab population: mature snow crabs sampled in stock assessment surveys do not migrate outside of US waters, but instead remain within the EBS shelf up to depths of 200 m, and are generally found between isobaths of 50 m (juveniles) and 200 m (adults) (mature adults). Within the EBS shelf, ontogenic migration carries snow crab south from a northerly direction. Simulation results offered objective criteria for defining the region of interest for modeling the EBS snow-crab population. IBM areas 9, 10, and 11 (i.e., the southern and westernmost areas of the Bering Sea) are effectively left out of the geographic region of interest due to a lack of I southward transport along the middle and outer domains, (ii) eastward transport into Bristol Bay, and (iii) westward transport off the outer domain.

1.5 Area of Stock Distribution - EBS Tanner Crab

The 2011 Crab FMP (2011) recognizes only one Tanner crab stock: *C. bairdi*, which is managed in the eastern Bering Sea. Tanner crabs in the EBS are considered a different stock from Tanner crabs on the eastern and western Aleutian Islands, according to the 2016 Crab SAFE study. Somerton (1981b) proposes that there may be clinal variances in some biological

1.2.	**Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.**

traits over the unit stock's range. Because terminal molt at maturity in this species was not known at the time of the investigation, and stock movement with ontogeny was not taken into account, these conclusions may be constrained. As a result, biological features determined using length frequency distributions across the stock's range or modal length analyses across time may be confounding.

Although the State of Alaska's (SOA) harvest plan and management regulations for this stock differ east and west of 166° W, the Tanner crab unit stock in the EBS appears to include both regions and includes crab across the NMFS bottom trawl survey's geographic range. There is insufficient evidence that the EBS shelf has two independent, non-mixing, non-breeding stocks that should be assessed and managed separately.

Effectiveness: *The stock may spend a portion of its life (migration for feeding, growth, or reproduction) in both fresh and saltwater, in international waters, or in another jurisdiction, and may suffer mortality or other pressures. These must be accounted for when assessing stock status.*	☑

EVIDENCE:

2. Consideration of area through which species migrates during its life cycle

For each of the five stocks under consideration, management measures take into account the entire area over which animals migrate during their life cycle. In the NFMS final Environmental Impact Statement (EIS) for the Bering Sea and Aleutian Islands King and Tanner Crab Fisheries, the life cycles of FMP crab species were thoroughly examined (NMFS 2004). The EIS looked at the physical and biological elements of embryonic stages, larval stages, transitional (glaucothoe) stages, juvenile stages, and adult stages of the life cycle. During the process of identifying and describing essential fish habitat (EFH) in the EIS (NMFS 2004) and Fishery Management Plan (FMP; NPFMC 2011) for the BSAI King and Tanner Crab Fisheries, the area through which each crab species migrates during its life cycle was further examined for each crab species.

Life cycle information is explicitly addressed in annual stock survey and assessment procedures (e.g., Crab SAFE 2016), and is thus integrated into TAC setting methodologies and the design of laws that regulate fisheries boundaries and seasons.

3. Consideration of other Biological Characteristics of the stock

Other biological parameters of all stocks managed under the BSAI Crab FMP are also taken into account in management measures. Biological traits that are relevant to stock assessments are taken into account during annual updates. Other biological characteristics of the EBS snow crab stock, such as growth, life history characteristics, natural mortality rates, weight at length, sexual maturity of males and females, molting probability, mating ratio and reproductive success, size and age, are explicitly considered in the 2016 Crab SAFE report. Existing stock survey and assessment techniques, TAC determination approaches, and existing rules specifying fisheries borders and seasons all take these biological aspects into account.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management measures consider (1) the stock status over its entire area of distribution, (2) the area through which the stock migrates during its life cycle, and (3) other biological characteristics of the stock. Examples may include the presence of genetic studies, age structure data, stock assessments or other relevant information.*	☑

EVIDENCE:

Summary of Identified King and Tanner Crab Stocks in the BSAI Area.

The BSAI King and Tanner Crab Fishery Management Plan (Crab FMP 2011) identified 17 separate stocks of king and Tanner crab that are managed in the BS/AI area (**Table 8**). 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.

1.2.	**Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.**

Table 8. Stocks of king and Tanner crab in the BS/AI area (from Crab FMP 101 October 2011).

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).
Northern District golden king crab	A group that has unique biological characteristics but may not be geographically distinct (see Otto and Cummiskey 1985, Somerton and Otto 1986).
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.

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1.2.	Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.

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1.2.	Management measures shall consider (1) stock status (i.e., overfished, biomass) and genetic diversity (stock structure) over its entire area of distribution, and (2) other biological characteristics of the fish stock (stock) including age of maturity and reproductive potential.
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Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.2.1.3 Supporting Clause 1.2.1.

1.2.1.	Previously agreed management measures established and applied in the same region is region shall be taken into account by management.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a process or system that allows the continuity and updating of previously agreed and implemented management measures. Examples may include a specific review process or management plan where these measures can be clearly identified and continued implementation and updating can be carried out.*	☑
EVIDENCE: Management takes account of previously agreed management measures that were established and applied in the same region. The NPFMC evaluates present and previous management measures in BSAI crab fisheries on an annual basis to see whether they may be improved. The agenda for each meeting of the Council is developed in response to current priority issues as well as probable future changes or events that could have an impact on the fisheries. Prior to and during all meetings, the public is invited to provide input. Continuous public participation in the NPFMC process guarantees that stakeholder concerns are addressed and fully handled. All meetings are announced on the NPFMC website, and the Council uses a 'Three Meeting Outlook' to summarize matters of concern that will most likely be covered at the next three NPFMC sessions. This method allows stakeholders to prepare and submit comments ahead of time for meetings, allowing concerns regarding current, proposed, or former management arrangements to be addressed in the appropriate forum.	
Current status/Appropriateness/Effectiveness: *Previously agreed management measures established and applied in the same region are included and part of current management decisions. Examples may include international or other agreements not honored by the management system or a management agency. The management system is effectively continuing implementation of agreed management measures.*	☑
EVIDENCE: All previously agreed-upon management measures are routinely taken into account by the BSAI crab management system. At the state, federal, and council levels, prior management arrangements are considered. The NPFMC evaluates present and previous management measures in BSAI crab fisheries on an annual basis to see whether they may be improved. The agenda for each meeting of the Council is developed in response to current priority issues as well as probable future changes or events that could have an impact on the fisheries. Prior to and during all meetings, the public is invited to provide input. Continuous public participation in the NPFMC process guarantees that stakeholder concerns are addressed and fully handled. All meetings are announced on the NPFMC website, and the Council uses a 'Three Meeting Outlook' to summarize matters of concern that will most likely be covered at the next three NPFMC sessions[17]. This method allows stakeholders to prepare and submit comments ahead of time for meetings, allowing concerns regarding current, proposed, or former management arrangements to be addressed in the appropriate forum. Individual Fishing/Processor Quotas (IFQ/IPQ) processes, for example, have shown adequate consideration of past management actions over the years since the program's inception. NPFMC and NMFS reviewed changes to the IFQ/IPQ system and the rules that govern it whenever alterations (e.g., Community protection measures, crew protection measures, etc.) were proposed. Many years of public input submitted as part of the NEPA process have revealed a constant trend toward better management: from open access to license limitation to the IFQ/IPQ system. The NPFMC and the Alaska Board of Fisheries (BOF) routinely take into account all previously agreed management actions, as indicated by their historical records. All stakeholders are welcome to submit revisions to any regulation dealing with the fisheries under discussion at BOF meetings. The state/federal management system has a lengthy history of strengthening enforcement and taking into consideration past management actions.	

[17] https://www.npfmc.org/wp-content/PDFdocuments/meetings/threemeetingoutlook.pdf

1.2.1.	**Previously agreed management measures established and applied in the same region is region shall be taken into account by management.**							
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that previously agreed management measures established and applied in the same region are taken into account by management.*								☑
EVIDENCE: NPFMC Three meeting outlook. https://www.npfmc.org/wp-content/PDFdocuments/meetings/threemeetingoutlook.pdf								
References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.1.4 Supporting Clause 1.3.

1.3.	**Where transboundary, shared, straddling, highly migratory, or high seas stocks are exploited by two or more States (neighboring or not), the applicant and appropriate management organizations concerned shall cooperate and take part in the formal fishery commission or arrangements appointed to ensure effective conservation and management of the stock(s) in question and their environment.**	
Relevance:	Not relevant. This clause is not applicable to the crab stocks under assessment. The five crab stocks under assessment (BB Red King Crab, SMI Blue King Crab, AI Golden King Crab, EBS snow crab, and EBS tanner crab) are not considered trans-boundary, shared, straddling, highly migratory, or high seas fish stocks (see discussion of BSAI crab stock structure under clause 1.2).	
	Note: This clause pertains only if the stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2. Where sub-stocks are referred to as part of an overall stock, there shall be sufficient information on biology, distribution, and life cycle that demonstrates the degree of association or disassociation, and the basis for the management approach taken, to prevent recruitment failure of the stock or other negative impacts that are likely to be irreversible or very slowly reversible.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism in place by which the applicant organization(s) cooperates for the management of the transboundary, shared, straddling, highly migratory or high seas stock. This mechanism has the sustainable total exploitation of the stock as its main objective.*		☐
EVIDENCE:		
Current Status/Appropriateness/Effectiveness: *There is evidence that the mechanism described in the process parameter is effective at ensuring the stock is sustainably exploited. This can take the form of evidence that the stock is not overfished or subject to overfishing across the entirety of the range of the stock.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where transboundary, shared, straddling, highly migratory, or high seas fish stocks are exploited by two or more States, the applicant and appropriate management organizations concerned cooperate and take part in formal fishery discussions or arrangements that have been appointed to ensure effective conservation and management of the stock(s) and fisheries in question. Examples may include evidence of formal agreements, records of meetings, and decisions.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	–	(	**Number of EPs <u>NOT</u> met**	x 3	)	=	**Overall score**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.5 Supporting Clause 1.3.1.

1.3.1.	**Conservation and management measures established for the stock under consideration within the jurisdiction of the relevant States for transboundary, shared, straddling, highly migratory, or high seas stocks, shall be compatible in a manner consistent with the rights, competence, and interests of the States concerned.**	
Relevance:	Not relevant. The five crab stocks under assessment are not considered shared, straddling, high seas or highly migratory stocks. As such, this clause is not applicable	
	Note. This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2. Compatibility of management measures does not mean identical management measures, but the approach shall be consistent with respect to the overall management and conservation goals of the stock.	
Evaluation Parameters		**Met?**
Process: *Identification of common objectives for maintenance of stock biomass.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *Implementation of measures to achieve the common objectives mentioned above (i.e., similar harvest rates based on stock status, common rebuilding objectives for depleted stocks).*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures established for the stock within the jurisdiction of the relevant States for shared, straddling, high seas, or highly migratory stocks, are compatible in a manner consistent with the rights, competences, and interests of the States concerned. Examples may include evidence of formal agreements, records of meetings and decisions, stock assessment, and other reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.6 Supporting Clause 1.4.

1.4.	**A State's fishery management organization not member or participant of a sub-regional or regional fisheries management organization shall cooperate, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement.**	
Relevance:	Not relevant. The five crab stocks under assessment are not considered shared, straddling, high seas or highly migratory stocks. As such, this clause is not applicable	
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.	
Evaluation Parameters		**Met?**
Process: *There is ongoing cooperation in stock assessment, data sharing, and other activities.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *Relevant measures are implemented by non-member States.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State non-member or participant of a sub-regional or regional fisheries management organization cooperates, in accordance with relevant international agreements and law, in the conservation and management of the relevant fisheries resources by giving effect to any relevant measures adopted by such organization or arrangement. Examples may include reports detailing results of common surveys or acceptable harvest rates.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.7 Supporting Clause 1.4.1

1.4.1.	**A fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement shall consult with the latter, in advance to the extent practicable, and take its views into account.**
Relevance:	Not relevant. The five crab stocks under assessment are not considered shared, straddling, high seas or highly migratory stocks. As such, this clause is not applicable
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.

Evaluation Parameters	**Met?**
Process: *There is a history of prior consultation.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *The views of the managing fishery organization are taken into account.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fishery management organization seeking to take any action through a non-fishery organization which may affect the conservation and management measures taken by a competent sub-regional or regional fisheries management organization or arrangement consults with the latter, in advance to the extent practicable, and take its views into account. Examples may include reports detailing action taken by the State(s) in question.*	☐
EVIDENCE:	

References:									
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10								

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.2.1.8 Supporting Clause 1.5.

1.5.	**The applicant's fishery management system, when appropriate for the stock under consideration, shall actively foster cooperation between States with regard to (1) information gathering and exchange, (2) fisheries research, (3) fisheries management, and (4) fisheries development.**	
Relevance:	Not relevant. The five crab stocks under assessment are not considered shared, straddling, high seas or highly migratory stocks. As such, this clause is not applicable	
	Note: This clause pertains only if stock is transboundary, shared, straddling, highly migratory, or high seas. Otherwise, this clause is not applicable. This clause is justified by the evidence provided in clause 1.2.	

Evaluation Parameters	**Met?**
Process: *The extent to which a formal process or system is available.*	☐
EVIDENCE:	
Current Status/Appropriateness/Effectiveness: *Level of activity, application, and level of engagement.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the applicant's fishery management system, when appropriate for the stock under consideration, fosters active international cooperation on fishery matters with regard to information gathering and exchange, fisheries research, fisheries management, and fisheries development. Example of evidence sources may include outputs from activity (e.g., reports, minutes, common or collective themes).*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):								

9.2.1.9 Supporting Clause 1.6.

1.6.	**A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is an agreed-upon system to finance the fishery management organizations and arrangements.*		☑

EVIDENCE:
There are established means by which fisheries management activities, organizations and arrangements are financed. Where appropriate, arrangements aim to recover the costs of fisheries conservation, management and research.

The majority of the costs associated with managing, researching, and enforcing the BSAI crab fishery are covered by Congressional funding for federal programs. In addition to financing from the Alaska Legislature, the NMFS provides some funding to the state of Alaska. The Crab Observer Program is supported by business monies as well as grants from Test Fish. An annual financial report outlining test fish expenses on the BSAI crab fisheries observer program is sent by ADF&G to the Crab Observer Oversight Task Force (COOTF) (ADF&G 2016).

Current status/Appropriateness/Effectiveness: *The fishery management organizations and arrangements are currently financed using a cost recovery or other system.*	☑

EVIDENCE:
The majority of the costs associated with managing, researching, and enforcing the BSAI crab fishery are covered by Congressional funding for federal programs. In addition to financing from the Alaska Legislature, the NMFS provides some funding to the state of Alaska. The Crab Observer Program is supported by business monies as well as grants from Test Fish. An annual financial report outlining test fish expenses on the BSAI crab fisheries observer program is sent by ADF&G to the Crab Observer Oversight Task Force (COOTF) (ADF&G 2016).

Alaska pays $2 million per year on BSAI crab management and research, which comes from the state's general revenue and test fish monies. Congress also pays it about $800,000 in federal crab reduction fees and other costs for Bering Sea crab research. Congressional appropriations, other public sector financing, and business money are used to cover the majority of research costs, including data processing and stock appraisal. University researchers receive financing from a variety of sources, including state, federal, private, and foreign sources.

1) Management; conservation and management of the fishery, as well as services for fishery participants, are primarily funded by Congressional appropriations and industry support programs, such as marine fisheries commissions and disaster relief.

2) Enforcement; Congressional appropriations and industry funds are used to pay vessel boarding, dockside monitoring, vessel monitoring system (VMS) implementation, auction inspection, aerial surveillance, and criminal investigations (for some VMS).

Program for Observers Alaska Statute contains provisions for funding the crab observation program (5 AAC 39.645.c Shellfish onboard observer program). The expenditures of the program are covered by federal grants and/or test fishing (cost-recovery). Costs of observer coverage are covered wholly by the vessel (100 percent coverage), through test-fishing, and/or through federal funds.

1.6.	**A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.**

Budget for NOAA[18]

The budget of the National Oceanic and Atmospheric Administration (NOAA) is split into two parts: operations, research, and facilities (ORF) and procurement, acquisition, and construction (PAC) (PAC). These two accounts account for more than 98 percent of the total NOAA appropriation for Fiscal Year (FY) 2021. Other accounts include Pacific Coastal Salmon Recovery, Coastal Impact Assistance Fund, Fishermen's Contingency Fund, Foreign Fishing Observer Fund, Fisheries Finance Program Account, Promote and Develop American Fishery Products and Research Pertaining to American Fisheries Fund, Damage Assessment and Restoration Revolving Fund, Coastal Zone Management Fund, Federal Ship Financing Fund, Limited Access System Administration Fund, Environmental Mammal Unusual Mortality Event Fund, and Medicare-Eligible Retiree Healthcare Fund.

The National Marine Fisheries Service (NMFS) of NOAA serves the nation by promoting sustainable fisheries and healthy coastal and marine ecosystems through a science-based approach to conservation and management of living marine resources. For economic, recreational, and subsistence purposes, NMFS manages 469 fish stocks, invertebrates, sea turtles, marine mammals, and other marine and coastal species, as well as their environments, inside the US Exclusive Economic Zone (EEZ). The President requested $869.8 million for NMFS in his FY 2021 budget (across all appropriations).

The following items are typically covered by the NMFS budget:

1) Protected Species Research & Management;
2) Fisheries Research and Management;
3) Enforcement & Observers/Training;
4) Habitat Conservation & Restoration;
5) Other Activities Supporting Fisheries.

The Fisheries Finance Program Account provides direct loans to help fisheries become more sustainable. At the request of a Fishery Management Council, the program provides Individual Fishing Quota (IFQ) finance. The program also makes long-term fixed-rate financing available to U.S. residents who would otherwise be ineligible for financing and refinancing of fishing vessels, shoreside processing, aquaculture, and mariculture facilities. These loans give at least one part of an otherwise turbulent sector some stability.

The Promote and Develop American Fishery Items & Research Pertaining to American Fisheries Fund receives 30% of the import duties collected on fishery-related products by the Department of Agriculture. A part of these monies will be used by NOAA to offset marine fishery resource programs in the FY 2016 Operations, Research, and Facilities (ORF) appropriation. The remaining funds are used by NOAA to encourage industry development through competitively awarded external grants for innovative fishing industry research and development initiatives, as well as internal research that complements the external program.

NOAA serves as trustee for the Damage Assessment and Restoration Revolving Fund (DARRF), which receives funds from claims against responsible parties for harm to natural resources, as determined by court settlements or agreements. NOAA transferred cash to the ORF account for damage assessment and rehabilitation in FY 1999 and previous years. Funds were expended in the DARRF and treated as obligatory budget authority beginning in FY 2000. NOAA responds to hazardous materials spills in coastal and marine settings by conducting damage assessments, giving scientific support during litigation, and using recovered damages to rehabilitate affected resources.

[18] https://www.commerce.gov/sites/default/files/2020-02/FY_2021_DOC_BiB-021020.pdf

1.6.	**A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.**

The Federal Ship Financing Fund is in charge of the loan guarantee portfolio that existed before the Federal Credit Reform Act of 1990 was passed.

The Limited Access System Administration Fund (LASAF) was created under the authority of Section 304(d)(2)(A) of the Magnuson Stevens Fisheries Conservation and Management Act, which stated that the NMFS must collect a fee to recover the incremental costs of managing, collecting data, and enforcing Limited Access Privilege Programs (LAPPs). These fees are put into the LASAF and are limited to 3% of the ex-vessel value of any fish harvested under such a program. A Regional Council might also develop and implement a royalties collection program for the initial or subsequent distribution of allocations; royalties are deposited in the LASAF. The LASAF shall be used solely for operating the central register system and administering and implementing the Magnuson-Stevens Act in the fishery in which the fees were collected, without regard to appropriation or fiscal year limits.

The Department of the Interior and Related Agencies Act of 1998 established the **Environmental Improvement and Restoration Fund** for the goal of conducting maritime research in the North Pacific. These funding will be used to fund research efforts on or relevant to fisheries or marine ecosystems in the North Pacific Ocean, Bering Sea, and Arctic Ocean by federal, state, private, or foreign organizations or individuals.

The Marine Mammal Unusual Mortality Event Fund provides funds to support investigations and responses to unusual marine mammal mortality events.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is agreement on the means by which the activities of such organizations and arrangements are financed. Where appropriate, and when possible, such organizations and arrangements aim to recover the costs of fisheries conservation, management, and research. Examples may include data showing the expenditure and cost recovery derived from fisheries management.*	☑

EVIDENCE:

ADF&G (2016) Alaska Department of Fish & Game (ADF&G) Bering Sea and Aleutian Islands (BSAI) crab observer program annual test fish report. Report to Crab Observer Oversight Task Force (COOTF). June 21, 2016. 19 p. https://www.adfg.alaska.gov/static/fishing/PDFs/commercial/bering_aleutian/fy16_adfgreporttoCOOTF.pdf

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

DOC (2016) The Department of Commerce Budget In Brief, Fiscal Year 2016. Penny Pritzker, Secretary. 160 p. http://www.osec.doc.gov/bmi/budget/FY16BIB/EntireDocument-WebVersionWithCharts.pdf

DOC (2021) The Department of Commerce Budget In Brief, Fiscal Year 2016. Gina Raimondo, Secretary. 154 p. https://www.commerce.gov/sites/default/files/2020-02/FY_2021_DOC_BiB-021020.pdf

NOAA Fisheries (2016) Crab Rationalization Program Cost Recover for Fishing Year 2015/2016. Sustainable Fisheries Division, NOAA Fisheries, 9 p. https://alaskafisheries.noaa.gov/sites/default/files/reports/fleetreport_fees2015_2016.pdf

References:								
Numerical score:	**Starting score**	–	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High

1.6.	**A fishery management organization and sub-regional or regional fisheries management organizations and arrangements, as appropriate, shall agree on the means by which the activities of such organizations and arrangements will be financed, bearing in mind, inter alia, the relative benefits derived from the fishery and the differing capacities of States to provide financial and other contributions. Where appropriate, and when possible, such organizations and arrangements shall aim to recover the costs of fisheries conservation, management, and research.**

Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.2.1.10 Supporting Clause 1.6.1.

1.6.1.	**Without prejudice to relevant international agreements, States or fishery management organizations shall encourage banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures.**
Relevance:	Not relevant. The BSAI king and Tanner Crab fisheries are conducted exclusively within the U.S. EEZ of Alaska. Only U.S. flagged vessels are permitted to access the fishery. There is no possibility of the use of flags of convenience. As such this clause is not applicable
	Note: The fishery for the *stock under consideration* occurs outside the exclusive economic zone (EEZ), there is evidence of flags of convenience, and evidence of illegal, unreported, and unregulated (IUU) fishing. Not applicable otherwise.

Evaluation Parameters	Met?
Process: *There is a system that encourages banks to require vessels to be flagged within the jurisdiction of interest.*	☐
EVIDENCE:	
Current Status/Appropriateness/Effectiveness: *There is regulation that directs for vessels to be flagged outside the State's jurisdiction. The fishery for the stock under consideration occurs outside EEZ, and there are flags of convenience operations present, or evidence of IUU fishing.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State or fishery management organizations encourages banks and financial institutions not to require, as a condition of a loan or mortgage, fishing vessels or fishing support vessels to be flagged in a jurisdiction other than that of the State of beneficial ownership where such a requirement would have the effect of increasing the likelihood of non-compliance with international conservation and management measures. Examples may include data showing fishery operation by vessels flying a flag different from that of the State where fishing geographically occurs.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):								

9.2.1.11 Supporting Clause 1.7.

1.7.	**Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a procedure to review management measures. The procedure includes the use of outcome indicators against which the success of management measures in achieving specific management objectives is measured. The procedure covers all management measures, including those relating to the sustainable exploitation of the target stock; the mitigation of negative impacts on non-target species through bycatch, discarding, and indirect effects; and the protection of Endangered, Threatened, Protected (ETP) species and the physical environment. Please note that both the management processes of the North Pacific Fishery Management Council (NPFMC) for federal waters, and the Alaska Board of Fisheries (BOF) for state waters, allow for the continuous review of conservation and management measures. Such processes shall be clearly documented as relevant to key management measures for the fishery under assessment.*		☑
EVIDENCE: Procedures are in place within the management system to ensure continuous review of the efficacy of conservation and management measures. A mechanism exists to revise or abolish current management measures in light of new information. there is a process in place to amend or eliminate present management measures. Regional Fishery Management Councils are required by the Magnuson-Stevens Act (MSA) to "conduct public hearings, at appropriate times and in appropriate locations in the geographical area concerned, to allow all interested persons an opportunity to be heard in the development of fishery management plans and amendments to such plans. The NPFMC has mechanisms in place to guarantee that the effectiveness of conservation and management measures is continually assessed (NPFMC 2012). The Council evaluates past, current, and potential future conservation and management measures on a yearly basis. The NPFMC prepares the agenda for each meeting based on current priority issues as well as expected future changes/events that may have an influence on BSAI crab fisheries, with all meetings available to public discussion		
Current status/Appropriateness/Effectiveness: *If, as a result of the review process, it is determined that management measures are not achieving the specific management objectives they are designed to achieve, they are revised and updated as appropriate.*		☑
EVIDENCE: In light of new information, there is a process in place to amend or eliminate present management measures. Regional Fishery Management Councils are required by the Magnuson-Stevens Act (MSA) to "conduct public hearings, at appropriate times and in appropriate locations in the geographical area concerned, to allow all interested persons an opportunity to be heard in the development of fishery management plans and amendments to such plans..."[19]: 1852(f)(3) Section 1852(f)(5) to "continuously examine, and update as necessary, the assessments and specifications issued under to section 1853(a)(3) and (4) of this chapter with respect to the optimum yield..." The NPFMC has mechanisms in place to guarantee that the effectiveness of conservation and management measures is continually assessed (NPFMC 2012). The Council evaluates past, current, and potential future conservation and management measures on a yearly basis. The NPFMC prepares the agenda for each meeting based on current priority issues as well as expected future changes/events that may have an influence on BSAI crab fisheries, with all meetings available to public discussion[20]. The constant public input into the NPFMC process effectively enables public oversight of the NPFMC's actions, with problems being debated as long as they are of interest to the stakeholder. Where areas of concern are found, NPFMC meetings discuss and debate revisions to conservation and management measures, with the resulting		

[19] https://www.law.cornell.edu/uscode/text/16/1852
[20] https://www.npfmc.org/council-meeting-archive/

1.7.	**Within the fishery management system, procedures shall be in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information.**

recommendations being sent to the appropriate agencies for approval. The amended regulations are implemented and enforced by the competent agencies after they have been approved. The Crab Plan Team (CPT), Scientific and Statistical Committee (SSC), the public, and the NPFMC, for example, review crab stocks and current rules as part of the yearly crab SAFE assessment process. The CPT, SSC, the public, or the Council can propose an amendment to the FMP if a need for program modification is identified during the annual review process.

Alaska's Board of Fisheries (BOF) features transparent management arrangements and decision-making processes, similar to NPFMC. Measures for conservation management are reviewed on a regular basis. On their websites, the Board (and ADFG) provide a wealth of information, including meeting agendas, discussion papers, news items, and decision records[21]. BOF deliberations are held in an open, public session, which actively encourages stakeholder participation. Anyone can make regulation ideas, and the BOF considers all of them. The Board of Fisheries has the jurisdiction to make regulations such as creating open and closed seasons and areas for taking fish, quotas, bag limits, harvest levels and limitations for taking fish, and methods and means for taking fish, as defined in AS 16.05.251. The issuance of amended Commercial Fisheries Regulations for King and Tanner Crab Fisheries by the BOF demonstrates its review and revision of conservation and management activities (ADF&G 2015).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fishery management system, procedures are in place to keep the efficacy of current conservation and management measures and their possible interactions under continuous review, and to revise or abolish them in the light of new information. Examples may include data showing recent regulation or management plan revisions.*	☑

EVIDENCE:

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

NPFMC (2012) Statement of Organization, Practices, and Procedures of the North Pacific Fisheries Management Council. Draft, 23 March 2012. 31 p. https://www.npfmc.org/wp-content/PDFdocuments/membership/SOPPs412.pdf

ADF&G (2020) 2020-2021 Commercial Fisheries Regulations for King and Tanner Crab Fisheries. Alaska Department of Fish and Game, 169 p. http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[21] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

9.2.1.12 Supporting Clause 1.8.

1.8.	**The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Current status: *There is transparency in management arrangements. Please note that both the management processes of the NPFMC for federal waters, and the BOF for state waters, shall be clearly documented to provide evidence for the transparency of these arrangements and decision-making processes.*		☑
EVIDENCE: Management arrangements and decision making are organized in a transparent manner for the fishery. As previously explained under supporting clause 1.7, the NPFMC and BOF procedures are organized in a highly transparent manner in terms of both management structures and decision-making processes. NPFMC: The public is welcome to attend council meetings, which are published in advance. The Council's rules of procedure mandate transparency in all subjects, including advance preparation and public notice of meeting agendas (NPFMC 2012). The NPFMC prepares the agenda for each meeting based on current priority problems as well as probable future changes/events that could affect BSAI crab fisheries. BOF: Alaska's Board of Fisheries (BOF) management arrangements and decision-making processes for the fishery are arranged in a transparent manner, similar to NPFMC's. On their websites, the Board (and ADFG) provide a wealth of information, including meeting agendas, discussion papers, news items, and decision records.		
Effectiveness: *There is transparency in decision-making processes.*		☑
EVIDENCE: As previously explained under supporting clause 1.7, the NPFMC and BOF procedures are organized in a highly transparent manner in terms of both management structures and decision-making processes. NPFMC: The public is welcome to attend council meetings, which are published in advance. The Council's rules of procedure mandate transparency in all subjects, including advance preparation and public notice of meeting agendas (NPFMC 2012). The NPFMC prepares the agenda for each meeting based on current priority problems as well as probable future changes/events that could affect BSAI crab fisheries. On their websites, the Council (and the NMFS) provide a wealth of information, including meeting agendas, discussion papers, and decision records[22]. All Council deliberations are held in open, public session, and the Council actively promotes stakeholder participation. As previously stated, the Three Meeting Outlook identifies problems that are likely to be of importance and thus covered at the next three NPFMC meetings, allowing stakeholders to prepare and submit views for discussion in advance of the meetings. BOF: Alaska's Board of Fisheries (BOF) management arrangements and decision-making processes for the fishery are arranged in a transparent manner, similar to NPFMC's. On their websites, the Board (and ADFG) provide a wealth of information, including meeting agendas, discussion papers, news items, and decision records[23]. BOF deliberations are held in an open, public session, which actively encourages stakeholder participation. Anyone can make regulation ideas, and the BOF considers all of them.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the management arrangements and decision-making processes for the fishery are organized in a transparent manner. Examples may include records of the management arrangements and decision-making processes.*		☑

[22] https://www.npfmc.org/council-meeting-archive/
[23] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

1.8.	The management arrangements and decision-making processes for the fishery shall be organized in a transparent manner.								
EVIDENCE: NPFMC (2012) Statement of Organization, Practices, and Procedures of the North Pacific Fisheries Management Council. Draft, 23 March 2012. 31 p. https://www.npfmc.org/wp-content/PDFdocuments/membership/SOPPs412.pdf									
References:									
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.2.1.13 Supporting Clause 1.9.

1.9.	**Management organizations not party to the Agreement to Promote Compliance with International Conservation and Management Measures by Vessels Fishing in the High Seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement.**	
Relevance:	Relevant.	
	Note: Not applicable if the fishery does not occur in high seas.	
Evaluation Parameters		**Met?**
Process: *Regulation to implement the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas has been adopted. Assessors shall consult the following document* http://www.fao.org/docrep/meeting/003/x3130m/X3130E00.htm *for reference to the Agreement.*		☑
EVIDENCE: The crab fisheries under assessment are managed under the BSAI King and Tanner Crab Fisheries Management Plan (FMP) which are prosecuted exclusively within waters of the U.S. EEZ and State of Alaska. These fisheries do not occur on the high seas. As such this clause is not applicable.		
Current status/Appropriateness/Effectiveness: *There are laws regulating high seas fishing activity. Describe how they accomplish this.*		☑
EVIDENCE: This clause is currently not applicable to the five crab fisheries under assessment. At present there are no high seas harvests of the five crab stocks considered under this assessment. However, as was noted in the initial assessment of BSAI King and Snow Crab fisheries (GTC 2012), if stock distributions were to change in the future (e.g. in response to climate change) such that high seas harvests were to occur, then it would be applicable to assess fishery compliance with the Agreement. Of relevance to this hypothetical scenario: The Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas ("Compliance Agreement") was adopted under the auspices of FAO, by FAO Conference Resolution 15/93 at the 27th Session of the FAO Conference in November 1993. It was adopted as part of FAO's work on the Code of Conduct for Responsible Fisheries (see 9.1.3) and was formally integrated as part of the Code when that instrument was adopted in 1995 (see Article 1(1) of the Code of Conduct). Unlike the other parts of the Code, however, the Compliance Agreement is a legally binding treaty. It entered into force on 24 April 2003, after acceptance by 25 Parties. The United States ratified the Agreement on the 19 December 1995.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization is party to the Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas, or has adopted laws and regulations consistent with the provisions of the Agreement. Examples may include reports on the management of high seas fishing activities.*		☑
EVIDENCE: GTC (2012) FAO-Based Responsible Fisheries Management Certification: Full Assessment and Certification Report for The U.S. Alaska King and Snow Crab Bering Sea Commercial Fisheries. Global Trust Certification. http://www.alaskaseafood.org/wp-content/uploads/2016/03/FAO-RFM-AK_BSAI-King-and-Snow-Crab-Full-Assessment-and-Certification-Report_Public-Release_28_May_2012.pdf FAO Compliance Agreement (1993) AGREEMENT TO PROMOTE COMPLIANCE WITH INTERNATIONAL CONSERVATION AND MANAGEMENT MEASURES BY FISHING VESSELS ON THE HIGH SEAS. FAO, Rome. http://www.fao.org/fileadmin/user_upload/legal/docs/012t-e.pdf THE INTERNATIONAL INSTRUMENTS: EVOLVING ROLE OF RFMOS AND PROVISIONS RELATING TO IUU FISHING. http://www.fao.org/3/a0098e/a0098e04.htm		
References:		
Numerical score:	**Starting score – Number of EPs NOT met x 3 = Overall score**	

1.9.	**Management organizations not party to the Agreement to Promote Compliance with International Conservation and Management Measures by Vessels Fishing in the High Seas shall be encouraged to accept the Agreement and to adopt laws and regulations consistent with the provisions of the Agreement.**								
		10		**(**	**0**		**)**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.2.2 Fundamental Clause 2. Coastal area management frameworks

Management organizations shall participate in coastal area management, decision-making processes and activities related to the fishery and its users, supporting sustainable and integrated resource use, and conflict avoidance.

9.2.2.1 Supporting Clause 2.1.

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.**	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *A mechanism exists by which the integrated management of multiple coastal area uses is conducted, the possible uses of coastal resources are assessed, and access to them is governed. Accordingly, policies for the management of the coastal area are set. Assessment teams shall document how existing authorities and/or processes cooperate and interact together to manage coastal resources (living and non-living) in a transparent, organized, and sustainable way that minimizes environmental issues while taking into account the socio-economic aspects, needs, and interests of the various stakeholders of the coastal zone.*		☑
EVIDENCE: There is in place an appropriate policy, legal and institutional framework to achieve sustainable and integrated use of living marine resources. The system takes into account the fragility of coastal ecosystems and the finite nature of natural resources, and it considers the rights, needs and customary practices of coastal communities. The system allows for determination of possible uses of coastal resources and governs access to them. Policies for coastal zone management take due account of the risks and uncertainties involved. The BSAI crab fisheries are managed by the state (ADF&G), with NMFS and NPFMC providing federal oversight. Through the federal National Environmental Policy Act (NEPA) process, NMFS and NPFMC participate in coastal area management-related institutional structures as federal agencies. Every time rules are updated or altered, NEPA documentation must be created, which means that all proposed regulations must incorporate NEPA considerations		
Current status/Appropriateness/Effectiveness: *The coastal management framework includes explicit consideration of the fragility of coastal ecosystems, the finite nature of coastal resources, and the needs of coastal communities, and accounts for the rights and customary practices of coastal communities. These policies take due account of risks and uncertainties.*		☑
EVIDENCE: A framework of policies, rules, statutes, and ordinances governs the management of coastal resources within the Alaskan EEZ, with the goal of achieving sustainable and integrated utilization of living marine resources. Coastal zone decision-making processes and activities affecting the BSAI crab fishing resource and its users are involving a number of state and federal authorities. The system considers the vulnerability of coastal ecosystems, the limited nature of natural resources, and the requirements of coastal inhabitants. Furthermore, it promotes the sustainable and integrated use of living marine resources while avoiding user conflict.		

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.**

The BSAI crab fisheries are managed by the state (ADF&G), with NMFS and NPFMC providing federal oversight[24]. Through the federal National Environmental Policy Act (NEPA) process[25], NMFS and NPFMC participate in coastal area management-related institutional structures as federal agencies. Every time rules are updated or altered, NEPA documentation must be created, which means that all proposed regulations must incorporate NEPA considerations. The NEPA process necessitates the release of information to the public, allows for extensive public participation, and assures that decisions are made in partnership with fishery managers, fishermen, fishing organizations, and fishing communities.

A number of other State and Federal institutions, in addition to NMFS and NPFMC, participate in coastal zone activities to ensure the sustainable and integrated use of living marine resources. Below are some of the most important entities, along with a brief description of their involvement in managing coastal resources within Alaska's EEZ.

Alaskan Department of Environmental Conservation (ADEC)[26]
ADEC implements statutes and regulations affecting air, land and water quality and is the lead state agency charged with implementing the federal Clean Water Act.

Alaska Department of Fish and Game (ADFG)[27]
ADFG has jurisdiction over the mouths of designated anadromous fish streams and legislatively designated state special areas (critical habitat areas, sanctuaries, and refuges). Some marine species also receive special consideration through the State's Endangered Species program.

Alaskan Department of Natural Resources (ADNR)[28]
ADNR manages all state-owned land, water, and natural resources (except for fish and game), and uses the state Endangered Species Program to preserve the habitats of species threatened with extinction.

ADNR Office of Project Management and Permitting (OPMP)[29]
The OPMP coordinates the review of larger scale projects in the state such as transportation, oil and gas, mining, federal grants, ANILCA coordination (ANILCA = Alaska National Interest Lands Conservation Act), and land use planning.

U.S. Fish and Wildlife Service (USFWS)[30]
The USFWS fulfills functions including enforcement of federal wildlife laws, protection of endangered species, restoration of nationally significant fisheries and conservation and restoration of wildlife habitat. Additionally, the USFWS distributes monies collected through the Sport Fish and Restoration Program to State fish and wildlife agencies for fishery projects, boating access and aquatic education.

[24] http://www.npfmc.org/
[25] https://www.epa.gov/nepa/national-environmental-policy-act-review-process
[26] http://dec.alaska.gov/
[27] http://www.adfg.alaska.gov/index.cfm?adfg=uselicense.main
[28] http://dnr.alaska.gov/
[29] http://dnr.alaska.gov/commis/opmp/
[30] http://www.fws.gov/help/about_us.html

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.**

Bureau of Ocean Energy Management (BOEM)[31]
The BOEM is responsible for managing environmentally and economically responsible development and provide safety and oversight of the offshore oil and gas leases. The activities of BOEM overlap extensively with those of ADNR, ADFG and ADEC given the potential impacts of such activities on marine resources.

Alaska Coastal Management Program (ACMP)
During the initial RFM assessment of BSAI crab fisheries, assessors noted the role of Alaska's Coastal Management Program (ACMP) in the framework for State management of coastal resources (see GTC 2012). The ACMP expired in 2011 and a ballot initiative to renew the program was not approved by Alaskan voters in 2012.

In effect, non-renewal of ACMP served to formalize and better define the State's role in decision making processes. Alaska has institutional and legal frameworks that determine the possible uses of coastal resources, govern access to them and take into account the rights of coastal fishing communities and their customary practices when doing so. The management framework explicitly recognizes and accounts for the rights of people dependent on marine fishing through NPFMC process, the Western Alaska Community Development Quota (CDQ) Program, allowances for subsistence fisheries in Alaskan waters and consultation with tribes and Native corporations. Ultimately, the assessment team considers the collectivity of NEPA processes and existing remits of State and Federal agencies to be demonstrably capable of planning and managing coastal developments in a transparent, organized and sustainable way.

NPFMC processes
The Council system mandated under the MSA (of which the NPFMC is part) was designed so that fisheries management decisions were made at the regional level allowing input from affected stakeholders. NPFMC meetings are open and public testimony is taken ensuring that the rights of coastal communities and their historic access to the fishery are considered in the decision making process.

The Western Alaska Community Development Quota (CDQ) Program[32]
The Western Alaskan Community Development Quota (CDQ) Program is a federal fisheries program, authorized and governed by the MSA as amended in 2006 (MSA Section 305(i)(1)), which aims to promote fisheries related economic development in western Alaska. The Program involves 65 eligible communities within a fifty-mile radius of the Bering Sea coastline split into six regional organizations, referred to as CDQ groups. The Program allocates a portion of the of the Bering Sea and Aleutian Island harvest amounts to CDQ groups, including halibut, groundfish (Pollock, Pacific cod, flatfish and rockfish), crab and bycatch species. The aims of the Program include:
1. Providing eligible villages with the opportunity to participate and invest in BSAI fisheries
2. Supporting economic development in western Alaska
3. Alleviating poverty and provide economic and social benefits for residents of western Alaska
4. Achieving sustainable and diversified local economies in western Alaska.

The six CDQ groups are located throughout the western Alaska coastline and South towards the Aleutian islands, these are:
- Aleutian Pribilof Island Community Development Association (6 communities)
- Bristol Bay Economic Development Corporation (17 communities)
- Central Bering Sea Fishermen's Association (1 community)
- Coastal Villages Region Fund (20 communities)

[31] http://www.boem.gov/uploadedFiles/Proposed_OCS_Oil_Gas_Lease_Program_2012-2017.pdf
[32] https://alaskafisheries.noaa.gov/fisheries/cdq

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.**

- Norton Sound Economic Development Corporation (15 communities)
- Yukon Delta Fisheries Development Association (6 communities).

By subsidizing docks, harbors, vessel acquisition, and the development of seafood processing facilities in western Alaska, the CDQ program has been a successful contributor to fisheries infrastructure. CDQ organizations have been able to gain equity ownership interests in the halibut, groundfish, and crab sectors as a result of the CDQ program, which has provided additional cash to fund local in-region economic development projects as well as education and training programs.
Allocation to the Adak Community (ACA)

The BOF established regulation for an ACA Western Aleutian Islands golden king crab fishery in 2005, in accordance with the CR program. The initiative was created to aid the Adak community, which established the Adak Community Development Corporation (ACDC). The Adak Community Development Corporation (ACDC) is a non-profit organization that represents the Adak community and is governed by a board of directors elected by Adak people. Because Adak is not a CDQ community, the ACA crab allotment is not a CDQ fishery. The group must present to DCED a detailed strategy for how the ACA monies generated from the harvesting of the ACA golden king crab will be used. The monies will be used for fisheries-related projects as well as other projects that will benefit the Adak community.

The ACA allocation is 10% of the TAC for the golden king crab fishery in the western Aleutian Islands (west of 174° W longitude). The fishery was first opened in August 2005, with a 270,000-pound allocation.

Consultation with Native corporations and tribes[33]

The National Marine Fisheries Service (NMFS) of the National Oceanic and Atmospheric Administration (NOAA) communicates with tribes and Native companies in Alaska on federal activities that may affect tribal governments and their people. In reality, the Alaska National Interest Lands Conservation Act (ANILCA[34]), which transferred significant swaths of federal land to settle Alaska native lands claims, instructs federal agencies to engage and work with the state. In the creation of policies, legislation, regulations, and programs, Executive Order 13175 establishes a framework for regular and meaningful consultation and collaboration with Alaska Native representatives.

Within and throughout the numerous NEPA processes, NPFMC proceedings, ANILCA, and the Department of Natural Resources (DNR) Office of Project Management and Permitting, risks and uncertainties connected to policies put up for the management of coastal areas are taken into account (OPMP).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that within the fisheries management organization's jurisdiction, an appropriate policy within the legal and institutional framework has been adopted in order to achieve sustainable and integrated use of living marine resources. Examples may include coastal management plans or other policy documents, and frameworks for resource/coastal management.*	☑

EVIDENCE:

National Environmental Policy Act Review Process. https://www.epa.gov/nepa/national-environmental-policy-act-review-process

OFFICE OF PROJECT MANAGEMENT & PERMITTING. http://dnr.alaska.gov/commis/opmp/

U.S. Fish and Wildlife Service Lacey act. https://www.fws.gov/news/blog/index.cfm/2021/8/26/The-Lacey-Act-Quietly-Protecting-Native-Wildlife-for-Over-120-Years-

[33] https://alaskafisheries.noaa.gov/tribal-consultations
[34] http://dnr.alaska.gov/commis/opmp/anilca/

2.1.	**Within the fisheries management organization's jurisdiction, an appropriate policy, legal, and institutional framework shall be adopted in order to achieve sustainable and integrated use of living marine resources, (1) taking into account the fragility of coastal ecosystems and finite nature of their natural resources, (2) allowing for determination of the possible uses of coastal resources and governing access to them, and (3) recognizing the rights and needs of coastal communities and their customary practices to the extent compatible with sustainable development. In setting policies for the management of coastal areas, States shall take due account of the risks and uncertainties involved.**
References:	

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.2.2.2 Supporting Clause 2.1.1.

2.1.1.	**States shall establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism to allow cooperation between neighboring States to improve coastal resource management.*		☑
EVIDENCE: There are mechanisms for cooperation and coordination between U.S. and Canadian national authorities for the p development, conservation and management of coastal areas The United States and Canada are the two countries that when it comes to coastal management in the eastern North Pacific region (i.e., the area comprising the Bering Sea and A Islands). The large shared border and different ecosystems requires tight cooperation across numerous U.S. states, C provinces, U.S. Tribes, First Nations, and local and federal agencies, resulting in one of the world's oldest and most e environmental partnerships. Over 40 international agreements have been enacted by the two federal governments to he environmental management in the border area, with over 100 more at the state level between US states and Canadian pro		
Current status/Appropriateness/Effectiveness: *There are records of cooperation. Examples may include fishery, fishery enhancement, or other agreements or records from international forums.*		☑
EVIDENCE: The United States and Canada are the two countries that matter when it comes to coastal management in the eastern North Pacific region (i.e., the area comprising the Bering Sea and Aleutian Islands). The large shared border and different ecosystems requires tight cooperation across numerous U.S. states, Canadian provinces, U.S. Tribes, First Nations, and local and federal agencies, resulting in one of the world's oldest and most effective environmental partnerships. Over 40 international agreements have been enacted by the two federal governments to help with environmental management in the border area, with over 100 more at the state level between US states and Canadian provinces[35]. Since 1994, Canada, Mexico, and the United States have worked together to protect North America's environment under the North American Agreement on Environmental Cooperation (NAAEC), which was enacted at the same time as the North American Free Trade Agreement (NAFTA) to ensure that the region's economic growth is accompanied by effective cooperation and continuous improvement in the environment. The NAAEC founded the Commission for Environmental Cooperation (CEC[36]), a tri-national intergovernmental institution, to facilitate international collaboration on environmental preservation, conservation, and enhancement in North America. The CEC, which is made up of a Council, a Secretariat, and a Joint Public Advisory Committee (JPAC), is funded by all three governments involved. The Council is the Commission's governing body, consisting of cabinet-level or equivalent representatives from each country; the Secretariat provides technical, administrative, and operational support to the Council; and the JPAC, made up of five citizens from each country, advises the Council on any matter within the NAAEC's scope. The CEC's mission is to "facilitate collaboration and public participation in order to foster conservation, protection, and enhancement of the North American environment for the benefit of current and future generations, in the context of increasing economic, trade, and social links between Canada, Mexico, and the United States." Through its cooperative work program and other programs, the CEC is tasked with addressing some of North America's most severe environmental issues. "Marine Protected Areas: Strengthening Management Effectiveness and Supporting Coastal Community Resilience," "Engaging Communities to Conserve Marine Biodiversity through NAMPAN," and "Conserving		

[35] https://www.epa.gov/international-cooperation/epa-collaboration-canada
[36] http://www.cec.org/about/agreement-on-environmental-cooperation/

2.1.1.	States shall establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas.

Marine Species and Spaces of Common Concern" are examples of past and current CEC projects related to the marine environment.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the States establish mechanisms for cooperation and coordination in planning, development, conservation, and management of coastal areas. Examples may include reports or data on the international cooperation/information exchange in these events.*	☑

EVIDENCE:
COMMISSION FOR ENVIRONMENTAL COOPERATION. http://www.cec.org/category/ecosystems/marine-and-coastal-conservation/
CEC Strategic Plans. http://www.cec.org/files/documents/strategic_plans/cec-strategic-plan-2021-2025.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.2.3 Supporting Clause 2.1.2.

2.1.2.	**The fisheries management organization shall ensure that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources.**	
Relevance:	Relevant/Not relevant.	
Evaluation Parameters		**Met?**
Process: *There are appropriate technical capacities and financial resources.*		☑
EVIDENCE: Management authorities have appropriate technical capacities and financial resources to represent the fisheries sector in coastal management processes. The fishing industry can be represented in coastal management processes by federal and state management bodies with the necessary technical capabilities. NPFMC, NMFS and ADF&G employ internationally recognized scientists, seasoned fishery managers and policy makers. In most cases, these staff persons devote their entire careers to the agency they work for and the resource they are trying to manage.		
Current status/Appropriateness/Effectiveness: *It can be determined with confidence that there are appropriate technical capacities and financial resources.*		☑
EVIDENCE: The fishing industry can be represented in coastal management processes by federal and state management bodies with the necessary technical capabilities. NPFMC, NMFS and ADF&G employ internationally recognized scientists, seasoned fishery managers and policy makers. In most cases, these staff persons devote their entire careers to the agency they work for and the resource they are trying to manage. This displays a technical capability to successfully represent their industry in broader coastal management activities. Authorities also have the financial resources to guarantee that the fishing industry is represented in coastal management processes.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that the authority or authorities representing the fisheries sector and fishing communities in the coastal management process have the appropriate technical capacities and financial resources. Examples may include reports or data, overall operating staff, and financial resources/budgets available.*		☑
EVIDENCE: (Please see clause 1.6 for a discussion about financial resources).		
References:		

Numerical score:	**Starting score**	− (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.2.2.4 Supporting Clause 2.2.

2.2.	**Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.**
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *Describe how fishery-related information is disseminated and how a process is in place to consult with the fishery sector and fishing communities.*	☑

EVIDENCE:

Representatives of the fisheries sector, including fishing communities and the wider public, are consulted in the decision-making processes involved in coastal area management planning and development. The public is kept aware of the need to protect coastal resources and the importance of affected groups participating in management processes.

Through the federal National Environmental Policy Act (NEPA) procedure, NMFS and NPFMC participate in coastal area management-related institutional structures. The NEPA processes provide for extensive and inclusive public participation in the decision-making process (CEQ 2007) Both the NPFMC and the NMFS have procedures in place to enable public participation and ensure that coastal communities' concerns are heeded. NPFMC holds open hearings where public testimony is taken both orally and in writing, and NMFS engages with tribes and Native companies on federal actions that may affect tribal governments and their constituents. The facilitation of public participation ensures that the NPFMC and NMFS are constantly informed about issues that affect coastal communities, and that these issues are taken into account when the Council engages in NEPA processes.

Current status/Appropriateness/Effectiveness: *There are records of consultations with the fisheries sector and fishing communities. Attempts have been made to create public awareness on the need for protection and management of coastal resources, and those affected by the management process have been made aware of its provision.*	☑

EVIDENCE:

Through the federal National Environmental Policy Act (NEPA) process, NMFS and NPFMC participate in coastal area management-related institutional structures[37]. The NEPA processes provide for extensive and inclusive public participation in the decision-making process (CEQ 2007). Representatives from the fishing industry are regularly contacted and involved in coastal area management planning and development decisions. Fishery managers, fishermen, fishing organizations, and fishing communities are all involved in meetings that are open to the public. The social and cultural significance of coastal resources is explicitly articulated as a part of the decision-making process for resource distribution and utilization.

Both the NPFMC and the NMFS have procedures in place to enable public participation and ensure that coastal communities' concerns are heeded. NPFMC holds open hearings where public testimony is taken both orally and in writing, and NMFS engages with tribes and Native companies on federal actions that may affect tribal governments and their constituents. The facilitation of public participation ensures that the NPFMC and NMFS are constantly informed about issues that affect coastal communities, and that these issues are taken into account when the Council engages in NEPA processes. The Alaska Board of Fisheries (BoF) follows similar procedures, such as having open meetings, posting meeting dates, agendas, and minutes, and requesting public comments. These BoF methods encourage public participation and ensure that the Board is aware of coastal communities' concerns about planned management actions.

Many of the State and Federal management entities involved in coastal management planning and development (see clause 2.1 for a list of agencies) have outreach programs to ensure that the public is aware of the importance of participation by affected groups in coastal zone management/decision-making processes. NPFMC, NMFS, and ADF&G, for example, ensure

[37] https://www.epa.gov/nepa/what-national-environmental-policy-act

2.2.	Representatives of the fisheries sector and fishing communities shall be consulted in the decision-making processes involving activities related to coastal area management planning and development. The public, as well as others affected, shall also be kept aware of the need for protection and management of coastal resources, and shall participate in the coastal management process.

that conservation and management actions receive adequate attention and that laws, regulations, and other legal standards controlling their execution are widely communicated. Users of the resource are informed about the rationales and goals of such measures in order to make them easier to use and get more support for their adoption.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that representatives of the fisheries sector and fishing communities are consulted in the decision-making processes and involved in other activities related to coastal area management planning and development. The public, and others affected, are also kept aware of the need for the protection and management of coastal resources and are participants in the management process. Examples may include public records of consultation activities and other available documentation published on the internet or distributed at public meetings.*	☑

EVIDENCE:

Examples of NPFMC meeting and consultations. https://meetings.npfmc.org/Meeting/Details/1745.

NEPA Process. https://www.epa.gov/nepa/what-national-environmental-policy-act

CEQ (2007) A Citizen's Guide to the NEPA. Having Your Voice Heard. Council on Environmental Quality, Executive Office of the President. December 2007. 45 p. https://ceq.doe.gov/get-involved/citizens_guide_to_nepa.html

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)** **=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.2.5 Supporting Clause 2.3.

2.3.	**Fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) shall be adopted, and fishing shall be regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms shall be established at the appropriate administrative level to settle conflicts that arise within the fisheries sector and between fisheries resource users and other coastal users.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *These practices have been adopted, and there is a process to regulate fishing gear, methods, and vessels so as to avoid risk of conflict. If conflicts arise, there is a process in place to settle conflicts between fishery users and other users.*	☑
EVIDENCE: Fisheries practices that avoid conflict among fishers and other coastal user groups (e.g., aquaculture, tourism, energy) are in place. Fishing is regulated to avoid risk of conflict among fishers using different vessels, gear and fishing methods. Procedures and mechanisms exist at State and Federal levels to settle conflicts which may arise within or between the fisheries sector and other coastal users. The NPFMC collaborates closely with the ADFG and the BOF to coordinate fishery management programs in Alaska's state and federal waters, addressing concerns about fish habitat, catch restrictions, allocation issues, and other management issues. The NPFMC and the Alaska BOF have also collaborated on the creation of "local area management plans," or LAMPs, for fisheries at ports with allocation or gear issues.	
Current Status/Appropriateness/Effectiveness: *Describe these practices and their effectiveness within the fishery sector, and between fishers and other coastal users.*	☑
EVIDENCE: CONFLICT AVOIDANCE The majority of internal conflicts are resolved through the management system's open and transparent structures and processes, as well as its participatory nature. Users are given the option to testify in person or in writing at NPFMC meetings, which serve as a forum for resolving any problems. Stakeholders can also peruse proposed rules published in the Federal Register and submit written comments to the NMFS. The NPFMC collaborates closely with the ADFG and the BOF to coordinate fishery management programs in Alaska's state and federal waters, addressing concerns about fish habitat, catch restrictions, allocation issues, and other management issues. The NPFMC and the Alaska BOF have also collaborated on the creation of "local area management plans," or LAMPs, for fisheries at ports with allocation or gear issues[38]. Before presenting LAMP ideas to the NPFMC for action, the Board of Fisheries solicits them and reviews them for protocol adherence. To address near-shore depletion or resolve other user problems, a LAMP could include a range of measures like as moratoriums, harvest caps, and/or exclusion zones for all fisheries. In many circumstances, the NEPA process explicitly considers all resources and users of those resources in order to settle any disputes amongst users prior to project approval. Administrative (via government agencies) and judicial (through courts of law) methods are both used to resolve conflicts. Project approvals are typically deferred until substantive conflicts are resolved. Conflicts between fishermen and other coastal users (such as aquaculture, tourism, and energy) are frequently explored and handled through the NEPA Process.	

[38] http://www.adfg.alaska.gov/static-sf/Region2/ground_fish/PDFs/Guidelines.pdf

2.3.	**Fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) shall be adopted, and fishing shall be regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms shall be established at the appropriate administrative level to settle conflicts that arise within the fisheries sector and between fisheries resource users and other coastal users.**

NPFMC created a "Gear Conflict" management objective inside the Crab FMP (NPFMC 2011) for BSAI crab fisheries to ensure that management actions avoid gear conflicts amongst fisheries. Crab rationalization has considerably reduced the likelihood of gear conflict in BSAI crab fisheries. Because the fisheries are now governed by an IFQ/IPQ system, there are less conflicts. The transition to the IFQ Program, which includes individual quota apportionment and considerably prolonged fishing seasons, has consolidated the fisheries and reduced gear conflict between fishermen.

Conflicts between the BSAI crab fishery and other fisheries operating in the region are also considered and sought to avoid or diminish through NPFMC processes. The federal LLP program or the streamlined Pollock and Flatfish programs govern groundfish fisheries in the Bering Sea. In addition, to safeguard crab habitat, many regions are closed to the groundfish fleet. Commercial fishing has also been prohibited in the waters surrounding traditional subsistence use areas. These fisheries work in tandem with the CDQ program, which safeguards the interests of coastal communities (see clause 2.1).

Furthermore, at the state level, ADF&G and the BOF provide a public forum for stakeholder participation and conflict resolution. Stakeholders have the option of testifying in person or in writing, which decreases the likelihood of confrontation. The role of BOF in IFQ allocation, for example, is considered as an important conflict-avoidance strategy. "By taking on the duty of resolving fishery disputes, the Board relieves fishery managers and politicians of the politically fraught subject of allocation. While this system is not without shortcomings, it significantly improved the management program's credibility by effectively separating allocation decisions from conservation considerations. Separating allocation and conservation decisions is crucial for ensuring sustainable fisheries in Washington and the rest of the Northwest." (Ulmer, *et al.*, 2000).

Dispute Resolution
At both the state and federal levels, procedures and processes for resolving issues exist. Administrative appeals are handled by the NOAA National Appeals Office at the federal level (NAO). The Office hears appeals from people who have been affected by initial administrative decisions, such as those involving the Magnuson-Stevens Fishery Conservation and Management Act. Hearings may be held as part of the appeals process. An administrative appeals officer takes testimony and enters evidence into the record during hearings. Motions and other requests connected to the administrative appeals process may also be addressed by the NAO. The Office ensures that all parties to the appeals process receive due process and that the appeals procedure is governed by solid and consistent law. The NAO identifies the regulatory issues to be resolved, assesses the evidence, and writes written appeal rulings. The Alaska Region Administrative Appeals Commission publishes its decisions on its website (the Alaska Office of Administrative Appeals is now part of NAO). The Office is in charge of designing, publicizing, and enforcing procedural rules that adhere to due process standards (see procedures in NOAA NAO 2014).

Conflict is handled at the state level through the BOF process and programs run by the Alaska Department of Natural Resources and ANILCA. A Joint Board Petition Policy (5 AAC 96.625) allows a person to petition the BOF for the adoption, alteration, or repeal of a regulation50. The petition process, on the other hand, is rarely used. The public has learned to expect a regularly planned participatory procedure to change fish and game rules.

In addition, Chapters 9 and 10 of the BSAI king and Tanner crab fishery management plan (NFMC 2011) contain procedures for challenging State laws or regulations alleged to be in conflict with the Magnuson-Stevens Act, the FMP, or any other applicable Federal law regarding management of these fisheries.

The aforementioned dispute resolution processes have proven to be effective in dealing with most concerns, eliminating the need for legal action in most cases. Parties can and do resolve disputes in the federal court system in circumstances where administrative methods have failed to resolve conflicts.

2.3.	**Fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) shall be adopted, and fishing shall be regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms shall be established at the appropriate administrative level to settle conflicts that arise within the fisheries sector and between fisheries resource users and other coastal users.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fisheries practices that avoid conflict among fishers and other users of the coastal area (e.g., fisheries enhancement facilities, tourism, energy) are adopted and fishing is regulated in such a way as to avoid risk of conflict among fishers using different vessels, gear, and fishing methods. Procedures and mechanisms are established at the appropriate administrative level to settle conflicts that arise within the fisheries sector, and between fisheries resource users and other coastal users. Examples may include laws and regulations or other documents.*	☑

EVIDENCE:

NOAA NAO (2014) National Appeals Office Rules of Procedure. 15 CFR Part 906 [Docket No. 101019524–3999–02] RIN 0648–BA36, Federal Register Vol. 79, No. 25, February 6, 2014, Rules and Regulations. https://www.gpo.gov/fdsys/pkg/FR-2014-02-06/pdf/2014-02565.pdf

NPFMC (2021) Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council, October 2021. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf

NOAA Fisheries National Appeals Office. https://www.fisheries.noaa.gov/national/rules-and-regulations/appeals

5 AAC 96.625. JOINT BOARD PETITION POLICY. https://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2015-2016/august_teleconference/petition_policy_96_625.pdf

References:								
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10		**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.2.6 Supporting Clause 2.4.

2.4.	States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a process that allows for fishery-related information to be disseminated.*	☑
EVIDENCE: Management entities have processes in place to effectively disseminate information relating to conservation and management measures. Managers explain to resource users the purpose behind conservation measures in order to facilitate their application and thus gain increased support in their implementation. Various agency resources provide information about the BSAI crab fishery to resource users and other interested parties. Users can get detailed up-to-date information on management and conservation actions on the websites of the NPFMC, NMFS, and ADF&G. Official profiles on various social media platforms are also maintained by management organizations, through which they can disseminate information and connect directly with stakeholders	
Current status/Appropriateness/Effectiveness: *There is a record of the disseminated information, and is it disseminated effectively, and the basis and purposes of such regulation explained to users.*	☑
EVIDENCE Management bodies have established procedures for properly disseminating information about conservation and management initiatives, as well as relevant laws and regulations. Various agency resources provide information about the BSAI crab fishery to resource users and other interested parties. Users can get detailed up-to-date information on management and conservation actions on the websites of the NPFMC, NMFS, and ADF&G. Official profiles on various social media platforms are also maintained by management organizations, through which they can disseminate information and connect directly with stakeholders[39][40][41]. Management agencies issue regular bulletins[42], news releases[43], and newsletters[44] to keep the public informed about what's going on in Alaska's fisheries. ADF&G prepares and distributes booklets outlining current regulations on a regular basis (for example, Commercial Fisheries Regulations for King and Tanner Crab Fisheries; ADF&G 2021), which are also available online. In addition to attending public events, management agencies have dedicated outreach sections that produce educational resources aimed at providing science-based materials and activities for students and teachers interested in learning more about the science behind marine resource management and conservation[45] Information on conservation measures is distributed through a range of channels in addition to the abovementioned management agency outreach platforms. National Public Radio (NPR) is one of Alaska's most important sources of information (http://www.npr.org/): fishery reports are broadcast on NPR, keeping fishermen up to date on new events as they happen. Local radio stations, the internet (NMFS and ADFG websites), and printed press releases and Emergency Orders (available at local harbormasters' offices, maritime supply businesses, and other locations) are also good places to get information. The Marine Conservation Alliance (MCA) maintains a webpage (http://www.marineconservationalliance.org/)	

[39] https://twitter.com/NOAAFisheriesAK
[40] https://www.facebook.com/NOAAFisheriesAK/?ref=hl
[41] https://www.facebook.com/alaskafishandgame
[42] https://alaskafisheries.noaa.gov/infobulletins/search/
[43] https://alaskafisheries.noaa.gov/news-releases/search
[44] https://www.npfmc.org/npfmc-newsletters/
[45] https://www.fisheries.noaa.gov/outreach-and-education

2.4.	States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.

with links to all of the many State, Federal, Industry, and USCG initiatives and ideas. Industry and communities alike make extensive use of NPR and MCA.

Management organizations work hard to communicate the rationale for and purpose of management and conservation actions to resource users in order to make them easier to apply and garner more support for their adoption. As previously stated, (see clauses 1.8, 2.1, and 2.2), the majority of NPFMC and BOF's business is conducted in open fora, with stakeholders having the opportunity to make comments and remark orally, either in person or electronically. The foundation for management suggestions is defined in supporting materials that are uploaded to the respective publicly accessible web platforms in advance of meetings, with enough time allotted for stakeholders to absorb the content and make appropriate comments. In this approach, NPFMC and BOF meetings serve as forums for resolving potential conflicts between resource users and managers before they turn into full-fledged conflicts, promoting stakeholder "buy-in" and possibly improving community support for proposed management actions.

While the National Marine Fisheries Service's Office of Law Enforcement (OLE) is responsible for enforcing the laws and regulations that protect our country's living marine resources, continuous education of the American public and ocean resource users is critical to their protection and conservation. Special agents, enforcement officers, and support employees from the Office of Legal Education deliver presentations to school, scout, and civic groups on a regular basis. These talks address a wide range of topics related to enforcement and conservation. They cover themes such as marine mammal protection, endangered species, sustainable fisheries, vessel monitoring systems, new Federal fishing legislation, and correct stranding processes, to name a few. Special agents and law enforcement officers are active in their areas and can be contacted through the local field office (http://www.nmfs.noaa.gov/pr/education/).

The NOAA Office of Protected Resources Outreach and Education Plan (NOAA OPR 2005) aims to provide guidance to the numerous initiatives now ongoing across the NMFS Protected Resources (PR) regional and headquarters offices, as well as NMFS science centers. This plan combines NOAA, NMFS, and PR ideas and mandates into an outline and action plan for outreach and education over the next three to five years. Planned outreach and education initiatives have gone off without a hitch. Full-time outreach experts, program personnel with partial outreach responsibilities, and motivated workers who include outreach and education into their regular jobs all contribute to the work. By enhancing the public's knowledge of the status of species, risks to their future survival, and how NMFS science and management are working to solve these issues, outreach and education will improve the public's perception of Protected Resource programs.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements give due publicity to conservation and management measures and ensure that laws, regulations and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures are explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures. Examples may include records of such management measures published in the internet or distributed at public meetings.*	☑

EVIDENCE:

NOAA OPR (2005) NOAA Fisheries Service Protected Resources Outreach and Education Strategic Plan, FY2005 – 2006. 27 p. http://www.nmfs.noaa.gov/pr/pdfs/education/strategic_plan.pdf

ADF&G (2020) 2020-2021 Commercial Fisheries Regulations for King and Tanner Crab Fisheries. Alaska Department of Fish and Game, 169 p. http://www.adfg.alaska.gov/index.cfm?adfg=fishregulations.commercial

NPFMC newsletter. https://www.npfmc.org/npfmc-newsletters/

2.4.	States' fisheries management organizations and sub-regional or regional fisheries management organizations and arrangements shall give due publicity to conservation and management measures and ensure that laws, regulations, and other legal rules governing their implementation are effectively disseminated. The bases and purposes of such measures shall be explained to users of the resource in order to facilitate their application and thus gain increased support in the implementation of such measures.

NOAA News Releases. https://www.fisheries.noaa.gov/news-and-announcements/bulletins?field_management_area_value%5BAlaska%5D=Alaska&field_species_vocab_target_id=&sort_by=created&title=

References:									
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.2.2.7 Supporting Clause 2.5.

2.5.	The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a system that allows for socio-economic value assessments and cultural value assessments to be carried out.*	☑

EVIDENCE:
Management organizations assess the economic, social and cultural value of coastal resources in order to assist decision-making on their allocation and use. Alaska Fisheries Science Center (AFSC) runs the Economic and Social Sciences Research (ESSR) Program in Alaska. The aim of the Program is to provide economic and sociocultural information to assist NMFS in meeting its stewardship responsibilities with activities being conducted in support of its NMFS mission.

Current status/Appropriateness/Effectiveness: *There are socio-economic value assessments and cultural value assessments, both of which are effectively assisting decision making on resource allocation and use.*	☑

EVIDENCE:
Alaska Fisheries Science Center (AFSC) runs the Economic and Social Sciences Research (ESSR) Program in Alaska[46]. The aim of the Program is to provide economic and sociocultural information to assist NMFS in meeting its stewardship responsibilities with activities being conducted in support of this mission including:

- collecting economic and sociocultural data relevant for the conservation and management of living marine resources
- developing models to use that data both to monitor changes in economic and sociocultural indicators and to estimate the economic and sociocultural impacts of alternative management measures
- preparing reports and publications
- participating on NPFMC, NMFS, and inter-agency working groups
- preparing and reviewing research proposals and programs
- preparing analyses of proposed management measures
- assisting Alaska Regional Office and NPFMC staff in preparing regulatory analyses
- providing data summaries

Many of the activities of the Program are conducted in collaboration with other Federal and State agencies and universities. Current research topics being addressed include regional economic impact models, behavioral models of fishing operations, indicators of economic performance, and the non-market valuation of living marine resources.

In 2005, AFSC compiled baseline socioeconomic information about 136 Alaska communities most involved in commercial fisheries compiling information from the US Census, ADF&G, CFEC, NMFS Restricted Access Management Division, Alaska Department of Community and Economic Development, and various community groups, websites, and archives in the process. In 2011 an exercise whereby the scope of the original evaluations was expanded led to updated profiles being produced for a total of 196 communities (Himes-Cornell *et al.* 2013). The new profiles add a significant amount of new information to help provide a better understanding of each community's reliance on fishing. Introductory materials cover purpose, methods, and an overview of the profiled communities in the larger context of the state of Alaska and North Pacific fisheries. The community profiles comprise additional information including, but not limited to, annual population fluctuation, fisheries-related infrastructure, community finances, natural resources, educational opportunities, fisheries revenue, shore-based processing plant narratives, landings and permits by species, and subsistence and recreational fishing participation, as well as information collected from communities in the Alaska Community Survey, which was implemented

[46] https://www.fisheries.noaa.gov/alaska/socioeconomics/alaska-economic-and-social-sciences-research

2.5.	**The economic, social, and cultural value of coastal resources shall be assessed by the appropriate fisheries management organization in order to assist decision making on their allocation and use.**

during summer 2011, and the Processor Profiles Survey, which was implemented in Fall 2011. Comprehensive community profiles, concise snapshots and searchable maps of communities involved in commercial, recreational and subsistence fishing may be found on the AFSC website[47].
Additional information about the value of coastal resources comes from the Alaska Fisheries Information Network (AKFIN)[48]. AKFIN was established in 1997 in response to an increased need for detailed, organized fishery information to aid decision-making by managers with the aims of consolidating, managing and dispensing information related to commercial fishing in Alaska. The AFKIN maintains an analytic database of both State and Federal historic, commercial Alaska fisheries data relevant to the needs of fisheries analysts and economists and provides that data in a usable format.

Assessment results are presented annually in Economic Stock Assessment and Fishery Evaluation (Economic SAFE) reports together with comprehensive information on stock assessments and updates on ecosystem status and trend (Ecosystem SAFE)[49]. For example, the BSAI Crab Economic Status Report summarizes available economic information about the commercial crab fisheries managed under the FMP for BSAI King and Tanner Crab, with particular attention to the subset of fisheries included in the Crab Rationalization program. The report includes information on: production, sales, revenue, and price indices in the harvesting and processing sectors; income, employment, and demographics of labor in harvesting and processing sectors; capital and operating expenditures in the fishery; quota share lease and sale market activity; changes in distribution of quota holdings; productivity in the harvesting sector; U.S. imports and exports of king and Tanner crab; price forecasts; performance metrics for catch share programs; and information regarding data collection and ongoing economic and social science research related to the BSAI crab fisheries and related communities.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the economic, social, and cultural value of coastal resources is assessed in order to assist decision decision-making on their allocation and use. Examples may include reports on social, cultural, and economic value of the resource.*	☑

EVIDENCE:

Garber-Yonts, B., and J. Lee., (2016) 2015 Stock Assessment and Fishery Evaluation Report for King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions: Economic Status of the BSAI Crab Fisheries, 2015. https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/CrabEconSAFE2015.pdf

Himes-Cornell, A., K. Hoelting, C. Maguire, L. Munger-Little, J. Lee, J. Fisk, R. Felthoven, C. Geller, and P. (2013) Community profiles for North Pacific fisheries - Alaska. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-259, Volume 1, 70 p.

References:									
Numerical score:	**Starting score**			**Number of EPs NOT met**					**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**)**	**=**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

[47] https://www.fisheries.noaa.gov/region/alaska#fisheries
[48] https://akfin.psmfc.org/about/about-akfin/
[49] https://meetings.npfmc.org/CommentReview/DownloadFile?p=84d483ac-bae8-437a-8649-bce5ff8480f3.pdf&fileName=D4%20Crab%20Economic%20SAFE.pdf

9.2.2.8 Supporting Clause 2.6.

2.6.	**States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system that allows research and monitoring of the coastal environment, and multidisciplinary research in support of coastal area management is promoted.*	☑
EVIDENCE: State and Federal agencies coordinate ongoing research and monitoring programs for the coastal environment. There are well-established multidisciplinary research programs to assess physical, chemical, biological, economic and social aspects of the coastal area which contribute to improved management. The North Pacific Fishery Management Council (NPFMC), the National Marine Fisheries Service (NMFS), the Alaska Department of Fish and Game (ADFG), the United States Fish and Wildlife Service (USFWS), the North Pacific Research Board (NPRB), and the Pacific Marine Environmental Laboratory (PMEL), as well as institutions of higher learning such as the University of Alaska Institute of Marine Science, are all involved in coastal zone research and monitoring (IMS). The functions of each of these entities are explored in further detail further below.	
Current status/Appropriateness/Effectiveness: *Systems of monitoring and research have taken into account physical, chemical, biological, economic, social, legal, and institutional capabilities to support coastal area management.*	☑
EVIDENCE: For the coastal environment, state and federal organizations collaborate on continuous research and monitoring activities. The National Coastal Zone Management Council (NPFMC), the National Marine Fisheries Service (NMFS), the Alaska Department of Fish and Game (ADFG), the United States Fish and Wildlife Service (USFWS), the North Pacific Research Board (NPRB), and the Pacific Marine Environmental Laboratory (PMEL), as well as institutions of higher learning such as the University of Alaska Institute of Marine Science, are all involved in coastal zone research and monitoring (IMS). The functions of each of these entities are explored in further detail further below. The NPFMC, NMFS, and ADF&G analyze economic and social-cultural components on a regular basis, either as part of their NEPA review of plan revisions or as part of their ongoing research and reviews (e.g., see Himes-Cornell *et al.*, 2013 for recent socio-economic profiles of 196 Alaska communities as described under clause 2.5). The Alaska Department of Environmental Conservation (ADEC); Alaska Department of Natural Resources (ADNR); DNR Office of Project Management and Permitting (OPMP); US Fish and Wildlife Service (USFWS); and Bureau of Ocean Energy Management (BOEM) are among the state and federal agencies that collaborate at the sub-regional level through NEPA processes to improve coastal area management (BOEM). In the supporting evidence for Clause 2.1, there are brief definitions of each position as it relates to coastal area management. EMA Through the collection of survey catch and oceanography observations, the AFSC's "Ecosystem Monitoring and Assessment Program" (EMA) aims to improve and reduce uncertainty in stock assessment models of commercial fish and shellfish species. Temperature, conductivity, salinity, density, photosynthetically available radiation (PAR), oxygen, Chlorophyll a, and estimations of the composition and biomass of phytoplankton and zooplankton (including jellyfish) species are among the oceanographic observations. Climate change and variability in large marine ecosystems are linked to early marine survival of commercially important fish species in the GOA, Bering Sea, and Arctic, according to these fisheries and oceanographic observations.	

2.6.	States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.

The oceanographic component of EMA looks into a variety of physical and biological characteristics in the Bering Sea's eastern region. These data show important spatial and temporal trends that shed light on how the ecosystem works. For comparisons of water mass characteristics, oceanographic data are evaluated separately and in conjunction with fishery data. To investigate productivity, water samples obtained above and below the pycnocline are examined for chlorophyll a content and used in primary production studies to investigate growth rates. Phytoplankton is the foundation of the food web and is vital to the Bering Sea ecology.

Zooplankton and jellyfish are collected to determine the species, biomass, and abundance of the organisms. Many Bering Sea fishes, including forage fishes and juvenile stages of many economically important species, feed on zooplankton. Understanding the connections between phytoplankton, zooplankton, and fishes will help the AFSC better understand changes in fishery stock populations and the impact of climate change in this region[50].

HCD

Habitat Conservation Division (HCD) of NOAA Fisheries works to avoid, minimize, or offset negative anthropogenic effects on Alaska's Essential Fish Habitat (EFH) and living marine resources. Conducting and/or assessing environmental studies for a wide range of activities, including commercial fishing, is part of this job. HCD focuses on activities in marine, estuarine, and freshwater habitats exploited by federally regulated fish species[51].

PMEL

The Pacific Marine Environmental Lab (PMEL) of the National Marine Fisheries Service (NMFS) collects oceanographic and environmental data on a regular basis to better understand the changing habitat of crab and other marine species in Alaskan waters[52].

NPRB

The North Pacific Research Board (NPRB) funds major research projects in the Gulf of Alaska[53] and the Bering Sea[54] aimed at determining the physical and biological mechanisms that determine juvenile groundfish survival in the GOA, as well as understanding the impacts of climate change and dynamic sea ice cover on the eastern BS ecosystem. NPRB has contributed millions of dollars to several projects establishing baseline oceanographic parameters and supporting environmental buoy arrays in the field of oceanography. NPRB has also supported important ecosystem research in the GOA and BSAI worth tens of millions of dollars (which are still ongoing) (see GOAIERP and BSIERP). The NPRB teamed together with the National Science Foundation's BASIS program to boost BSIERP's special funding to roughly $52 million. Individual projects to promote management and conservation of Council-related fisheries were also sponsored by the NPRB. Each NPRB award contains a provision that a portion of the funds be used for community outreach and education.

IMS

The IMS is the School of Fisheries and Ocean Science's oldest and largest unit, and it houses oceanographic and marine biology research, as well as graduate student research for M.S. and Ph.D. degrees[55]. IMS scientists undertake study in the world's oceans, with a focus on arctic and Pacific subarctic seas, as well as collaborative, multidisciplinary ecological studies in Alaska's waters. IMS also undertakes research as part of bigger national and international collaborations69. Over the last decade, externally sponsored research has averaged close to $20 million per year, and with the fully operating R/V Sikuliaq,

[50] https://www.fisheries.noaa.gov/alaska/ecosystems/alaska-ecosystem-monitoring-and-assessment
[51] https://www.fisheries.noaa.gov/region/alaska#habitat
[52] https://www.pmel.noaa.gov/
[53] http://www.nprb.org/gulf-of-alaska-project/about-the-project/
[54] http://www.nprb.org/bering-sea-project/about-the-project/
[55] https://www.uaf.edu/cfos/research/institute-of-marine-scien/index.php

2.6.	**States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.**

it now reaches $43 million in FY17. Expertise in marine biology, biological oceanography, physical, chemical, and geological oceanography is provided by IMS faculty and research employees. The following are the major research areas:

- structure and dynamics of ecosystems
- Climate Change's Consequences
- Factors affecting Alaskan fisheries from an oceanographic and ecosystem perspective
- Applied research issues confronting the Arctic offshore oil and gas business in the United States

Habitat Division of the ADF&G
The Alaska Department of Fish and Game's Habitat Division conducts research on coastal and marine ecosystems around the state in order to monitor and minimize human-related impacts, habitat changes, and species abundance[56].

During the St. Matthew's pot survey, the agency also collects physical and chemical data, such as temperature, depth, salinity, and conductivity, using data loggers mounted on the survey pots.

ADEC
The Division of Water of the Alaska Department of Environmental Conservation (ADEC) sets water quality standards, regulates discharges to waters and wetlands, offers financial assistance for water and wastewater facility construction, as well as waterbody assessment and remediation; trains, certifies, and assists water and wastewater system operators; and monitors and reports on water quality. This agency is also in charge of monitoring and enforcing regulations concerning discharges from fish and shellfish processing[57]. The ADEC Division of Spill Prevention and Response works to avoid oil and hazardous material spills, prepares for spills, and responds quickly to safeguard human health and the environment[58].

USCG
The Coast Guard enforces fishery rules at sea, including regulations that help marine protected species and their habitats recover[59].

RAM
The Restricted Access Management Program (RAM)[60] of the NMFS Alaska Regional Office is in charge of managing Alaska Region permit programs, including those that restrict access to federally controlled fisheries in the North Pacific. RAM compiles and publishes landings reports for all federal fisheries, including the Bering Sea crab fisheries.

AFKIN
The Pacific States Marine Fisheries Commission (PSMFC) established the Alaska Fisheries Information Network (AKFIN)[61] in 1997 to integrate, monitor, and disseminate information about Alaska's commercial fisheries. With a mission to maintain an analytic database of both state and federal historic, commercial Alaska fisheries data relevant to the needs of fisheries analysts and economists and to provide that data in a usable format75, AFKIN was founded in response to an increased need for detailed, organized fishery information to aid in management decisions.

56 http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch.main
57 http://dec.alaska.gov/water/
58 http://dec.alaska.gov/spar/
59 https://www.pacificarea.uscg.mil/Portals/8/Documents/Final-Fact-Sheet-PAC-092.pdf?ver=MiLvWXUWjAcPtVM_ZAeaBA%3d%3d
60 https://www.fisheries.noaa.gov/contact-directory/alaska-regional-office-restricted-access-management-ram-program
61 http://www.akfin.org/about/about-akfin/

2.6.	**States shall cooperate to support and improve coastal area management, and in accordance with capacities, measures shall be taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities.**

ANILCA

The Alaska National Interest Lands Conservation Act (ANILCA)[62] also requires federal agencies to consult and work with Alaska. Natural resources, tourism, and transportation agencies in each state collaborate to provide input during federal planning procedures.

OPMP

The Office of Project Management and Permitting (OPMP)[63] of the Department of Natural Resources (DNR) handles the examination of larger-scale projects in the state. Because of the complexity of these initiatives and their possible influence on numerous divisions or agencies, they usually benefit from having a single central point of contact. To facilitate interagency cooperation and a cooperative working relationship with the project proponent, each project is designated a project coordinator. Transportation, oil and gas, mining, federal funds, ANILCA coordination, and land use planning are among the initiatives handled by the office. Every project is unique, requiring a unique combination of agencies, permitting needs, statutory responsibilities, and resource management responsibilities.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is cooperation to support and improve coastal area management, and in accordance with capacities, measures are taken to establish or promote (1) systems for research and monitoring of the coastal environment, and (2) multidisciplinary research of the coastal area using physical, chemical, biological, economic, social, legal, and institutional capabilities. Examples may include reports on the status of the coastal area using the various aspects listed above.*	☑

EVIDENCE:

Alaska Ecosystem Monitoring and Assessment. https://www.fisheries.noaa.gov/alaska/ecosystems/alaska-ecosystem-monitoring-and-assessment

NOAA Fisheries' Habitat Conservation Division (HCD). https://www.fisheries.noaa.gov/region/alaska#habitat

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[62] http://dnr.alaska.gov/commis/opmp/anilca/

[63] http://dnr.alaska.gov/commis/opmp/

9.2.2.9 Supporting Clause 2.7.

2.7.	**In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system to allow early information sharing (i.e., within appropriate timeframes to avoid negative consequences) between States in case of adverse environmental effects from one State.*	☑
EVIDENCE: If an incident were to occur with potential for adverse environmental effects (e.g., oil spill, escape of an invasive species), there are management systems and action plans in place for response and containment. Additionally, there are systems to ensure the early sharing of information with the relevant Canadian authorities should such events have the potential for spill-over impacts on Canadian waters.	
Current status/Appropriateness/Effectiveness: *There are current agreements for or past records of such occurrences. Examples may include oil spills, and aquaculture farm escapes among others.*	☑

EVIDENCE:

OIL AND HAZARDOUS SUBSTANCES

The International Convention on Oil Pollution Preparedness, Response, and Cooperation (OPRC) is an international maritime convention that establishes national and international methods for dealing with marine oil pollution incidents[64]. The OPRC Convention was written under the auspices of the International Maritime Organization (IMO) before being adopted in 1990, going into force in 1995, and being supplemented in 2000 by a Protocol on hazardous and noxious chemicals. As of April 2016, the treaty had 109 signatories, including the United States, Canada, and Russia, which are the countries most likely to be affected by a marine pollution incident in Alaskan waters.

States that have signed the Convention agree to take all necessary steps, individually or collectively, to prepare for and respond to oil pollution incidents. Parties are also expected to cooperate and offer advisory services, technical support, and equipment in the event of an oil pollution incident, at the request of any Party that is impacted or likely to be affected by the incident. In layman's terms, this means that under the Convention, the United States can both request and receive aid from other signatory states in the case of a marine pollution incident in American seas.

Any event, or indeed any observed event, involving a discharge, probable discharge, or the presence of oil at sea must be reported without delay to either the nearest coastal State, in the case of a ship, or the coastal State whose jurisdiction the unit is subject, in the case of an offshore unit, according to the Convention. Similarly, those in charge of sea ports and oil handling facilities must immediately notify the appropriate national authority of any event involving the discharge or potential release of oil or the presence of oil.

While international marine pollution contingency plans for Canada-United States contiguous waters have been in place since the early 1970s, the provisions of the OPRC need additional changes.

JCP86 is the Joint Marine Pollution Contingency Plan. The plan's custodians are the United States and Canadian Coast Guards, and its purpose is to outline and define roles and responsibilities in the event of a marine pollution incident, as well as provide non-binding guidance to the respective Coast Guards and other appropriate authorities in coordinating preparedness and response operations.

[64] https://www.imo.org/en/About/Conventions/ListOfConventions/Pages/Default.aspx

2.7.	In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.

The Division of Spill Prevention and Response (SPAR) of the Alaska Department of Environmental Conservation is responsible for protecting Alaska's land, waters, and air from oil and hazardous substance spills by preventing, responding to, and ensuring the clean-up of unauthorized oil and hazardous substance discharges. The Prevention and Emergency Response Program (PERP) was created by SPAR with the goal of protecting public safety, public health, and the environment by preventing and mitigating the effects of oil and hazardous substance releases and ensuring their clean-up through government planning and rapid response[65]. PERP personnel perform a range of essential responsibilities during a spill response, depending on the scale and nature of the disaster, including:

- Identifying the spiller, often known as the "responsible party"
- Calculating the amount of liquid spilled and recovered
- Monitoring the spill's progress
- Using the Incident Command System (ICS) defined in the State of Alaska Disaster Response Plan[66] and the Alaska Incident Management System Guide (AIMS) For Oil and Hazardous Substance Response to coordinate with all local, state, and federal interests[67].

The Oil and Hazardous Substance Release Prevention and Response Fund was established in 1986 to provide cash for the safe management and cleanup of oil and hazardous substances. It is funded by a per-barrel fee on crude oil output. The spiller, who is ultimately responsible for these costs, gets reimbursed for state clean-up costs. SPAR may also seek federal reimbursement for costs incurred in oil spill response actions from the National Oil Spill Liability Trust Fund.

The Pacific States/British Columbia Oil Spill Task Force was formed in 1989 by a memorandum signed by the governors of Alaska, Washington, Oregon, and California, as well as the premier of British Columbia, and includes representatives from state and provincial environmental agencies in the Pacific coastal area. Hawaii joined the Task Force in 1990. The task force was formed in response to the necessity for cross-border coordination and collaboration in the aftermath of two significant spills, the oil barge Nestucca (December 1988) and the Exxon Valdez (December 1989). (March 1989).

The goal of the Task Force is to improve oil spill prevention, planning, and response on a state and provincial level. It accomplishes this by gathering and sharing oil spill data, coordinating oil spill prevention efforts, and supporting regulatory safeguards.

Management of Non-native/Invasive Species in the Sea

ADFG, the Aquatic Nuisance Species (ANS) Task Force, and the National Invasive Species Council are among the state and federal entities dealing with the management of biological threats that have the potential to have negative transboundary environmental effects on coastal areas (NISC).

The National Invasive Species Council (NISC) was established by Executive Order in 1999 to offer high-level interdepartmental coordination of federal invasive species measures and to collaborate with other federal and non-governmental organizations to address invasive species challenges on a national level[68].

The ANS Task Force is a 13-agency interagency committee established under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPPCA) to combat nonindigenous aquatic nuisances[69]. The Task Force is entrusted with coordinating, designing, and implementing a program to prevent the introduction and dissemination of ANS in U.S. waters, to monitor, control, and research such species, and to distribute information about ANS. It is co-chaired by the USFWS and NOAA. This program is stated in the Task Force Strategic Plan, which commits to implementing the NANPPCA's

[65] https://dec.alaska.gov/spar/ppr.aspx
[66] https://dec.alaska.gov/spar/ppr/contingency-plans/disaster-response-plan/
[67] https://dec.alaska.gov/media/8433/aims-guide.pdf
[68] https://www.doi.gov/invasivespecies/
[69] https://www.fws.gov/anstaskforce/default.php

2.7.	In the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, States shall provide timely information and if possible, prior notification to potentially affected States, and consult with those States as early as possible.

provisions in dealing with aquatic invasive species challenges (ANS Task Force 2012). The Alaska Aquatic Nuisance Species Management Plan (ADF&G 2012) was adopted by the federal Aquatic Nuisance Species (ANS) Task Force in 2002 as a management plan to address the threat posed by invasive species to Alaska's aquatic ecosystems. The Alaska Aquatic Nuisance Species Management Plan and the Task Force Strategic Plan both emphasize the significance of communication and education in the avoidance of nuisance species.

Management of Aquaculture and Mariculture

All marine locations in the United States are required to have containment management systems, which are enforced by regular inspections and audits. Advanced containment measures and improved management procedures have significantly reduced escapes from U.S. fish farms in the last ten years[70], and this trend is likely to continue as technology and husbandry skills improve.

The Mariculture Program of the ADFG allows and manages aquaculture in a way that protects the state's fish, game, and aquatic plant resources[71]. Oysters, clams, and mussels are the main products of Alaska's mariculture business. The Mariculture Program's key activities include ensuring that aquatic farming does not have a substantial impact on an established fishery resource and is compatible with fish and animal resources and habitat.

Note: It was concluded that clause 2.7 of RFMv1.1 (analogous to clause 2.9 in RFMv1.3) was not applicable in the initial RFM assessment of BSAI Crab since the stocks under assessment are not transboundary and are managed solely within the Alaska EEZ (see GTC 2012). However, the re-assessment team believes that clause 2.9 applies to BSAI crab management because we employ a broader definition of the term "activities," which we consider to include both fishing and non-fishing activities in the coastal zone.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of a States' activities that may have an adverse environmental effect on coastal areas of other States, the State provides timely information and if possible, prior notification to potentially affected States. Examples may include reports or data on the international cooperation in these events.*	☑

EVIDENCE:

ANS Task Force (2012) Aquatic Nuisance Species Task Force Strategic Plan (2013 – 2017). Aquatic Nuisance Species Task Force (ANSTF). May 3, 2012. 29 p. https://www.anstaskforce.gov/Documents/ANSTF%20Strategic%20Plan%202013-2017.pdf

ADF&G (2012) The Alaska Aquatic Nuisance Species Management Plan. Alaska Department of Fish and Game. Juneau, Alaska. October 2002, RIR 5J02-10, 116 p. http://www.adfg.alaska.gov/FedAidpdfs/RIR.5J.2002.10.pdf

References:							
Numerical score:	**Starting score**	**–**	**(** **Number of EPs NOT met**	**x**	**3)**	**=**	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

70 https://www.fisheries.noaa.gov/topic/aquaculture#8what

71 http://www.adfg.alaska.gov/index.cfm?adfg=fishingaquaticfarming.programinfo

9.2.3 Fundamental Clause 3. Management objectives and plan

Management objectives shall be implemented through management rules and actions formulated in a plan or other framework.

9.2.3.1 Supporting Clause 3.1.

3.1.	Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *Management objectives based on the best scientific evidence available (which can include traditional/local knowledge, if verifiable) have been translated into a fishery management plan, are in regulation, or are in another document.*	☑
EVIDENCE: Long term management objectives are translated into a plan that is subscribed to by all interested parties. Long-term objectives for the fishery are outlined in the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs (NPFMC 2011). FMP objectives are dictated by, and consistent with, the Magnuson-Stevens Act (MSA).	
Current status/Appropriateness/Effectiveness: *The objectives described by the management plan are consistent with the sustainable use of the resource, and are subscribed to by all relevant fishery stakeholders.*	☑

EVIDENCE:

Long-term objectives for the fishery are outlined in the Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs (NPFMC 2011). FMP objectives are dictated by, and consistent with, the Magnuson-Stevens Act (MSA).

National Standards for Fishery Conservation and Management

The MSA, as amended, sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent. They are:

1. Conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the optimum yield from each fishery for the United States fishing industry.
2. Conservation and management measures shall be based upon the best scientific information available.
3. To the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.
4. Conservation and management measures shall not discriminate between residents of different States. If it becomes necessary to allocate or assign fishing privileges among various United States fishermen, such allocation shall be A) fair and equitable to all such fishermen; B) reasonably calculated to promote conservation; and C) carried out in such manner that no particular individual, corporation, or entity acquires an excessive share of such privileges.
5. Conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.
6. Conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.
7. Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.
8. Conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), take into account the importance of fishery resources to fishing communities 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.

3.1.	**Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.**

Management Objectives
The BSAI king and Tanner crab FMP lists the following objectives:

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

The national standards and management objectives defined in BSAI Crab FMP provide adequate evidence to demonstrate the existence of long-term objectives clearly stated in a management plan.

The NPFMC's Crab Plan Team uses biological studies conducted by the NMFS to recommend a Total Allowable Catch (TAC) in each fishery[72]. ADF&G establishes catch limits for each of its crab fisheries in the Bering Sea and Aleutian Islands based on their recommendations and the best scientific evidence available at the time. Long-term objectives for these fisheries are also maintained by the BOF and the Department, which are outlined in regulations and Annual Management Reports. The Alaska Administrative Code, Title 5, Chapter 34 and 35, provide state regulations for the king and Tanner crab fishery. 5 AAC 34.816 Bristol Bay red king crab harvest strategy, 5 AAC 34.917 St. Matthew Island Section blue king crab harvest strategy, 5 AAC 35.517 Bering Sea C. opilio Tanner crab harvest strategy, and 5 AAC 35.508 Bering Sea *C. bairdi* Tanner crab harvest strategy are all long-term objectives for State regulations. On the department's website, you can find annual management reports (e.g., Zheng and Pengilly 2011).

The Council and BOF make management decisions, which are then implemented and enforced by AWT, NMFS-OLE, and the USCG (see discussion of enforcement under clause 10). NPFMC and ADF&G both make public their Council and Board deliberations and associated documents on their websites (e.g., Crab SAFE (NPFMC 2016); ADF&G Annual Management Report for Shellfish Fisheries (Leon *et al.*, 2017). Both agencies' decision-making processes are very transparent and open to all stakeholders9697, ensuring that the strategy is supported by all interested parties.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that scientifically based long-term management objectives consistent with the sustainable use of the resource are translated into a plan or other management document which is subscribed to by all interested parties. Examples may include fishery management plan/framework or legal rules.*	☑

EVIDENCE:

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

NPFMC (2011) Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council, October 2011. 229 p. http://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf

NPFMC (2016) Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. 2016 Final Crab SAFE, North Pacific Fishery Management Council, September 2016. 899 p. https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/2016CrabSAFE_final.pdf

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

3.1.	Long-term management objectives shall be translated into a plan or other management document (taking into account uncertainty and imprecision) and be subscribed to by all interested parties.

Leon, J. M., J. Shaishnikoff, E. Nichols, and M. Westphal. (2017) Annual management report for shellfish fisheries of the Bering Sea–Aleutian Islands Management Area, 2015/16. Alaska Department of Fish and Game, Fishery Management Report No. 17-10, Anchorage. http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercial.main

Zheng, J. and D. Pengilly. (2011) Overview of Proposed Harvest Strategy and Minimum Size Limits for Bering Sea District Tanner Crab. Alaska Department of Fish and Game, Special Publication No. 11-02, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/sp11-02.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.3.2 Supporting Clause 3.1.1.

3.1.1.	There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a process that allows for setting specific management objectives in fishery management plans or other relevant regulation (or other appropriate frameworks) for the protection of ETP species.*	☑

EVIDENCE:

There are explicit objectives and management measures to ensure that biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected.

The Magnuson-Stevens Act (MSA) establishes an overall legal framework for the conservation of benthic biodiversity in aquatic ecosystems. Similarly, the Endangered Species Act (ESA) establishes an overall legal framework for ensuring the protection of endangered species (also see references cited under evidence for clause 12.5.1).

The NPFMC's management process includes preserving the biodiversity of aquatic habitats and ecosystems. In the BSAI king and Tanner crab fishery management plan (crab FMP), the NPFMC lays out seven management objectives, one of which is a specific habitat aim (NPFMC 2011). NPFMC has adopted an Ecosystem-Based Fishery Management (EBFM) approach that emphasizes the importance of biodiversity conservation at the ecosystem level.

Current status/Appropriateness/Effectiveness: *There are clear objectives in management plans or other relevant regulations (or other appropriate frameworks) seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and fishery enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Such objectives may be outlined in overarching fisheries legislation, regulations, or management plans.*	☑

EVIDENCE:

The Magnuson-Stevens Act (MSA) establishes an overall legal framework for the conservation of benthic biodiversity in aquatic ecosystems. Similarly, the Endangered Species Act (ESA) establishes an overall legal framework for ensuring the protection of endangered species (also see references cited under evidence for clause 12.5.1).

The NPFMC's management process includes preserving the biodiversity of aquatic habitats and ecosystems. In the BSAI king and Tanner crab fishery management plan (crab FMP), the NPFMC lays out seven management objectives, one of which is a specific habitat aim (NPFMC 2011). For a more detailed explanation of aquatic habitat protection goals, see Article 3.5.

NPFMC has adopted an Ecosystem-Based Fishery Management (EBFM) approach that emphasizes the importance of biodiversity conservation at the ecosystem level. "Maintain biodiversity commensurate with natural evolutionary and ecological processes, including dynamic change and variability," is the first of four stated goals in the Council's EBFM strategy (Zador 2015). For a more detailed explanation of aquatic ecosystem protection goals, see clause 3.6.

Should there be any concerns about the impact of BSAI crab fisheries on aquatic habitats and ecosystems, the NPFMC will summarize the issue(s) in the Ecosystems Considerations chapter of the Council's annual SAFE report (Ecosystem SAFE; Chilton *et al.*, 2011). Additionally, the state of habitats and ecosystems within Alaska's ecosystems is examined on a yearly basis (Zador *et al.*, 2015).

The Council and the NMFS have a long history of establishing management measures to protect aquatic habitats and ecosystems' biodiversity. Broad time/area closures; bottom trawl restrictions; gear modifications (biodegradable panels, salmon/halibut excluder devices, seabird deterrents, elevated trawl sweeps); and bycatch limits on non-FMP species

3.1.1.	There shall be management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any fisheries enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

(salmon, halibut, herring, crab, forage fish)103 are just a few examples of conservation measures. For further information on measures to conserve aquatic habitats, see article 12.9, and clause 12.15 for more information on ecosystem outcome indicators. The Council and the National Marine Fisheries Service have a long history of limiting fishing activities to safeguard endangered and threatened marine animals and birds. In general, the BSAI crab fisheries under review here have little or no influence on marine mammals or birds that are endangered or threatened. For a more detailed discussion of measures to safeguard endangered species, see clause 12.5.1.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to ensure that endangered species are protected from adverse impacts resulting from interactions with the unit of certification and any associated culture or enhancement activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans/framework or legal rules. ☑

EVIDENCE:

ESA (1977) ENDANGERED SPECIES ACT OF 1973 As Amended through the 108th Congress. https://www.fws.gov/endangered/esa-library/pdf/ESAall.pdf

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

NPFMC (2011) Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council, October 2011. 229 p. http://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and R.J. Foy (2011) Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.3.3 Supporting Clause 3.1.2.

3.1.2.	**There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the essential habitat of the stock under consideration and the potential impacts of the fishery (i.e., employing bottom contact gear) upon them are identified. This or a similar mechanism shall also be in place to identify habitats, which are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives seeking to avoid significant negative impacts on habitats. When identifying highly vulnerable habitats, their value to ETP species shall be also considered, with habitats essential to ETP species being categorized accordingly. Note that this clause shall consider Alaska-specific designation of important and essential fish habitats categorized as such at the state and federal level. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans.*	☑
EVIDENCE: There are management objectives seeking to avoid, minimize or mitigate impacts of the unit of certification on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. The NPFMC has developed defined management objectives aimed at avoiding, minimizing, or mitigating the consequences of BSAI crab fishing (as well as other fisheries) on important habitats. In Section 7.2.4 of the BSAI crab FMP (NPFMC 2011), for example, a habitat target is stated clearly: To support king and Tanner crab populations and preserve a healthy ecosystem, suitable numbers of essential fish habitat (EFH) must be protected, conserved, and enhanced.	
Current status/Appropriateness/Effectiveness: *There is evidence that the objectives described above are in place, and that effective management measures relative to those have been implemented.*	☑
EVIDENCE: The NPFMC has developed defined management objectives aimed at avoiding, minimizing, or mitigating the consequences of BSAI crab fishing (as well as other fisheries) on important habitats. In Section 7.2.4 of the BSAI crab FMP (NPFMC 2011), for example, a habitat target is stated clearly: To support king and Tanner crab populations and preserve a healthy ecosystem, suitable numbers of essential fish habitat (EFH) must be protected, conserved, and enhanced. The Magnuson-Stevens Act (MSA) requires the Council to ensure that any repercussions on EFH are small and only temporary. EFH is defined by the MSA as "those waters and substrate required by fish for spawning, breeding, feeding, or maturation." In fisheries management plans (FMPs), the NMFS and the NPFMC must describe and identify EFH, limit the harmful effects of fishing on EFH to the degree possible, and identify alternative steps to encourage the conservation and enhancement of EFH. Federal agencies must confer with NMFS before authorizing, funding, or doing actions that could harm EFH, and NMFS must make conservation recommendations to federal and state agencies about actions that would harm EFH. Depending on the nature of the activity104, the Council may also engage in EFH consultations[73].	

[73] https://www.npfmc.org/wp-content/PDFdocuments/conservation_issues/EFH/EFHconsultationmotion412.pdf

3.1.2.	**There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.**

Many of the concerns about EFH consequences were addressed in the EFH Environmental Impact Statement (EFH EIS) produced in 2005 (NMFS 2005) and the Final EIS for BSAI crab fishery (NMFS 2004). Each Fishery Management Plan must include an examination of the possible harmful effects of all regulated fishing activities on EFH, according to EFH regulations (50 CFR 610.815(a)(2)(1). A fishery effects model was created as part of this procedure. The Long-term Effect Index (LEI) calculated the percentage decline in a habitat characteristic if a fishery were continued at current intensity and distribution until equilibrium, compared to an unfished condition (effects neither increase nor decrease if continued longer). For example, the LEI model discovered that no fishing activity in the Aleutian Islands has a detrimental effect on EFH that is more than minor and not transient (NMFS 2005).

HAPCs are unique locations within EFH that are of great ecological importance to the long-term sustainability of controlled species, are of a rare type, or are particularly vulnerable to deterioration or development. HAPCs are intended to concentrate conservation and management efforts and may require additional protection from negative consequences. Certain habitat protection areas and habitat conservation zones have been established to safeguard HAPCs. A habitat protection area is a protected region with unique and uncommon habitat features where fishing activities that could harm the habitat are prohibited. A habitat conservation zone is a subset of a habitat conservation area where, in order to safeguard certain environmental features, further fishing limitations are placed beyond those imposed for the conservation area. The NPFMC website lists the current habitat protection areas and habitat conservation zones in Alaskan waters[74].

The Council has a track record of implementing management actions to avoid, limit, or mitigate negative impacts on HAPCs and other vulnerable ecosystems. The Council, for example, created the Aleutians Islands Habitat Conservation Area in 2006 as part of a suite of precautionary measures, which froze the footprint of the bottom trawl fishery and closed nearly 60% of the AI's fishable depths to bottom trawling. Several coral gardens, Bowers Ridge, and seamounts were also shielded from different types of gear (see Aleutian Islands FEP; NPFMC 2007).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear. Examples may include various regulations, fishery management plans, data, and reports.*	☑

EVIDENCE:

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended. https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

NPFMC (2007) Aleutian Islands Fishery Ecosystem Plan. Prepared by: K. Aydin,S. Barbeaux, F. Bowers, V. Byrd, D. Evans, S. Gaichas, C. Ladd, S. Lowe, J. Olson, J. Sepez, P. Spencer, F. Wiese. For North Pacific Fishery Management Council. December 2007. 198 p. https://www.npfmc.org/aleutian-islands-fishery-ecosystem-plan/

NPFMC (2011) Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council, October 2011. 229 p. http://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf

NMFS (2004) Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement. NOAA NMFS, NPFMC. August 2004. 1003 p. https://alaskafisheries.noaa.gov/sites/default/files/analyses/crabeis0804-chapters.pdf

NMFS (2005) Final EIS for Essential Fish Habitat Identification and Conservation in Alaska - April 2005. https://alaskafisheries.noaa.gov/habitat/efh-eis2005

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**

[74] http://www.npfmc.org/habitat-protections/

3.1.2.	**There shall be management objectives seeking to avoid, minimize, or mitigate impacts of the unit of certification on the stock under consideration's essential habitats, and on habitats that are highly vulnerable to damage by the unit of certification's fishing gear.**	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)		High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		Full Conformance
Non-conformance Number (if applicable):		

9.2.3.4 Supporting Clause 3.1.3.

3.1.3.	**There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.**	
Relevance:	Relevant/Not relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process in place by which adverse impacts of the fishery (including any fishery enhancement) on the structure, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible are identified. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. This process results in setting relative management objectives. Management priority shall be focused primarily towards minimizing and avoiding identified impacts.*		☑
EVIDENCE: Council EBFM objectives seek to minimize adverse impacts of the unit of certification on the structure, processes and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. The NPFMC has utilized an informal Ecosystem-Based Fishery Management (EBFM) approach for many years. The Council formalized their EBFM approach when they adopted an ecosystem "vision and strategy" as Council policy in February 2014. NPFMC processes ensure that there is monitoring of potential impacts of BSAI crab fisheries (as well as other fisheries) on aquatic ecosystems, as summarized in the Ecosystems Considerations chapter of the Council's annual SAFE report (Ecosystem SAFE).		
Current status/Appropriateness/Effectiveness: *There are management measures in place to achieve the objectives described in the process parameter. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans.*		☑
EVIDENCE: The NPFMC has utilized an informal Ecosystem-Based Fishery Management (EBFM) approach for many years[75]. The Council formalized their EBFM approach when they adopted an ecosystem "vision and strategy[76]" as Council policy in February 2014: Value Statement The Gulf of Alaska, Bering Sea, and Aleutian Islands are some of the most biologically productive and unique marine ecosystems in the world, supporting globally significant populations of marine mammals, seabirds, fish, and shellfish. This region produces over half the nation's seafood and supports robust fishing communities, recreational fisheries, and a subsistence way of life. The Arctic ecosystem is a dynamic environment that is experiencing an unprecedented rate of loss of sea ice and other effects of climate change, resulting in elevated levels of risk and uncertainty. The North Pacific Fishery Management Council has an important stewardship responsibility for these resources, their productivity, and their sustainability for future generations. Vision Statement The Council envisions sustainable fisheries that provide benefits for harvesters, processors, recreational and subsistence users, and fishing communities, which (1) are maintained by healthy, productive, biodiverse, resilient marine ecosystems that support a range of services; (2) support robust populations of marine species at all trophic levels, including marine mammals and seabirds; and (3) are managed using a precautionary, transparent, and inclusive process that allows for analyses of tradeoffs, accounts for changing conditions, and mitigates threats.		

[75] https://www.npfmc.org/wp-content/PDFdocuments/membership/EcosystemCommittee/EBFMstatus.pdf
[76] https://www.npfmc.org/ecosystem-vision-statement/

3.1.3.	There shall be management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement) on the structure, and function of the ecosystems that are likely to be irreversible or very slowly reversible.

Implementation Strategy

The Council intends that fishery management explicitly take into account environmental variability and uncertainty, changes and trends in climate and oceanographic conditions, fluctuations in productivity for managed species and associated ecosystem components, such as habitats and non-managed species, and relationships between marine species. Implementation will be responsive to changes in the ecosystem and our understanding of those dynamics, incorporate the best available science (including local and traditional knowledge), and engage scientists, managers, and the public.

The vision statement shall be given effect through all of the Council's work, including long-term planning initiatives, fishery management actions, and science planning to support ecosystem-based fishery management.

NPFMC processes ensure that there is monitoring of potential impacts of BSAI crab fisheries (as well as other fisheries) on aquatic ecosystems, as summarized in the Ecosystems Considerations chapter of the Council's annual SAFE report (Ecosystem SAFE; Chilton *et al.*, 2011). A Fishery Ecosystem Plan has been prepared for the Aleutian Islands (NPFMC 2007) and a draft FEP is in preparation for the Bering Sea (NPFMC 2015). Additionally, the status of habitats and ecosystems are monitored within the broader framework of Alaska's ecosystems and results are reviewed annually (Zador *et al.*, 2015). Existing programs provide adequate monitoring for potential adverse impacts of fisheries on the structure, processes and function of aquatic ecosystems. These systems give confidence that if irreversible or very slowly irreversible impacts were present at the ecosystem level, they would be detected and addressed through timely management response.

Note: BSAI king and Tanner crab fisheries are not enhanced fisheries (see clause 13.1). Therefore, enhancement considerations are not applicable under clause 3.2.6.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are management objectives seeking to minimize adverse impacts of the fishery (including any enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, other regulatory documents, or laws.*	☑

EVIDENCE:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and R.J. Foy (2011) Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

NPFMC (2007) Aleutian Islands Fishery Ecosystem Plan. Prepared by: K. Aydin,S. Barbeaux, F. Bowers, V. Byrd, D. Evans, S. Gaichas, C. Ladd, S. Lowe, J. Olson, J. Sepez, P. Spencer, F. Wiese. For North Pacific Fishery Management Council. December 2007. 198 p. https://www.npfmc.org/aleutian-islands-fishery-ecosystem-plan/

NPFMC (2015) Development of a Bering Sea Fishery Ecosystem Plan. Discussion Paper – November 2015. C-7 BS FEP, December 2015. 31 p. https://www.npfmc.org/bsfep/

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.3.5 Supporting Clause 3.2.

Management measures shall provide, inter alia, that:

9.2.3.6 Supporting Clause 3.2.1.

3.2.1	Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.*	☑
EVIDENCE: Conservation and management measures ensure that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Individual Fishing Quotas (IFQs) for BSAI crab were adopted by NMFS in 2005 as part of the NPFMC's Individual Fishing Quotas (IFQs) program, which was designed to reduce surplus fishing capacity and improve the fishing industry's economic sustainability. NMFS has been conducting an evaluation since 1998 to verify that the IFQ program continues to meet its objectives.	
Current status/Appropriateness/Effectiveness: *The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).*	☑
EVIDENCE: Individual Fishing Quotas (IFQs) for sablefish and Pacific halibut were adopted by NMFS in 1995 as part of the NPFMC's Individual Fishing Quotas (IFQs) program, which was designed to reduce surplus fishing capacity and improve the fishing industry's economic sustainability. The Alaska Commercial Fisheries Entry Commission (CFEC) examined and analyzed the IFQ program's effects for the first few years. NMFS has been conducting this evaluation since 1998 to verify that the IFQ program continues to meet its objectives[77]98. In 2005, the Bering Sea crab fishery followed suit, with a Congressionally approved strategy establishing Processor Quota Shares as well as Individual Fishing Quotas in the BSAI[78]99. Participants were able to join cooperatives that resulted in fewer vessels deploying less gear on the grounds by capping the number of buyers and sellers and giving considerably extended seasons (reviewed in Fina 2011). The pot gear used is selective, with escape rings required by the ADF&G to allow small crabs to escape and biodegradable string to reduce ghost fishing from lost pots. With the fishing race no longer looming over the fleet, pot losses were decreased, on-deck sorting damage was reduced, deadloss was reduced, and the product was of greater quality. When substantial concentrations of crab are found, a large, efficient fleet operating in a race for fish situation can swiftly surpass a harvest target. The GHL for Bristol Bay red king crab was exceeded in two out of five years (2001 and 2002 seasons); the GHL for Bering Sea C. opilio was exceeded in four out of five years (2000, 2002, 2003, and 2004 seasons); and the GHL for Aleutian Islands golden king crab was exceeded in two out of five years (2000/01 and 2001/02 seasons; NPFMC 2007). Observed harvest levels have been at or below the total permitted catch (TAC) set for each of these fisheries since the introduction of the crab rationalization program.	

[77] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/pacific-halibut-and-sablefish-individual-fishing-quota-ifq-program
[78] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/bering-sea-and-aleutian-islands-bsai-crab-fisheries

3.2.1	Excess fishing capacity shall be avoided and exploitation of the stocks shall remain economically viable.							
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.*								☑
EVIDENCE: Fina, M. (2011) Evolution of Catch Share Management: Lessons from Catch Share Management in the North Pacific. Fisheries 36(4): 164-177. April 2011. http://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Fina_CatchShare_411.pdf NPFMC (2007) 2007 Crab SAFE. Stock Assessment and Fishery Evaluation Report. https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/CRABSAFE07.pdf								
References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.2.3.7 Supporting Clause 3.2.2.

3.2.2.	The economic conditions under which fishing industries operate shall promote responsible fisheries.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There are management measures in place to limit and/or reduce the total fishing capacity of the unit of certification. These measures shall include specific fishing capacity objective(s), which themselves are based on the best scientific evidence available to understand the level of fishing pressure appropriate to ensure the long-term sustainability of the fishery. Please note that assessors should ensure that catches are within limits, and that data from enforcement show an adequate level of compliance with fisheries laws and regulation.*	☑
EVIDENCE: The economic conditions under which fishing industries operate promote responsible fisheries. The economic conditions of the BSAI crab fishery are assessed on a regular basis, usually once a year. The National Marine Fisheries Service (NMFS) publishes a number of status reports, including the yearly Economic SAFE Report (e.g., Garber-Yonts and Lee 2016). ADF&G also keeps track of the value of fisheries they oversee and publishes Annual Management Reports (e.g., Leon et al 2017). These in-depth reports are available both online and in print.	
Current status/Appropriateness/Effectiveness: *The fishing capacity of the unit of certification is at or below the level of the specific fishing capacity objective(s).*	☑
EVIDENCE: According to NMFS and NPFMC economic evaluations, the economic environment in which the fishing businesses operate favor responsible fishing. The economic conditions of the BSAI crab fishery are assessed on a regular basis, usually once a year[79]. The National Marine Fisheries Service (NMFS) publishes a number of status reports, including the yearly Economic SAFE Report (e.g., Garber-Yonts and Lee 2016). ADF&G also keeps track of the value of fisheries they oversee and publishes Annual Management Reports (e.g., Leon et al 2017). These in-depth reports are available both online and in print. The findings of continuing data collecting, monitoring, and evaluation activities for BSAI crab fisheries are published by NMFS and NPFMC (also see references given under clauses 4.5 and 8.1.3). The Center for Independent Experts has independently examined the operation of various data programs (Anderson 2011). Furthermore, some of the key results from these socioeconomic monitoring initiatives are peer-reviewed research published in academic journals (e.g., Abbott *et al.*, 2010). There is substantial evidence that conservation and management initiatives have improved the BSAI crab fishing industry's economic conditions. There were 245 Bristol Bay red king crab quota holders, 231 Bering Sea C. opilio (snow crab) quota holders, and 136 St. Matthew Island blue king crab quota holders in a rationalized fishery, for example. Quota shares were allocated based on the historical volume of pounds legally landed compared to the total pounds landed by the entire fleet, hence a quota share holder could have quota in several (or all) fisheries. Prior to the rationalization, the largest fisheries would have over 300 vessels participating. The usage of cooperatives has reduced the number of boats required to complete the TAC. For example, seventy vessels landed 14.3 million pounds of red king crab in the Bristol Bay red king crab fishery in 2009/2010. Ex-vessel, those crabs were worth $63.1 million. Seven vessels also engaged in the St. Matthew fishery that season, landing a catch worth around one million dollars ex-vessel. Sixty-nine vessels caught 43.2 million pounds of crab in the 2009/10 snow crab season, with an ex-vessel value of $48.27 million.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that excess fishing capacity is avoided and exploitation of the stocks remains economically viable. Examples may include fishery reports on harvest recommendation or fleet reports.*	☑

[79] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/alaska-fisheries-management-reports

3.2.2.	The economic conditions under which fishing industries operate shall promote responsible fisheries.						
EVIDENCE: Abbott, J.K., Garber-Yonts, B., and Wilen, J.E. (2010) Employment and Remuneration Effects of IFQs in the Bering Sea/Aleutian Islands Crab Fisheries. Marine Resource Economics, 25:333-354. Anderson, C.M. (2011) Bering Sea/Aleutian Island Crab Economic Data Report. Center for Independent Experts Review Meeting, August 23-25, 2011. Panel Chair's Summary Report, November 2011.							
References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x	3)	=	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

9.2.3.8 Supporting Clause 3.2.3.

3.2.3.	**The interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries shall be taken into account.**	
Relevance:	Not Relevant	
Evaluation Parameters		**Met?**
Process: *There is a system or process in place that identifies the interests of small-scale fishers, either through stakeholder engagement or social research, in a way, which permits the utilization of the information during the management measure development process.*		☐
EVIDENCE: This Clause is irrelevant there is no small-scale or artisanal fishing on the BSAI crab stocks		
Current status/Appropriateness/Effectiveness: *There is evidence that the interests of small-scale fishers are effectively taken into account during the development of management measures, and there is no evidence that small-scale fisheries are adversely impacted by any management measures currently in place.*		☐
EVIDENCE: This Clause is irrelevant there is no small-scale or artisanal fishing on the BSAI crab stocks		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the interests of fishers, including those engaged in subsistence, small-scale, and artisanal fisheries are taken into account. Examples may include dedicated quotas, public meeting records, laws, and regulations.*		☐
EVIDENCE: This Clause is irrelevant there is no small-scale or artisanal fishing on the BSAI crab stocks		
References:		
Numerical score:	**Starting score** – (**Number of EPs NOT met** x 3) =	**Overall score**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)		
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		
Non-conformance Number (if applicable):		

9.2.3.9 Supporting Clause 3.2.4.

3.2.4.	**Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.**
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There are management measures in place specifically designed to ensure that the biodiversity of aquatic ecosystems are conserved and ETP species are protected. This shall reflect the existence of specific management objectives and measures, which are based on the best scientific evidence available.*	☑
EVIDENCE: There are explicit objectives and management measures to ensure that biodiversity of aquatic habitats and ecosystems is conserved and endangered species are protected. The Magnuson-Stevens Act (MSA) establishes an overall legal framework for the conservation of benthic biodiversity in aquatic ecosystems. Similarly, the Endangered Species Act (ESA) establishes an overall legal framework for ensuring the protection of endangered species (also see references cited under evidence for clause 12.5.1). The NPFMC's management process includes preserving the biodiversity of aquatic habitats and ecosystems. In the BSAI king and Tanner crab fishery management plan (crab FMP), the NPFMC lays out seven management objectives, one of which is a specific habitat aim (NPFMC 2011). NPFMC has adopted an Ecosystem-Based Fishery Management (EBFM) approach that emphasizes the importance of biodiversity conservation at the ecosystem level.	
Current status/Appropriateness/Effectiveness: *The management measures currently in place have been successful in meeting the management objectives. Such objectives may be outlines in overarching fisheries legislation, regulations, or management plans. There is no evidence that the fishery is currently having a significant adverse impact on aquatic ecosystems, and it is not putting any ETP species at risk of extinction.*	☑
EVIDENCE: The Magnuson-Stevens Act (MSA) establishes an overall legal framework for the conservation of benthic biodiversity in aquatic ecosystems. Similarly, the Endangered Species Act (ESA) establishes an overall legal framework for ensuring the protection of endangered species (also see references cited under evidence for clause 12.5.1). The NPFMC's management process includes preserving the biodiversity of aquatic habitats and ecosystems. In the BSAI king and Tanner crab fishery management plan (crab FMP), the NPFMC lays out seven management objectives, one of which is a specific habitat aim (NPFMC 2011). For a more detailed explanation of aquatic habitat protection goals, see Article 3.5. NPFMC has adopted an Ecosystem-Based Fishery Management (EBFM) approach[80] that emphasizes the importance of biodiversity conservation at the ecosystem level. “Maintain biodiversity commensurate with natural evolutionary and ecological processes, including dynamic change and variability,” is the first of four stated goals in the Council's EBFM strategy (Zador 2015). For a more detailed explanation of aquatic ecosystem protection goals, see clause 3.6. Should there be any concerns about the impact of BSAI crab fisheries on aquatic habitats and ecosystems, the NPFMC will summarize the issue(s) in the Ecosystems Considerations chapter of the Council's annual SAFE report (Ecosystem SAFE; Chilton *et al.*, 2011). Additionally, the state of habitats and ecosystems within Alaska's ecosystems[81] is examined on a yearly basis (Zador *et al.*, 2015). The Council and the NMFS have a long history of establishing management measures to protect aquatic habitats and ecosystems' biodiversity. Broad time/area closures; bottom trawl restrictions; gear modifications (biodegradable panels, salmon/halibut excluder devices, seabird deterrents, elevated trawl sweeps); and bycatch limits on non-FMP species (salmon, halibut, herring, crab, forage fish) are just a few examples of conservation measures. For further information on	

[80] https://www.npfmc.org/ecosystem-vision-statement/
[81] https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

3.2.4.	Biodiversity of aquatic ecosystems shall be conserved and ETP species shall be protected. Where relevant, there shall be management objectives, and as necessary, management measures.

measures to conserve aquatic habitats, see article 12.9, and clause 12.15 for more information on ecosystem outcome indicators.

Evidence Basis: *Evidence Basis: The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that biodiversity of aquatic ecosystems is conserved and ETP species are protected. Where relevant, there are management objectives, and as necessary, management measures. Examples may include laws and regulations, fisheries management plans, and speciesstatus reports.*	☑

EVIDENCE:

ESA (1977) ENDANGERED SPECIES ACT OF 1973 As Amended through the 108th Congress. https://www.fws.gov/endangered/esa-library/pdf/ESAall.pdf

Magnuson–Stevens Fishery Conservation and Management Act (MSFCMA), commonly referred to as the Magnuson–Stevens Act (MSA). Enacted April 13, 1976. 16 U.S.C. §§ 1801-1884 as amended.https://www.law.cornell.edu/uscode/text/16/chapter-38/subchapter-IV

NPFMC (2011) Fishery Management Plan for Bering Sea/Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council, October 2011. 229 p.http://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and R.J. Foy (2011) Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011.http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.3 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

9.3.1 Fundamental Clause 4. Fishery data

There shall be effective fishery data (dependent and independent) collection and analysis systems for stock management purposes.

9.3.1.1 Supporting Clause 4.1.

4.1.	**All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.**	
Relevance:	Relevant **Note:** Provision of data to relevant States and, regional, and international fisheries organizations is dependent on the nature of the stock (i.e., transboundary, shared, straddling, highly migratory and high seas stock) and the type or arrangement in place for co-management (i.e., commission, arrangement, etc.). This part of the clause does not apply in cases where stocks occur entirely in one State's EEZ or jurisdiction, and co-management with another country is not required.	
Evaluation Parameters		**Met?**
Process: *There is a process or system that allows for effective data collection (including data on retained catch, bycatch, discards and waste) on the status of fisheries and ecosystems for management purposes. In the case of stocks fished by more than one State, this includes a system or agreement with other States to ensure mortality and removals data are available for the entirety of the biological stock. Some fisheries and/or fish stock are hard to monitor for various reasons, including remoteness of operation/distribution and complexity of fishing operations—posing particular challenges with the collection and maintenance of adequate, reliable, and current data and/or other information. Assessors shall acknowledge and explain these challenges, data collection, and maintenance to cover all stages of fishery development in accordance with applicable international standards and practices. For salmon, the assessors shall describe and present the enumeration methods (i.e., peak aerial survey, feet survey, weir count, tower, mark–recapture, sonar, etc.) utilized for all the major stocks managed by formal escapement goal in Alaska. Such summary data can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally reviews the latest 9–10 years of salmon escapements, enumeration, goal development methods, and the relative escapement goal performance.*		☑
EVIDENCE: All fishery removals and mortality of the target stocks is considered by management. ADFG undertakes a comprehensive, annual monitoring program to collect data on retained catch, bycatch/discards in all BSAI directed crab fisheries as well as crab bycatch/discards in all groundfish fisheries[82]. There is ongoing annual monitoring of ecosystem conditions that provides a basis for evaluation of impacts on recruitment to BSAI crab stocks of factors other than fishing.		
Current status:		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *There are appropriate and reliable data collection and estimation methods. Reliable and accurate data are collected on retained catch, bycatch, discards, and waste (for targeted and non-targeted fisheries), and the direct and indirect impacts of the fishery on the ecosystem. Such information is disseminated to all relevant fishery*		☑

[82] http://www.adfg.alaska.gov/FedAidPDFs/FDS14-49.pdf

4.1.	**All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.**

management authorities. Overall, the data collection system is considered effective for the purposes of this clause if fishery scientists believe there is a high probability that the total estimated mortality is an accurate reflection of the actual total mortality across the entire biological stock. Fishery data are collected with a frequency and level of aggregation, which allows the effective and informed management of the stock. The appropriate level of aggregation will often be the stock level, but could also reflect specific habitats, gear types, sub-populations, etc. The requirements for data collection are focused on the need to assess the effects of the unit of certification on non-target stocks. Non-target catches and discards refer to species/stocks that are taken by the unit of certification other than the stock for which certification is being sought. The adequacy of data relates primarily to the quantity and type of data collected (including sampling coverage) and depends crucially on the nature of the systems being monitored and purposes to which the data are being put. Some analysis of the precision resulting from sampling coverage would normally be part of an assessment of adequacy and reliability. The currency of data is important, inter alia, because its capacity for supporting reliable assessment of current status and trends declines as it gets older.

EVIDENCE:

ADFG undertakes a comprehensive, annual monitoring program to collect data for all Bering Sea and Aleutian Islands (BSAI) crab fisheries. Retained catch and estimated bycatch from the directed fishery as well as the Community Development Quota (CDQ) fishery and the ADFG cost-recovery harvest and fishing effort (pot lifts) are recorded on the ADFG eLandings system (previously reported on paper 'fish tickets'). In the directed fisheries, on-board observers record total catch, bycatch, discards, effort, size frequencies and shell condition, and sampling of retained catches is carried out by shore-based observers. The data are used in stock assessment and in-season projection of fishery performance. They also provide an independent estimate of fishery CPUE for comparison with estimates based on eLandings, daily fishing logs and interviews with vessel captains. Data on crab bycatch in the trawl and fixed gear groundfish fisheries are obtained by the NMFS observer program. Estimates of discarded catch include different assumed handling mortality rates for pot and trawl bycatches. Collectively, these monitoring and observer programs provide the basis for reliable estimation of total removals from all crab stocks annually for assessment and management purposes.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that all significant fishery removals and mortality of the target species are considered by the fishery management organizations. Specifically, reliable and accurate data required for assessing the status of fishery/ies and ecosystems—including data on retained catch, bycatch, discards, and waste—are collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can objectively be verified (i.e., the knowledge has been collected and analyzed though a systematic, objective, and well-designed process, and is not just hearsay). Examples may include stock assessment reports, catch data, and observer data.*	☑

EVIDENCE:

Data from this annual monitoring, including from the most recent fishing season, are updated and utilized in the annual assessment of BSAI crab stocks[83]. Any deficiencies in terms of data reliability are identified and any uncertainties are reflected in the stock assessment modelling as well as in the catch level decision-making process.

References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High

[83] http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/2020/SAFE_2020_Complete.pdf

4.1.	**All significant fishery removals and mortality of the target species (shall be considered by management. Specifically, reliable and accurate data required for assessing the status of fishery(ies) and ecosystems—including data on retained catch, bycatch, discards, and waste—shall be collected. Data can include relevant traditional, fisher, or community knowledge, provided their validity can be objectively verified. These data shall be collected, at an appropriate time and level of aggregation, by relevant management organizations connected with the fishery, and provided to relevant States regional, and international fisheries organizations.**

Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.1.2 Supporting Clause 4.1.1.

4.1.1.	**Timely, complete, and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management, and development.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *There is a process or system that allows for the production, maintenance, update, and verification of statistical data to international standards. Such standards include the FAO Coordinating Working Party on Fishery Statistics Handbook of Fishery Statistical Standards. Also, there is a process for the use and distribution of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice). Please note that stock assessment for salmon is intended as the processes that leads to enumeration, escapement goal development, and fishery management activities to meet escapement goals.*	☑
EVIDENCE: Complete and reliable statistics are compiled on catch and fishing effort and subjected to rigorous statistical analysis in each annual stock assessment. Research results have been used as a basis for the setting of management objectives, reference points and performance criteria, as well as for annual adjustment of allowable catch levels.	
Current status/Appropriateness/Effectiveness: *There is evidence for the production, maintenance, updating, and review of statistical data on catch and fishing effort in the fishery under assessment. There is evidence that the best scientific evidence available is used to inform the fisheries management process. Where there is a legal requirement for the advice of scientific authorities to be adopted, this shall be viewed as conformance with this evaluation parameter.*	☑
EVIDENCE: Landings data for all BSAI crab fisheries, in the form of retained catch numbers and biomass, and fishing effort, in terms of pot lifts, are recorded on the ADFG eLandings system and are available to NMFS, ADFG, NPFMC and other agencies for their scientific, management and enforcement purposes. The data are verified in real time and can be used to close or modify a fishery in-season when necessary. Lengthy time series of annual catch and effort data are available for all BSAI crab fisheries. The datasets are updated and utilized, along with other fishery and fishery-independent data, in the annual assessment of each stock/fishery conducted by a team of scientists familiar with and aware of potential inconsistencies in the data or their use in population estimation methods. Stock assessment reports note any deficiencies in data and identify any gaps which need to be filled by new research. Each stock assessment includes rigorous peer review by the Crab Plan Team (CPT) and by the Scientific and Statistical Committee (SSC) of NPFMC. In addition, periodic reviews are conducted by specially organized workshops with independent scientists and by the Center of Independent Experts (CIE)[84]. CIE reviews of BSAI crab stock assessments were done for EBSSC and BBRKC in 2021, for AIGKC in 2018 and for EBSTC in 2017. All details of the various datasets used in the assessment of each stock along with results and recommendations from the process are documented in the annual SAFE report. It informs the management decision-making process for the next fishing season. These annual assessments have provided the basis for the setting of management objectives, reference points and performance criteria and ensure adequate linkages between applied research and fisheries management.	

[84] https://www.st.nmfs.noaa.gov/science-quality-assurance/cie-peer-reviews/index

4.1.1.	**Timely, complete, and reliable statistics shall be compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data shall be updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) shall be promoted. Results of analysis shall be distributed accordingly as a contribution to fisheries conservation, management, and development.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that timely, complete, and reliable statistics are compiled on catch and fishing effort and maintained in accordance with applicable international standards and practices, and in sufficient detail to allow sound statistical analysis for stock assessment. Such data are updated regularly and verified through an appropriate system. The use of research results as a basis for setting management objectives, reference points, and performance criteria, as well as for ensuring adequate linkage between applied research and fisheries management (e.g., adoption of scientific advice) is promoted. Analysis results are distributed accordingly as a contribution to fisheries conservation, management, and development. Examples may include stock assessment reports and other data.*	☑

EVIDENCE:
The annual SAFE report for each BSAI crab stock assessment (link provided in 4.1 references) reviews and updates all-time series of data, including those for catch and fishing effort, used in stock assessment modelling.

References:								
Numerical score:	**Starting score**	−	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.3.1.3 Supporting Clause 4.1.2.

4.1.2.	**In the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries.**
Relevance:	Not relevant. **Note:** If the fishery for the *stock under consideration* is managed fully using stock-specific information then this clause can be scored with full conformance.
	All BSAI crab stocks are assessed using specific information, therefore, this SC is not relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that allows for the use of generic evidence based on similar stocks for fisheries with low risk. The greater the risk, the more specific evidence is necessary to assess sustainability. In principle, "generic evidence based on similar stocks" should not suffice, but it may be adequate where there is low risk to the stock under consideration. In general, "low risk to that stock under consideration" would suggest that there is very little chance of the stock becoming overfished (e.g., where the exploitation rate is very low and the resilience of the stock is high). However, the evidence for low risk and the justification for using surrogate data shall come from the stock assessment itself.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *Information has been utilized from generic evidence based on similar fishery situations. Based on the risk of overfishing, the information utilized is of higher precision to account for higher risks (i.e., intensive fisheries).*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of specific information on the stock under consideration, generic evidence based on similar stocks can be used for fisheries with low risk to that stock under consideration. However, the greater the risk of overfishing, the more specific evidence is necessary to ascertain the sustainability of intensive fisheries. Examples may include stock assessment reports and other data.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.3.1.4 Supporting Clause 4.2.

4.2.	**An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established.**	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *An observer program is present. There may be cases where collection of accurate data for research and support compliance could be established without the use of observers or a formal observer scheme (i.e., inspection scheme, enforcement, port sampling, at shore inspection, voluntary or compulsory logbooks, e-logbooks or other harvester collected data, electronic monitoring [video], or bycatch surveys). The reliability and accurateness of that system(s) would need to be verified accordingly. Note also that some fisheries observer programs are designed to collect biological data and others serve mainly as a compliance or enforcement tool. This shall be considered accordingly in the overall evaluation of this clause. Assessors shall question primarily whether the required data for fisheries management are collected or if there are important data gaps (e.g., because of the absence of an observer program).*		☑
EVIDENCE: A scheme of at-sea and dock-side observers is established to collect accurate data for research and support compliance with applicable fishery management measures.		
Current status/Appropriateness/Effectiveness: *The data collected by the observer program is considered accurate and useful.*		☑
EVIDENCE: ADFG undertakes a comprehensive, annual monitoring program to collect data for all Bering Sea and Aleutian Islands (BSAI) crab fisheries. ADFG may deploy observers on any vessel participating in these fisheries. Since 1988, varying levels of observer coverage have been required. In accordance with the provisions of 5 AAC 39.645, during the 2013/14 season observers were deployed on all floating-processor and catcher-processor vessels, and on randomly selected catcher vessels participating in the Bristol Bay red king crab, Bering Sea snow crab and Bering Sea Tanner crab fisheries. In the Aleutian Islands golden king crab (AIGKC) fisheries, all catcher vessels were required to carry an observer during harvest of at least 50% of their total harvested weight in each 3-month trimester of the 9-month season. Dockside samplers are responsible for sampling retained catch delivered by vessels with no onboard observer. On-board observers are an important component of data collection and fishery management. They monitor fishing position, depth and soak time of the gear, as well as sample total and retained catch for size/sex composition and shell condition. They also document total catch, bycatch and effort[85]. Similar information on crab bycatch in trawl and fixed gear groundfish fisheries is obtained by the NMFS (AFSC Fisheries Monitoring and Analysis Division) observer program[86].		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures is established. Examples may include stock assessment, survey, observer, or other reports.*		☑
EVIDENCE: The annual SAFE report for each BSAI crab stock assessment (link provided in 4.1 references) reviews and updates all-time series of data, including those for catch and fishing effort, used in stock assessment modelling.		
References:	Crab Observer Training and Deployment Manual. September 2014. ADF&G Shellfish Observer Program. Dutch Harbor, unpublished.	

85 https://www.adfg.alaska.gov/FedAidPDFs/FDS14-49.pdf
86 https://www.afsc.noaa.gov/resource/document/north-pacific-observer-sampling-manual

4.2.	An observer scheme designed to collect accurate data for research and support compliance with applicable fishery management measures shall be established.								
	Shellfish Dockside Sampling Manual. September 2014. ADF&G Dockside Sampling Program. Dutch Harbor, unpublished.								
Numerical score:	Starting score	–	(	Number of EPs NOT met	x	3	)	=	Overall score
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.3.1.5 Supporting Clause 4.2.1.

4.2.1.	**Where necessary, fisheries management organizations and regional fisheries management organizations and other such arrangements should strive to achieve a level and scope of observer programs sufficient to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.**	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *There is a clear system that allows the observer program, or any other appropriate data gathering system as appropriate, to provide sufficient quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.*		☑
EVIDENCE: The observer programs conducted by ADFG and NMFS, as described in 4.1 and 4.2, provide a basis for quantitative estimates of catch, bycatch and discards in all BSAI crab fisheries.		
Current status/Appropriateness/Effectiveness: *The data collected by the observer program is considered accurate and useful, especially for providing quantitative estimates of total catch, discards, and incidental takes of living aquatic resources.*		☑
EVIDENCE: Data sets from observer programs are updated and utilized, along with other fishery and fishery-independent data, in the annual assessment of each stock/fishery conducted by a team of scientists familiar with and aware of potential inconsistencies in the data or their use in population estimation methods. Stock assessment reports note any deficiencies in data and identify any gaps which need to be filled by new research.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the observer program is established and able to provide quantitative estimates of total catch, discards, and incidental takes of living aquatic resources. Examples may include stock assessment, observer, survey, or other reports.*		☑
EVIDENCE: The annual SAFE report for each BSAI crab stock assessment (link provided in 4.1 references) reviews and updates all-time series of data, including those for catch, bycatch and discards, used in stock assessment modelling.		
References:		

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.1.6 Supporting Clause 4.3.

4.3.	A fisheries management organization, regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a system within the regional body structure that allows for data distribution in line with confidentiality requirements.*	☑
EVIDENCE: Policies and procedures are prescribed at the federal and state levels to protect the confidentiality of data submitted to and collected by employees and contractors. Only authorized users have access to confidential data to perform an official duty**.**	
Current status/Appropriateness/Effectiveness: *There is evidence proving that confidentiality requirements are satisfied when data is distributed to the various parties.*	☑
EVIDENCE: NOAA administrative order 216-100[87] prescribes policies and procedures for protecting the confidentiality of data submitted to and collected by NOAA/NMFS. Confidential data are those identifiable with a person. Before release to the public, data must be aggregated to protect individual identities. For fisheries data, this requires at least 3 entities contributing to any level of aggregated data. Only authorized users have access to confidential data, they must have a need to collect or use these data in the performance of an official duty, and they must sign a statement of nondisclosure affirming their understanding of NMFS obligations with respect to confidential data and the penalties for unauthorized use and disclosure. Confidential data must be maintained in secure facilities. Data collected by a contractor, such as an observer, must be transferred timely to authorized Federal employees; no copies of these data may be retained by the contractor. NMFS may permit contractors to retain aggregated data. A data return clause shall be included in the agreement. All procedures applicable to Federal employees must be followed by contractors collecting data with Federal authority. Confidentiality requirements for observers are described in the 2021 Observer sampling Manual (at pp. 2-8 and 20-9 - link provided in 4.2 references) as per statute 16 USC 1881a $ 402 and 1802 $ 3. Alaska Statute 16.05.815 also prohibits ADFG from releasing certain information that it receives from fishermen, fish buyers, and processors to ensure that detailed information on individual business activities will be held confidential and to provide an incentive for the public to furnish the department with good data. Records and reports requiring confidentiality include catch reports (fish tickets) and fishermen's log books, annual reports filed with the department by buyers, processors, and exporters, and data collected by onboard observers and port samplers. Under agreements with the State, each State data collector collecting confidential data will sign a statement at least as protective as the one signed by Federal employees, which affirms that the signer understands the applicable procedures and regulations and the penalties for unauthorized disclosure.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that a fisheries management organization, regional fisheries management organizations or arrangements compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures. Examples may include reports where confidentiality requirements have been affected.*	☑

[87] https://www.st.nmfs.noaa.gov/st1/recreational/documents/Intercept_Appendices/Appendix%M%20031408%20NOAA%20administrative%20order%20216-100.pdf

4.3.	**A fisheries management organization, regional fisheries management organizations or arrangements shall compile data and make them available, in a manner consistent with any applicable confidentiality requirements, in a timely manner and in an agreed format to all members of these organizations and other interested parties in accordance with agreed procedures.**

EVIDENCE:

As documented in annual SAFE reports for each BSAI crab stock, data collected by observers during a particular fishing season are made available in an agreed format and in accordance with agreed procedures for the assessment which provides the basis for catch level decisions for the following season. The ADF&G publishes an Annual Management Report for BSAI crab fisheries which includes tables summarizing time series of data collected from the fisheries each year[88]. There are many cells in these tables, particularly in those for AIGKC fisheries, which are marked confidential because data were collected from a small number of vessels.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[88] https://www.adfg.alaska.gov/FedAidPDFs/FMR19-33.pdf

9.3.1.7 Supporting Clause 4.4.

4.4.	States shall stimulate the research required to support policies related to fish as food.	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *There is research to support policies related to fish as food.*		☑
EVIDENCE: There is strong promotion of research into all aspects of seafood use by federal and state agencies and industry organizations that support national policies related to fish as food. State and national policies regarding seafood are guided and driven by the Alaska Seafood Marketing Institute (ASMI), Food and Drug Administration (FDA), Department of Agriculture (USDA), the National Institute of Health (NIH) and many others. ASMI is the state agency primarily responsible for increasing the economic value of Alaskan seafood through marketing programs, quality assurance, industry training, and sustainability certification[89].		
Current status/Appropriateness/Effectiveness: *There is evidence of this research.*		☑
EVIDENCE: The powers of the ASMI board include: conducting or contracting for scientific research to develop and discover health, dietetic, or other uses of seafood harvested and processed in the state, and prepare market research and product development plans for the promotion of any species of seafood and their byproducts (Alaska Statute 16.51.090 Powers of Board). State of Alaska regulations also stipulate that the harvest of the resource will be in a manner that emphasizes the quality and value of the fishery product. It operates the Kodiak Seafood and Marine Science Center[89] as a component of the University of Alaska Fairbanks (UAF). The Center provides training for harvesting, processing, and conservation of fisheries resources of Alaska, provides research and development activities to adapt existing or create new technologies to enhance the economic value of the industry, and encourages joint projects between the fishing industry and government to enhance the productivity of the fishing industry. Examples of the focus of specific projects include: safe handling and preservation techniques, nutritional content, gear and techniques to reduce capture of non-target species, novel and enhanced markets for underutilized species. Also, the Alaska Fisheries Development Foundation (AFDF)[90] has a long history related to promoting and developing fish and fish species as food.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State stimulates the research required to support policies related to fish as food.*		☑
EVIDENCE: Links provided show that research to support policies related to fish as food are strongly stimulated.		
References:		

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3)	=	Overall score
	10		0			10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

89 https://www.alaskaseafood.org
90 https://www.afdf.org

9.3.1.8 Supporting Clause 4.5.

4.5.	There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.
Relevance:	Relevant
Evaluation Parameters	**Met?**
Process: *There is a system in place for collecting economic, social, marketing, and institutional knowledge of the fisheries.*	☑
EVIDENCE: Extensive knowledge of the economic, social, marketing and institutional aspects of the BSAI crab fisheries has been acquired through dedicated research. Annual collection and analysis of relevant data provide the basis for ongoing monitoring, analysis and policy formulation related to these aspects of the fisheries.	
Current status/Appropriateness/Effectiveness: *These data are used for ongoing monitoring, analysis, and policy formulation.*	☑

EVIDENCE:

The MSA's National Standard 8 mandates that conservation and management measures shall, consistent with the conservation requirements of the 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. Accordingly, the NPFMC and Board of Fisheries hold public meetings throughout the year in a variety of convenient locations. Participation is actively pursued.

The economic and social objective of the BSAI crab FMP[91] intends to ensure that benefits derived from these fisheries are maximized over time through selection of management measures that examine: 1) The value of crab harvested 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 considers 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 these economic and social benefits.

Social and economic impacts of the BSAI crab fisheries on coastal communities are extremely high. Subsistence harvests must ensure that requirements are met as required by law. Basically, State law requires that a reasonable opportunity be provided for subsistence use before other consumptive use is allowed. The Economic and Social Sciences Research Program within NMFS's REFM[92] provides economic and socio-cultural information that assists NMFS in meeting its stewardship programs[93]. NPFMC, the AFSC, and community stakeholder organizations have identified ongoing collection of community-level socio-economic information that is specifically related to commercial fisheries as a priority. To address this need, the AFSC's Economic and Social Sciences Research (ESSR) Program has implemented the Alaska Community Survey, an annual voluntary data collection program initially focused on Alaska communities for feasibility reasons, in order to improve the socio-economic data available for consideration in North Pacific fisheries management.
The Community Development Quota (CDQ) program allocates a percentage of all BSAI crab quotas to eligible western Alaskan communities in order to provide an opportunity for those communities to participate in the BSAI crab fisheries, to support sustainable and diversified economic development and provide social benefits to those communities. CDQ fisheries

[91] https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf
[92] https://apps-afsc.fisheries.noaa.gov/REFM/Socioeconomics/Projects/communities/default.php
[93] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

4.5.	There shall be sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries collected through data gathering, analysis, and research, as well as comparable data generated for ongoing monitoring, analysis, and policy formulation.

are managed by ADF&G with NMFS oversight[94]. Allocations of crabs to the CDQ program are 10% of the guideline harvest level (GHL) for each species.

The Alaska Board of Fisheries and the NPFMC are open public processes[95]. Any individual or group can submit proposals for discussion of management and research for crab fisheries in Alaska. The BOF and the NPFMC meet in communities across the region to provide public opportunities. NPFM also continues to incorporate local and traditional knowledge in fishery management, considers ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge in fishery management where appropriate. They also actively work to increase Alaska Native participation and consultation in fishery management through community workshops.

The Alaska Fisheries Information Network (AKFIN)[96] was established in 1997 under the direction of the Pacific States Marine Fisheries Commission (PSMFC) to consolidate, manage and dispense information related to Alaska's commercial fisheries. AKFIN was founded in response to an increased need for detailed, organized fishery information to help in making management decisions with a mission to maintain a database of both state and federal historic, commercial fisheries data relevant to the needs of fisheries analysts and economists.

Also see supporting clause 3.2.2 for further discussion of the economic conditions under which the fishing industry operates.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is sufficient knowledge of the economic, social, marketing, and institutional aspects of fisheries, that they are adequately researched, and that comparable data are generated for ongoing monitoring, analysis, and policy formulation. Examples may include reports on social/cultural/economic value of the resource.*	☑

EVIDENCE:
Links provided demonstrate considerable knowledge of the economic, social, marketing and institutional aspects of BSAI crab fisheries as well as data generation for ongoing monitoring, analysis, and policy formulation.

References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

[94] https://www.fisheries.noaa.gov/alaska/fisheries/cdq
[95] https://www.adfg.gov/index.cfm?adfg=fisheriesboard.main
[96] https://www.akfin.org/about-akfin

9.3.1.9 Supporting Clause 4.6.

4.6	**The fisheries management organization shall investigate and document traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development.**
Relevance:	Relevant

Evaluation Parameters	**Met?**
Process: *Traditional fisher knowledge has been investigated. Note that for highly developed fisheries that knowledge may already have been integrated into fisheries management.*	☑
EVIDENCE: Traditional fisheries knowledge is obtained through ongoing opportunity for public/community input to the fisheries management process to ensure its application to sustainable fisheries conservation, management and development.	
Current status/Appropriateness/Effectiveness: *There are records of the documentation of small-scale fisher practices.*	☑
EVIDENCE: The BSAI crab fisheries are fully developed industrialized fisheries using modern technology in the capture process. They are prosecuted solely by the domestic US fleet. The Community Development Quota (CDQ) program allocates a percentage of all BSAI crab quotas to eligible western Alaskan communities in order to provide an opportunity for those communities to participate, to support sustainable and diversified economic development and provide social benefits to those communities. CDQ fisheries are managed by ADFG with NMFS oversight. Allocations of crabs to the CDQ program are 10% of the guideline harvest level (GHL) for each species. Similarly, in the Golden king crab fishery west of 174°W long (WAG) 10% of the TAC is allocated to the Adak Community Allocation (ACA). The Alaska Board of Fisheries and the NPFMC are open public processes. Any individual or group can submit proposals for discussion of management and research for crab fisheries in Alaska. The BOF and the NPFMC meet in communities across the region to provide public opportunities. NPFMC also continues to incorporate local and traditional knowledge in fishery management, considers ways to enhance collection of local and traditional knowledge from communities, and incorporate such knowledge into current fishery management regimes where appropriate. They also actively work to increase Alaska Native participation and consultation in fishery management through community workshops[97,98].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization investigates and documents traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development. Examples may include various fisheries reports.*	☑
EVIDENCE: Links in 4.5 references demonstrate extensive effort by management organizations to incorporate traditional knowledge in management of BSAI crab fisheries. Links 97 and 98 provide evidence for active integration of local and traditional knowledge in management of BSAI crab fisheries.	

References:					
Numerical score:	**Starting score**	**–**	**Number of EPs NOT met x 3**	**=**	**Overall score**

[97] https://alasksseagrant.org/2019/07/01/local-and-traditional-knowledge-included-in-bering-sea-management-plan/
[98] https://repository.library.noaa.gov/view/noaa/13001

4.6	**The fisheries management organization shall investigate and document traditional fisheries knowledge and technologies—in particular those applied to small-scale fisheries—in order to assess their application to sustainable fisheries conservation, management, and development.**				
	10	**(**	**0**	**)**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					

9.3.1.10 Supporting Clause 4.7.

4.7	**If a fisheries management organization is conducting scientific research activities in waters of another State, it shall ensure that their vessels comply with the laws and regulations of that State and international law.**	
Relevance:	Not relevant. **Note:** If the stock is fully managed by one State and there is no need for shared stock research (between two or more States), then this clause is not applicable.	
	All the scientific research in support of BSAI crab fisheries management is conducted within the Alaska EEZ.	
Evaluation Parameters		**Met?**
Process: *There is a system in place to manage the conduct of research vessels operating in waters of other States.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *If a fisheries management organization is conducting scientific research activities in waters of another State, there is record of such shared research activities and they comply with required regulations.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if a fisheries management organization is conducting scientific research activities in waters of another State, it ensures that their vessels comply with the laws and regulations of that State and international law. Examples may include survey reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.3.1.11 Supporting Clause 4.8.

4.8.	**Adoption of uniform guidelines governing fisheries research conducted on the high seas shall be promoted and, where appropriate, support the establishment of policies that include, inter alia, facilitating research at the international and sharing the research results with affected States.**							
Relevance:	Not relevant. **Note:** If the stock is fully managed by one State and there is no need for shared stock research (between two or more States), then this clause is not applicable.							
	All the research in support of BSAI crab fisheries management is conducted within the Alaska EEZ.							
Evaluation Parameters								**Met?**
Process: *There is a mechanism in place to allow the development and review of guidelines governing fisheries research conducted on the high seas.*								☐
EVIDENCE:								
Current status/Appropriateness/Effectiveness: *There is a record of uniform high seas research guidelines or a mechanism to create them.*								☐
EVIDENCE:								
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that adoption of uniform guidelines governing fisheries research conducted on the high seas is promoted and, where appropriate, supports the establishment of mechanisms, including, inter alia, adopting uniform guidelines to facilitate research at the international level, and encouraging such research results be shared with affected States. Examples may include survey reports, or high seas guidelines.*								☐
EVIDENCE:								
References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)** **=**	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.3.1.12 Supporting Clause 4.9.

4.9	**If appropriate, the fisheries management organization and relevant international organizations shall promote and enhance the research capacities of developing countries, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources.**	
Relevance:	Not relevant. **Note**: This clause is only applicable when the unit of certification includes a transboundary, shared, straddling, highly migratory or high seas stock, which is fished by one or more developing States.	
	Developing countries do not participate in the BSAI crab fisheries.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism in place by which the research capacities of developing countries can be developed and enhanced. This could include, but is not limited to, the provision of personnel, equipment, funding, or cooperation on data collection and stock assessment.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *There are recognizable examples of instances in the history of the fishery under assessment where actions by the managers of the unit of certification have promoted or enhanced the research capacity of one or more developing nations in the ways described above.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that if appropriate, the fisheries management organization and relevant international organizations promote and enhance the research capacities of developing States, inter alia, in the areas of data collection and analysis, information, science and technology, human resource development, and provision of research facilities, in order for them to participate effectively in the conservation, management, and sustainable use of living aquatic resources. Examples may include various data or reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10								

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

9.3.1.13 Supporting Clause 4.10.

4.10.	**Competent national organizations shall, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished.**
Relevance:	Not relevant. **Note**: This criterion does not apply to fully developed fisheries, as defined by the FAO. The FAO definition of a developed fishery is *"a fishery which, following a period of rapid and steady increase of fishing pressure and catches, has reached its level of maximum average yearly production. It is usually understood that such a fishery is yielding close to its maximum sustainable yield."*
	The BSAI crab fisheries are fully developed industrialized fisheries.

Evaluation Parameters	**Met?**
Process: *There is a mechanism to allow a national organization to render technical and financial support to the State.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is a record of the provided technical and financial support.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that competent national organizations, where appropriate, render technical and financial support to States upon request and when engaged in research investigations aimed at evaluating stocks which have been previously unfished or very lightly fished. Examples may include various data or reports.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.3.1.14 Supporting Clause 4.11.

4.11.	Relevant technical and financial international organizations shall, upon request, support States in their research efforts, devoting special attention to developing countries—in particular the least developed among them and small developing island countries.	
Relevance:	Not relevant. **Note**: This clause is relevant where the fishery is within a developing region/small island region and management of the resource is performed through an international organization.	
	Developing countries do not participate in the BSAI crab fisheries.	
Evaluation Parameters		**Met?**
Process: *The international management component of the fishery is engaged in processes that support the fishery based in developing countries.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *There is a record of the provided technical and financial support.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that relevant technical and financial international organizations are, upon request, supporting States in their research efforts, and are devoting special attention of developing countries—in particular the least developed among them and small island developing countries. Examples may include various data or reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10								
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									
Non-conformance Number (if applicable):									

9.3.2 Fundamental Clause 5. Stock assessment

There shall be regular stock assessment activities appropriate for the fishery, its range, the species biology, and the ecosystem, undertaken in accordance with acknowledged scientific standards to support its optimum utilization.

9.3.2.1 Supporting Clause 5.1.

5.1.	**An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is an established institutional framework for fishery management purposes that determines applied research needs and use.*	☑
EVIDENCE: A well-organized institutional framework is in place that conducts the research required for fishery management purposes. The BSAI crab fisheries are jointly managed by the NPFMC and the BOF under the Fishery Management Plan (FMP). A requirement of the FMP is the production of an annual stock assessment and fishery evaluation (SAFE) report. For each stock/fishery, the SAFE report provides a detailed description of the data and methodology used in the stock assessment, any changes in approaches, the estimated status of the stocks in relation to pre-determined fisheries management reference points, advice on appropriate harvest levels, and an assessment of the relative success of existing state and federal fishery management programs.	
Current status: *There is evidence to substantiate that essential research for fishery management purposes is determined and carried out. This research generally includes routine stock(s) and ecosystem assessment reports. Assessors shall evaluate the specific stock assessment model/practices for each of the species under assessment and verify the technical appropriateness for use. For salmon, the assessors shall present and evaluate the methods for escapement goal development utilized to develop the annual escapement goals in Alaska (about 300). Statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.*	☑
EVIDENCE: In addition to the stock assessment, the SAFE report contains a chapter which assesses BSAI ecosystem trends, identifies and provides annual updates of ecosystem status indicators and research priorities for BSAI crab stocks, and updates management status indicators. A separate SAFE report describes the economic aspects of these fisheries. Ecosystem and Socioeconomic Profiles (ESPs) have recently been appended to SAFE reports for certain stocks. These contribute to risk evaluation and inform the catch level decision-making process. Extensive peer review is an integral part of the stock assessment process detailed in the SAFE reports, ensuring a robust scientific analysis of fishery status. The annual assessments of individual stocks are conducted by ADFG and NMFS scientists. The assessments are then peer reviewed by the full Crab Plan Team (CPT). Members of the CPT are employed by several agencies and are recognized experts in stock assessment and crab fisheries biology. The CPT provides comments and suggestions for improved methodology to the assessment authors who formally respond to all comments or suggestions. The CPT then makes recommendations on overfishing level (OFL) determinations, acceptable biological catch (ABC), stock status specifications and any other related issues to the Scientific and Statistics Committee (SSC) of the NPFMC. The SSC also provides comments and suggestions on the assessment which will be addressed in future SAFE reports. The SSC makes the final recommendation on OFL and ABC to the NPFMC. ADFG sets total allowable catch (TAC) levels in line with the Council's ABC recommendations.	

5.1.	An appropriate institutional framework shall be established to determine the applied research required and its proper use (i.e., assess/evaluate stock assessment model/practices) for fishery management purposes.

In addition to the peer review process that is integral to each annual assessment, BSAI crab stock assessment methodologies are also reviewed as considered necessary by way of specially convened NPFMC workshops with independent scientists that provide a more comprehensive review of special stock assessment methodology issues than would occur during the annual assessment cycle. Reference to any such review germane to current assessment activity for a particular stock is included in the annual SAFE report. In addition, periodic peer reviews of stock assessments and methodologies are conducted by the Center of Independent Experts (CIE).

Current status/Appropriateness/Effectiveness:	☐

EVIDENCE:

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that an appropriate institutional framework is established to determine the applied research required and its proper use (i.e., assess and evaluate stock assessment models or practices) for fishery management purposes. Examples may include description of the overall process of research assessment and peer review, as well as stock and ecosystem assessment reports.*	☑

EVIDENCE:
Links provided in 4.1, 4.1.1 and 4.5 evidence demonstrate a well-established institutional framework for stock assessment science in support of management of BSAI crab fisheries.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.3.2.2 Supporting Clause 5.1.1.

5.1.1.	**Less elaborate stock assessment methods are frequently used for small-scale or low-value capture fisheries resulting in greater uncertainty about the status of the *stock under consideration.*, A more precautionary approach to managing fisheries on such resources shall be required, including, where appropriate, a lower level of resource utilization. A record of good management performance may be considered as supporting evidence of the adequacy of the management system.**
Relevance:	Relevant. **Note.** If the fishery for the stock under consideration has sufficient data collected through regular stock assessment activities for its management, then this clause can be scored with full conformance.

Evaluation Parameters	Met?
Process: *There is a process that allows more precautionary approaches to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.*	☑
EVIDENCE: Stock status criteria used in the assessment of BSAI crab stocks ensure more precautionary approaches to managing fisheries when uncertainty is high. None of the BSAI crab fisheries can be considered small scale or low value. Nevertheless, the assessment methodology and degree of reliability varies between stocks. Status determination criteria for these stocks are 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.	
Current status/Appropriateness/Effectiveness: *There is evidence that precautionary approaches are applied to managing fisheries (e.g., lower exploitation rates) on resources assessed through stock assessment methods that result in greater uncertainty about the state of the stock under consideration.*	☑
EVIDENCE: Tier 5 (highest uncertainty) stocks have no reliable estimates of biomass and only historical catch data are available. For these, the OFL is set equal to the average catch from a time period determined to be representative of the production potential of the stock. 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. The State of Alaska harvest strategy for each stock determines TACs within the ABC limit based on threshold values for various stock component indicators that are more conservative than the ABC. Additional related information is provided in the evidence for supporting clauses 6.1 and 6.3.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that with less elaborate stock assessment methods frequently used for small-scale or low-value capture fisheries, more precautionary approaches to managing fisheries on such resources are required, including where appropriate, lower level of resource utilization. Examples may include stock assessment reports and other data.*	☑
EVIDENCE: The annual SAFE report reviews the Tier status designation for each BSAI crab stock, details OFL calculations and recommends a buffer to account for uncertainty in the stock assessment to be applied to the OFL to determine the ABC. A	

5.1.1.	**Less elaborate stock assessment methods are frequently used for small-scale or low-value capture fisheries resulting in greater uncertainty about the status of the *stock under consideration.*, A more precautionary approach to managing fisheries on such resources shall be required, including, where appropriate, a lower level of resource utilization. A record of good management performance may be considered as supporting evidence of the adequacy of the management system.**

presentation to crab industry reviews stock assessment results and explains application of the SOA harvest strategy which ensures a more precautionary approach to setting TACs for stocks with a higher degree of uncertainty.

References:	Review of TACs Bering Sea Crab: 2020/21 Season. ADF&G Presentation to BSAI Crab Industry, October 8, 2020.

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.2.3 Supporting Clause 5.1.2.

5.1.2	**The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There are organizations and processes in place to permit research into the aspects of fisheries listed in the clause.*	☑

EVIDENCE:

Well established institutions with qualified staff are in place that conduct research into all aspects of fisheries. Results are made available as needed to ensure that the best scientific evidence is used for fisheries conservation, management and development. In federal waters, the BSAI crab fisheries are jointly managed by the North Pacific Fishery Management Council (NPFMC), the National Marine Fisheries Service Alaska Region, BOF and ADFG under the BSAI Fishery Management Plan (FMP). Day-to-day management decisions and enforcement are devolved to the State of Alaska through the ADFG. With passage of the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA) in 1976, management jurisdiction of the crab fisheries occurs out to 200 miles. MSFCMA sets out ten national standards for fishery conservation and management (16 U.S.C. § 1851), with which all fishery management plans must be consistent[99].

Current status/Appropriateness/Effectiveness: *Research is conducted into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The described types of research carried out shall result in the fishery being deemed compliant with this evaluation parameter.*	☑

EVIDENCE:

The research branch of the NMFS Alaska Region is the Alaska Fisheries Science Center (ASFC)[100]. Its mission is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence. NMFS shellfish assessment programs are coordinated between the ASFC's Kodiak Laboratory and the NOAA/NMFS AFSC in Seattle, Washington. The AFSC is split into a number of Divisions which contribute to research and stock assessment of shellfish.

The Resource Assessment and Conservation Engineering (RACE) Division[101] comprises scientists from a wide range of disciplines whose function is to conduct quantitative fishery surveys and related ecological and oceanographic research to describe the distribution and abundance of commercially important fish and shellfish stocks in the region, and to investigate ways to reduce bycatch, bycatch mortality and the effects of fishing on habitat. Information derived from both regular surveys and associated research are analyzed by Division stock assessment scientists and supplied to fishery management agencies and to the commercial fishing industry.

Resource Ecology and Fisheries Management (REFM) Division[102] conducts research and data collection to support an ecosystem approach to management of fish and crab resources. Economic and ecosystem assessments are provided to the Council on an annual basis. Division scientists evaluate how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate. The Division also has a socio-economic program whose work includes evaluating economic impacts of fisheries rationalization programs, and compiling and evaluating socio-cultural information on Alaskan communities and traditional ecological knowledge.

[99] https://www.fisheries.noaa.gov/resource/document/magnuson-stevens-fishery-conservation-and management-act
[100] https://www.afsc.noaa.gov
[101] https://www.fisheries.noaa.gov/contact/resource-assessment-and-conservation-engineering
[102] https://www.fisheries.noaa.gov/contact/resource-ecology-and-fisheries-management

5.1.2	**The fisheries management organization shall ensure that appropriate research is conducted into all aspects of fisheries including biology, ecology, technology, environmental science, economics, and fishery enhancement. Analysis results shall be distributed in a timely and readily understandable fashion in order that the best scientific evidence available contributes to fisheries conservation, management, and development. The fisheries management organization shall also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research.**

The Fisheries Monitoring and Analysis Division (FMA)[103] monitors groundfish fishing activities and conducts research associated with sampling commercial fishery catches and estimation of catch and bycatch mortality, and analysis of fishery-dependent data. In relation to the crab assessments, the key role is the oversight of observers who collect groundfish catch and crab bycatch data on board groundfish fishing vessels and quality assurance of the data provided by these observers.

An Ecosystem Monitoring and Assessment Program and Fisheries Behavioral Ecology Program conduct research in support of ecosystem-based fishery management. Key projects which could be important for understanding crab population dynamics are focused on loss of sea ice, essential fish habitat and ocean acidification.

NMFS conducts an annual fishery-independent trawl survey of the eastern Bering Sea to determine the distribution and abundance of crab and groundfish resources. It provides fishery-independent indices of relative stock abundance/biomass, size/sex composition and shell condition for four of the five fisheries under consideration. The AI Golden King crab stock is not covered in this survey. A cooperative AI Golden King crab (pot) survey is carried out annually by the Aleutian Islands King Crab Foundation (an industry group) and ADF&G (for the first time in August 2018) in the EAG (east of 174° W longitude) and WAG (west of 174° W longitude) fisheries, by vessels that were quota fishing (i.e., each vessel fishing an allotted share of total allowable catch).

Details of monitoring programs in place to collect crab fishery catch and effort data as well as at-sea and dockside observer programs to collect catch composition, bycatch and discard data from crab and groundfish fisheries are included in the evidence for supporting clauses 4.1, 4.1.1 and 4.2.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States are conducting appropriate research into the following aspects of the fisheries: biology, ecology, technology, environmental science, economics, and aquaculture. The research is disseminated accordingly. States also ensure the availability of research facilities and provide appropriate training, staffing, and institution building to conduct the research. Examples may include stock assessment, economic value, fleet reports, and other reports.*	☑

EVIDENCE:
Links provided demonstrate that research has been ongoing over a long period into all aspects of fisheries science. This research provides the basis for annual assessment of stock status, reviews of ecosystem status, ecosystem and socioeconomic profiles, etc that inform all facets of management of BSAI crab stocks.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[103] https://www.fisheries.noaa.gov/contact/fisheries-monitoring-and-analysis

9.3.2.4 Supporting Clause 5.2.

5.2.	There shall be established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system that establishes the required research capacity needed to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems; (2) the status of the stock under State jurisdiction; and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Please note that climate science is complex and evolving, and the system shall recognize the ability to assess and monitor these parameters over time.*	☑
EVIDENCE: There is well established research capacity to assess and monitor the effects of climate or environment change on BSAI crab stocks and their ecosystem, the state of these stocks and the impacts of ecosystem changes resulting from human activity.	
Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that there is sufficient research capacity in place to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under consideration, and (2) the impacts of fishing activity, pollution, or habitat alteration.*	☑
EVIDENCE: Resource Ecology and Fisheries Management (REFM) Division (link in 5.1.2 evidence) at the NMFS AFSC conducts a program of research and data collection to support an ecosystem approach to management of fish and crab resources. Crab stock assessments are conducted annually and used by the Council to set catch quotas. Economic and ecosystem assessments are also conducted and provided to the Council on an annual basis. These provide a basis for scientific evaluation of how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate. A socio-economic program evaluates economic impacts of fisheries rationalization programs, and evaluates socio-cultural information on Alaskan communities and traditional ecological knowledge. Also, an Ecosystem Monitoring and Assessment Program and Fisheries Behavioral Ecology Program conduct research in support of ecosystem-based fishery management. An Ecology and Ecosystem Modeling Program[104] prepares an annual ecosystem status report which provides a concise summary of the status of marine ecosystems in Alaska for stock assessment scientists, fishery managers, and the public. The report provides detailed information and updates on the status and trends of ecosystem components as well as early signals of direct human effects on ecosystem components that might warrant management intervention or to provide evidence of the efficacy of previous management actions. The indicators summarize information about the characteristics of the human influences (particularly those related to fishing, such as catch composition, amount, and location) that are influencing a particular ecosystem component. A major component of the report is an ecosystem assessment that synthesizes historical climate and fishing effects on the eastern Bering Sea/Aleutian Islands and Gulf of Alaska ecosystems using information from the Ecosystem Status and Management Indicators section and stock assessment reports. Notable trends that capture unique occurrences, changes in trend direction, or patterns across indicators are highlighted. An ongoing goal is to produce an ecosystem assessment utilizing a blend of data analysis and modeling to clearly communicate the current status and possible future directions of ecosystems. The annual BSAI Crab SAFE report summarizes the status of crab stocks. It also includes a section on ecosystem considerations which provides information on ecosystem indicators which may have an impact on crab stocks. The annual ecosystem status report considers the physical environment of the BSAI ecosystem including climatic factors, sea ice trends, habitat and ocean acidification, the biological environment of the ecosystem including crab prey and predators of crab, and the physical and biological environmental impacts on crab biology including recruitment, growth and mortality, and provides	

[104] https://www.fisheries.noaa.gov/Alaska/science-data/resource-ecology-and-ecosystem-modeling

5.2.	There shall be established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration.

trends in ecosystem-based management indicators. Ecosystem and Socioeconomic Profiles (ESPs) have recently been appended to SAFE reports for certain stocks. These contribute to risk evaluation and inform the catch level decision-making process.

NOAA Fisheries also conducts and reviews environmental analyses of impacts of a wide variety of human activities to ensure these have minimal impact on essential fish habitat and marine life in Alaska. Conservation activities include protecting EFH, mitigating damage to and enhancing/restoring habitat affected by human activity with a focus on habitat used by federally-managed fish species located offshore, nearshore, in estuaries and in freshwater areas[105, 106].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is established research capacity necessary to assess and monitor (1) the effects of climate or other environmental change on stocks and aquatic ecosystems, (2) the status of the stock under State jurisdiction, and (3) the impacts of ecosystem changes resulting from fishing activity, pollution, or habitat alteration. Examples may include stock, ecosystem, and habitat assessment reports.*	☑

EVIDENCE:
Links provided here and in 5.1.2 evidence demonstrate established research capacity to access and monitor effects of environmental change on BSAI crab stocks as well as the impacts of ecosystem changes resulting from human activities.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[105] https://www.fisheries.noaa.gov/region/alaska#habitat
[106] https://www.uarctic.org/organization/thematic-networks/global-ecological-and-economic-connections-in-arctic-and-sub-arctic-crab-fisheries/

9.3.2.5 Supporting Clause 5.3.

5.3	**Management organizations shall cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is cooperation or interaction between international organizations to ensure optimum utilization of resource.*	☑
EVIDENCE: The various species that compose BSAI crab stocks are distributed quite widely. There is extensive international collaboration/cooperation that encourages research to improve understanding of their biology, environment and status and hence, to ensure optimum utilization of these resources throughout their range.	
Current status/Appropriateness/Effectiveness: *There is evidence available to substantiate that such cooperation or interaction has taken place. There is data available that substantiates cooperation activities.*	☑
EVIDENCE: Research output on BSAI crab stocks is regularly published in the scientific literature and presented/discussed at relevant international conferences, annual meetings and symposia[107]. Scientists participate in meetings of different organizations involving attendees from various countries, including, for example, the North Pacific Marine Science Organization (PICES)[108], which has members from the US, Russia, Japan and Canada, to exchange and discuss the latest results and advance stock assessment science and management of fishery resources. Meetings of the Scientific Committee of the North Pacific Fisheries Commission[109] provide another forum for international cooperation in fisheries research. The US is also party to many international agreements on fisheries matters which encourage cooperation and support for research on all aspects of sustainable use of marine resources[110].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management organizations cooperate with relevant international organizations to encourage research in order to ensure optimum utilization of fishery resources. Examples may include outputs resulting from meetings or other research.*	☑
EVIDENCE: Links provided substantiate extensive international involvement encouraging research into sustainable use of fisheries resources.	

References:								
Numerical score:	**Starting score**			**Number of EPs NOT met**				**Overall score**
	10	**–**	**(**	**0**	**x**	**3**	**) =**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[107] https://www.pmel.noaa.gov
[108] https://www.pices.int
[109] https://www.fisheries.noaa.gov/resource/document/2020-international-fisheries-agreement-book
[110] https://www.fisheries.noaa.gov/document/2020-international-fisheries-agreement-book

9.3.2.6 Supporting Clause 5.4.

5.4.	The fishery management organizations shall directly, or in conjunction with other States, develop collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary, shared, straddling, highly migratory and high seas stocks.
Relevance:	Not relevant. **Note:** Not applicable if stock in not transboundary, shared, straddling, highly migratory or high seas in nature.
	BSAI crab stocks are not transboundary nor shared with any other country.

Evaluation Parameters	Met?
Process: *The collaborative technical and research programs to improve understanding of the biology, environment, and status of transboundary aquatic stocks have been developed.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is evidence available to substantiate that such cooperation or interaction has taken place. There are data on collaborative programs to improve understanding of transboundary, shared, straddling, highly migratory or high seas stocks.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations directly, or in conjunction with other States, have developed collaborative technical and research programs to improve understanding of the biology, environment, and status, of transboundary, shared, straddling, highly migratory or high seas stocks. Examples may include outputs resulting from meetings or other research.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.3.2.7 Supporting Clause 5.5.

5.5.	**Data generated by research shall be analyzed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate.**	
Relevance:	Relevant	
Evaluation Parameters		**Met?**
Process: *There is a process that allows analysis of research data, ensuring, where appropriate, their confidentiality.*		☑
EVIDENCE: The issues identified in this supporting clause have been addressed in SCs 5.3 and 4.3.		
Current status/Appropriateness/Effectiveness: *There is evidence data was properly analysed. Data was published respecting, where appropriate, confidentiality agreements. The rules of confidentiality are effectively respected.*		☑
EVIDENCE: The issues identified in this supporting clause have been addressed in SCs 5.3 and 4.3.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data generated by research is analysed and the results of such analyses published in a way that ensures confidentiality is respected, where appropriate. Examples may include various data or reports.*		☑
EVIDENCE: Refer to references provided in SCs 5.3 and 4.3.		
References:		

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**	**0**	**x 3)**	**=**	**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.3 Fundamental Clause 6. Biological reference points and harvest control rule

The current state of the stock shall be defined in relation to reference points, relevant proxies, or verifiable substitutes that allow effective management objectives and targets to be set. Remedial actions shall be available and taken where reference points or other suitable proxies are approached or exceeded.

9.3.3.1 Supporting Clause 6.1.

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *A target reference point(s) or proxy has been officially established. Managers shall be able to apply technical measures to reduce fishing pressure in the event that reference points are approached or exceeded.*		☑

EVIDENCE:

The FMP contains the following stock status definitions:

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

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.

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 FMSY 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, and is expressed as the fishing mortality rate.

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

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.

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 8.2.2.

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

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 to abundance estimates.

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 nontarget 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 determines 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 (SSC), and Crab Plan Team (CPT) 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 the FMP. Information pertaining to economic, social and ecological factors relevant to the determination of optimum yield is provided in the FMP. 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

6.1.	The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.

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 the FMP 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 8.2.2, the State establishes TACs at levels that maximize harvests, and associated economic and social benefits, when biological and ecological conditions warrant doing so.

Current status/Appropriateness/Effectiveness: *The official target reference point or proxy is consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Furthermore, there is evidence that the target reference point/management target has been used as an objective by the management process. If there are historical instances of the reference point being approached or exceeded, managers have taken remedial action as appropriate. In the context of reference points, when data are insufficient to estimate reference points directly, other measures of productive capacity can serve as reasonable substitutes or proxies. Suitable proxies may include, for example, standardized Catch per Unit of Effort (CPUE) as a proxy for biomass; or specific levels of fishing mortality and biomass, which have proven useful in other fisheries, can be used with a reasonable degree of confidence in the absence of better-defined levels. It is important to note that the use of a proxy may involve additional uncertainty, and if so, should trigger extra precaution in setting biological reference points. For salmon, escapement goals are the equivalent of a target reference point proxy.*	☑

EVIDENCE:

In the Five-Tier System, the OFL and ABC for each stock are annually estimated for the upcoming crab fishing year. 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 CPT process to the SSC which 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. For Tiers 1 through 4, 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}. The F_{MSY} control rule reduces the F_{OFL} as biomass declines by stock status level. Three levels of stock status are specified: at level (a), current stock biomass exceeds the B_{MSY}, at level (b), current biomass is less than B_{MSY} but greater than a level specified as the "critical biomass threshold" (β), at level (c), the ratio of current biomass to B_{MSY} (or a proxy for B_{MSY}) is below β (i.e. below MSST). 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. 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 SSC may recommend different values for a specific stock or stock complex as merited by the best available scientific information. For 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}. For Tier 5, the OFL is specified in terms of an average catch value over an historical time period, unless the SSC recommends an alternative value based on the best available scientific information.

Stock assessment authors prepare the annual assessment and calculate the proposed OFLs by applying the F_{OFL} and using the most recent abundance estimates. Proposed ABCs are calculated by applying the ABC control rule to the proposed OFL. Stock assessments 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. The CPT reviews stock assessment documents, the most recent abundance estimates, the proposed OFLs and ABCs, and complies the Stock Assessment and Fishery Evaluation (SAFE) Report. The CPT

6.1.	**The fishery management organization shall establish safe target reference point(s) for management. Management targets are consistent with achieving maximum sustainable yield (MSY), a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid adverse impacts on dependent predators.**

then makes recommendations to the SSC on the OFLs, ABCs, and any other issues related to the crab stocks. The SSC reviews the SAFE report, including the stock assessment documents, recommendations from the CPT, and the methods to address scientific uncertainty. The CPT and the SSC 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 accounts for in annual TAC setting. The SSC then sets the final OFLs and ABCs for the upcoming crab fishing year.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that target reference points have been established and are consistent with achieving MSY, a suitable proxy, or a lesser fishing mortality—if that is optimal in the circumstances of the fishery (e.g., multispecies fisheries) or is needed to avoid severe adverse impacts on dependent predators. Examples may include stock assessment reports or fishery management plans.*	☑

EVIDENCE:
Links provided in supporting clause 4.5 to the FMP and to the 2019 SAFE substantiate that safe target reference points have been established for management of BSAI crab fisheries.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.3.2 Supporting Clause 6.2.

6.2.	**The fishery management organization shall establish appropriate limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible; Appendix 1, Part 1). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *A scientifically based limit reference point or proxy has been officially established, and together with the measure to be taken, ensures the reference point(s) will not be exceeded.*		☑
EVIDENCE: Establishment of reference points, including a limit reference point, in BSAI crab fisheries is reviewed in supporting clause 6.1.		
Current status/Appropriateness/Effectiveness: *The stock under assessment shall not currently be overfished (see glossary) according to the best scientific evidence available. The stock is currently estimated to be on the sustainable side of this reference point (e.g., spawning stock biomass is above the limit reference point, F is below F_{lim}, etc.). F_{lim} shall not exceed F_{msy}. The limit reference point or proxy is consistent with avoiding recruitment overfishing and other severe negative impacts on the stock. There are mechanisms in place (e.g., harvest control rule or mechanism) to ensure that the level of fishing pressure is reduced if the limit reference point is approached or reached, and these mechanisms are consistent with ensuring to a high degree of certainty that the limit reference point will not be exceeded, and that actions are taken to decrease the fishing mortality (or its proxy) below that limit reference point. The level of B_{lim} should be set on the basis of historical information, applying an appropriate level of precaution according to the reliability of that information. In addition, an upper limit should be set on fishing mortality, F_{lim}, which is the fishing mortality rate that, if sustained, would drive biomass down to the B_{lim} level. It is important to clarify that for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered a suitable minimum reference point for salmon management. Specific to this point, underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4–5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to ensure stocks are managed with the objective of returning them to safe biological targets.*		☑
EVIDENCE: Safe limit reference points have been established for exploitation of BSAI crab stocks and measures are in place to ensure fishing mortality is decreased when a limit reference point is approached. The biomass that is associated with MSY, B_{MSY}, is effectively treated as the target reference point since it is the desired stock condition but, effective harvest is always lower, consistent with ABC, ACL and TAC formulations, although MSY itself is treated as an upper limit rather than a target reference point because the overfishing limit (OFL) is based upon MSY. The (lower) limit reference point corresponds to 0.5 x B_{MSY}. The harvest rate in the directed fishery is decreased when stock biomass is moving from upper to limit reference point. At stock status level (c), the ratio of current biomass to B_{MSY} (or a proxy for B_{MSY}) is below β (critical biomass threshold), 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 a rebuilding plan. The stock is considered as overfished if the annual estimated biomass drops below the minimum stock size threshold (MSST). As the annual catch limit (ACL) is never set at a level that would exceed the overfishing level (OFL), the OFL and its associated value of fishing mortality, F_{OFL}, can be considered as limit reference points established for all five crab stocks. As OFL is based upon MSY, then MSY is treated as a limit rather than a target reference point. In fact, ACL (=ABC for crab stocks) is lower than OFL so the limit reference point is actually lower than MSY. The optimum yield (OY), which may range from 0 to <OFL, is also a limit reference point. OY is prescribed on the basis of MSY from the fishery reduced by any relevant social, economic		

6.2.	**The fishery management organization shall establish appropriate limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible; Appendix 1, Part 1). When a limit reference point is approached, measures shall be taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions should be taken to decrease the fishing mortality (or its proxy) below that limit reference point.**

or ecological factor, or in the case of an overfished stock, provides for rebuilding to a level consistent with producing MSY from that fishery.

If overfishing has occurred (total catch exceeds OFL) or the stock is overfished (biomass is less than MSST), the Magnuson-Stevens Act (MSA) requires NPFMC to immediately end overfishing and rebuild stocks. The MSA also requires that the FMP includes accountability measures to prevent ACLs from being exceeded and to correct overages if they do occur.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are established safe limit reference point(s) for exploitation (i.e., consistent with avoiding recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible). When a limit reference point is approached, measures are taken to ensure that it will not be exceeded. For instance, if fishing mortality (or its proxy) is above the associated limit reference point, actions are taken to decrease the fishing mortality (or its proxy) below that limit reference point. Examples may include stock assessment reports or fishery management plans.*	☑

EVIDENCE:
Links provided in supporting clause 4.5 to the FMP and to the 2019 SAFE substantiate that safe limit reference points have been established for management of BSAI crab fisheries.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.3.3 Supporting Clause 6.3.

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**	
Relevance:	Relevant.	

Evaluation Parameters	**Met?**
Process: *Data and assessment procedures (i.e., stock assessment process) are in place to measure the position of the fishery in relation to the target and limit reference points.*	☑
EVIDENCE: Procedures are in place to measure the position of BSAI crab fisheries in relation to their reference points and measures are in place to ensure they are not overfished or being overfished and take into account long term changes in productivity or impacts other than fishing.	
Current status/Appropriateness/Effectiveness: *The current stock status in relation to reference points is used to determine the level of fishing permitted. The latter is commensurate with the current state of the fishery resources (i.e., close to or above target reference point and most importantly, not overfished or at or below its limit reference point or proxy), and takes into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. The stock is positioned at or above the target reference point. As a minimum, the stock is located above the midway point between the target and the limit reference point. It is important to clarify that, for salmon, spawning escapement goals are a suitable proxy for the intent of this clause. Escapement goal performance over a 4- to 5-year period shall be considered as a suitable minimum reference point for salmon management. Underperforming salmon stocks that do not meet their escapement goals for a sustained period (over 4– 5 years) shall be appropriately managed within the stock of concern framework by the State of Alaska to return them to safe biological targets. Assessors shall present evidence and evaluate escapement goals and escapement goal performance (i.e., met, not met) for all the wild salmon stock with a formal escapement goal in force in Alaska (about 300 annually). Overall, statewide summary data for Alaska can be found in the annually released ADF&G document Summary of Pacific salmon escapement goals in Alaska with a review of escapements from [year] to [year]. The document generally presents the latest 9–10 years of salmon escapement performance in review.*	☐
EVIDENCE: The annual Crab SAFE report describes the data, assessment methodology and stock determination criteria which permit an assessment of the position of each of the crab fisheries in relation to pre-defined reference points. BSAI crab resources are managed under a joint federal/state agreement that includes federal oversight but defers much of the management to the State of Alaska. To a very large extent, management is a continuation of long-standing practice that pre-dates the FMP and is modified as required over time but in conformity with the FMP. The FMP authorizes the State to set preseason TACs and GHLs under State regulations taking into account a suite of economic, social, biological and ecological factors in developing harvest strategies for each fishery. The annual TACs are set at levels that maximize harvests and associated economic and social benefits when biological and ecological conditions warrant. TACs are set sufficiently below the ACL so that the sum of the catch and the State's assessment of additional uncertainty do not exceed the ACL. The decision to open a fishery in any given year is based on a threshold value of mature male and/or female biomass estimated from the most recent survey as a percentage of long-term averages. Details of the calculation of threshold values varies among fisheries. A fishery may not be opened even though the formal federal assessment indicates that the stock is not overfished and that overfishing is not occurring. A thorough review of the TAC decision-making process for each fishery is presented to the BSAI crab industry prior to season opening each year (referenced in supporting clauses 5.1.1 and 5.1.2). ADF&G may close a fishery with a GHL before or after the GHL is achieved based on current in-season information. TACs and GHLs for each fishery are reported in the annual SAFE report, along with the OFLs and ABC/ACLs.	

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

The following stock status summaries from SAFE 2020:

Eastern Bering Sea Snow Crab

Fishery information relative to OFL setting. Total catch mortality in 2019/20 was 20,800 t (with discard mortality rates applied), while the retained catch in the directed fishery was 15,400 t. Because the total catch mortality for this stock was below the 2019/20 OFL of 54,900 t, overfishing did not occur. Snow crab bycatch occurs in the directed fishery and to a lesser extent in the groundfish trawl fisheries. Estimates of trawl bycatch in recent years are less than 1% of the total snow crab catch.

Data and assessment methodology. The stock assessment is based on a size- and sex-structured model in which crabs are categorized into immature or mature, and account is taken of a terminal molt. The model is fitted to biomass and size frequency data from the NMFS trawl survey, total catch data from the directed fishery, bycatch data from the trawl fishery, size frequency data for male retained catch in the directed fishery, and male and female bycatch in the directed and trawl fisheries. The model is also fitted to biomass estimates and size frequency data from the 2009 and 2010 BSFRF surveys. Updated data in the 2020 assessment include retained and total catch and length frequencies from the 2019/20 directed fishery, and discard catch and length frequencies from the 2019/20 groundfish fisheries. There were no new survey data because there was no 2020 NMFS trawl survey.

Stock biomass and recruitment trends. Observed mature male biomass in the NMFS EBS bottom trawl survey, based on applying a maturity ogive, decreased from a peak of 167,100 t in 2011 to 97,500 t in 2013, increased to 163,500 t in 2014, fell to 63,200 t in 2016, then increased once again to 84,000 t in 2017, 198,400 t in 2018, and 169,100 t in 2019. Observed survey mature female biomass rose quickly from a low of 52,200 t in 2009 to 175,800 t in 2011, its highest value since 1991, decreased steadily to 55,400 t in 2016, then increased to 106,800 t in 2017 and to a peak of 165,900t in 2018. Observed survey mature female biomass decreased in 2019 to 110,400 t.

The model estimates for mature male biomass-at-mating (MMB) declined from a 10-year high of 209,600 in 2009/10 to a low in 2015/16 of 66,900 t. MMB increased in subsequent years and was estimated to be 560,200 t in 2020/21. Model-estimated mature female biomass-at-mating (MFB) began to decline somewhat later, from a peak in 2011/12 (546,700 t) to a low in 2016/17 (201,200 t), followed by increases to 432,900 t in 2019/20. MFB declined to 352,800t in 2020/21.

Estimated recruitment to the population has been episodic, with peaks in recruitment generally preceding peaks in mature biomass by a few years. The most recent peaks were in 2008/09 (1,370,000 crab), preceding peaks in MMB and MFB in 2009/08 and 2011/12, respectively, and in 2015/16 (15,720,000 crab), preceding the increases in MMB and MFB that began in 2015/16. The estimate of 2015/16 recruitment is substantially higher in this year's assessment than the 2019 assessment.

OFL/ABC determination and catch specifications. The CPT recommends that the EBS snow crab is a Tier 3 stock so the OFL will be determined by the F_{OFL} control rule using F35% as the proxy for F_{MSY}. The proxy for B_{MSY} (B35%) is the mature male biomass at mating (113.7 kt) based on average recruitment over 1982 to 2018. Consequently, the minimum stock size threshold (MSST) is 56.8 kt. Projected MMB for 2020/21 (276.7kt) is above the MSST, so the stock is not overfished. The CPT recommends that the ABC be less than maximum permissible ABC. The buffer between the ABC and OFL was 20% for 2017, 2018 and 2019 assessments, reflecting uncertainty about model misspecification (growth) and parameter confounding, the ongoing evidence for retrospective patterns, and the uncertainty surrounding rates of natural mortality. There is less concern about growth in the 2020 assessment, but the CPT was concerned about the reasons for the substantial increase in 2015/16 recruitment, which may be a consequence of GMACS imposing only weak penalties on the recruitment deviations. Thus, ignoring the effect of the lack of a 2020 survey, the CPT recommends a buffer of 25% based only on uncertainties related to the model fit.

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

Table 9. Status and catch specifications (1000 t) for snow crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2016/17	75.8	96.1	9.7	9.7	11.0	23.7	21.3
2017/18	71.4	99.6	8.6	8.6	10.5	28.4	22.7
2018/19	63.0	123.1	12.5	12.5	15.4	29.7	23.8
2019/20	56.8	167.3	15.4	15.4	20.8	54.9	43.9
2020/21		276.7				184.9	92.5

Bristol Bay Red King Crab

Fishery information relative to OFL setting. The commercial harvest of Bristol Bay red king crab (BBRKC) dates to the 1930s. The fishery was initially prosecuted mostly by foreign fleets but shifted to a largely domestic fishery in the early 1970s. Retained catch 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 two decades compared to those seen in the 1970s. The fishery is managed for a total allowable catch (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). In addition to the retained catch that occurs during the commercial fishery, which is limited by the TAC, there is also retained catch that occurs in the ADF&G cost-recovery fishery.

The current SOA 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. Annual non-retained catch of female and sublegal male RKC during the fishery has averaged less than 8.6 kt since data collection began in 1990. Total catch (retained and bycatch mortality) increased from 7.6 kt in 2004/05 to 10.6 kt in 2007/08 but has decreased since then; retained catch in 2019/20 was 1.78 kt and total catch mortality was 2.22 kt.

Data and assessment methodology. The stock assessment is based on a sex- and size-structured population dynamics model incorporating data from the NMFS eastern Bering Sea trawl survey, the Bering Sea Fisheries Research Foundation (BSFRF) trawl survey, landings of commercial catch, at-sea observer sampling, and dockside retained catch sampling. In the model recommended by the CPT, annual stock abundance was estimated for male and female crabs ≥ 65-mm CL from 1975 to July 1, 2020 and mature male (males ≥120 mm CL) biomass was projected to 15 February 2021. 2019/20 fishery data on retained catch in the directed fishery were obtained from ADF&G fish tickets and reports (retained catch numbers, retained catch weight, and pot lifts by statistical area and landing date), on bycatch in the red king crab and Tanner crab fisheries from the ADF&G observer database, and on bycatch in the groundfish trawl fisheries from the NMFS groundfish observer database. The 2020 NMFS EBS shelf bottom trawl survey was cancelled due to safety concerns associated with the COVID-19 pandemic; consequently, the model was fit using 1975-2019 NMFS trawl survey dataset, which included sex-specific area-swept estimates of abundance, biomass, and size composition.

Stock biomass and recruitment trends. Based on the CPT-recommended scenario, 19.3, the MMB at the time of mating is estimated to have been highest early in the late 1970s (approximately 120 kt), with secondary peaks in 1989 (27 kt) and 2002/03 (~33 kt), followed by a gradual decline. The estimated MMB at time of mating in 2019/20 was 14.24 kt. The projection for the 2020/21 time of mating, which assumes the fishing mortality in 2020/21 matches that corresponding to the OFL, is 14.93 kt. Estimates of recruitment since 1985 have been generally low relative to those estimated for the period

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

prior to 1985 and intermittent peaks in 1995, 2002, and 2005 (61, 52, and 42 million crab, respectively). The relatively low estimate of recruitment for 2019 (3.8 million crab) was the second lowest since 1994. The estimate for 2020, 18.9 million, was the largest since 2010 but was highly uncertain due to the lack of 2020 survey data to inform the model.

OFL/ABC determination and catch specifications. Bristol Bay red king crab is in Tier 3. Based on previous discussion regarding an apparent reduction in stock productivity associated with the 1976/77 climate regime shift in the EBS, the CPT concurred with the author's recommendation to drop the terminal year recruitment from the time period for average recruitment when calculating B35% because it is highly uncertain. The CPT recommends computing average recruitment as has been done in recent assessments
(i.e., based on model recruitment using the time period 1984 and corresponding to fertilization in 1977) to the penultimate year of the assessment. Based on model scenario 19.3, the estimated B35% is 25.4 kt. MMB projected for 2020/21 is 14.93 kt, 59% of B35%. Consequently, the BBRKC stock is in Tier 3b for 2020/21. The corresponding OFL is 2.14 kt.

Last year, the CPT recommended setting the ABC below the maximum permissible, using a 20% buffer on the OFL to account for additional uncertainty in the assessment associated with the model's lack of fit to the 2018 and 2019 NMFS EBS bottom trawl survey data and recent environmental conditions (e.g. elevated bottom temperatures, lack of a cold pool). The CPT agreed that the uncertainty associated with these issues was already included in the 20% buffer previously adopted and did not warrant further increase. Additional uncertainty associated with the cancelled 2020 NMFS survey was evaluated and results indicate a likely additional uncertainty of approximately 5%. There was also concern that the stock in 2021 was estimated to be at 59% of B_{MSY}, which is close to the overfished threshold. The CPT concluded that the cancelled survey in 2020 reduced the ability to reliably determine stock status, which warrants the additional buffer. The CPT recommends an additional buffer of 5% based on a retrospective analysis
that indicated the OFL tended to be over-estimated by about 5% when there was no survey in the terminal year. This recommendation would result in a total buffer of 25%.

MMB for 2019/20 was estimated to be 14.24 kt and above MSST (10.62 kt); hence the stock was not overfished in 2019/20. The total catch mortality in 2019/20 (2.22 kt) was less than the 2019/20 OFL (3.40 kt); hence overfishing did not occur in 2019/20. However, several CPT members expressed concern that the stock will be overfished in a few years and that king crab stocks do not seem to rebuild easily, once an overfished condition is reached. It was suggested that it may be time to review the use of F35% as a proxy
for F_{MSY} for this and other Alaskan crab stocks.

Table 10. Status and catch specifications (1000 t) for Bristol Bay red king crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2016/17	12.53	25.81	3.84	3.92	4.28	6.64	5.97
2017/18	12.74	24.86	2.99	3.09	3.48	5.60	5.04
2018/19	10.62	16.92	1.95	2.03	2.65	5.34	4.27
2019/20	12.72	14.24	1.72	1.78	2.22	3.40	2.72
2020/21		14.93				2.14	1.61

Guidance for current status states that "At a minimum, the stock is located above the midway point between the target (B_{MSY}) and the limit (MSST = .5 B_{MSY}) reference point. That means current biomass should be ~ 19.00 kt but it is well below that at ~ 15.00 kt. Therefore, a NC is raised against BBRKC.

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

Eastern Bering Sea Tanner crab

Fishery information relative to OFL setting. Eastern Bering Sea (EBS) Tanner crab are caught in directed Tanner crab fisheries, as bycatch in the groundfish and scallop fisheries, as bycatch in the directed Tanner crab fishery (mainly as non-retained females and sublegal males), and other crab fisheries (notably, eastern Bering Sea snow crab and, to a lesser extent, Bristol Bay red king crab). A single OFL is set for Tanner crab in the EBS. Under the Crab Rationalization Program, ADF&G sets separate TACs for directed fisheries east and west of 166° W longitude. The mature male biomass was estimated to be below the MSST in February 2010 (the assumed time of mating) based on trends in mature male biomass from the survey, and NMFS declared the stock overfished in September 2010. The directed fishery was closed from 2010/11 through 2012/13 crab fishery years. NMFS determined the stock was rebuilt in 2012 based on a new assessment model with a revised estimate of B_{MSY}. The directed fishery was open for the 2013/14 to 2015/16 seasons with a total allowable catch (TAC) of 1,410 t in 2013/14, 6,850 t in 2014/15, and 8,920 t in 2015/16. The total retained catch in 2015/16 (8,910 t) was the largest taken in the fishery since 1992/93. In 2016/17, ADF&G determined that mature female biomass did not meet the criteria for opening a fishery according to the regulatory harvest strategy, and the TAC was set at zero. Consequently, there was no directed harvest in 2016/17. In 2017/18, ADF&G determined that a directed fishery could occur in the area west of 166°W longitude. The TAC was set at 1,110 t for 2018/19, of which 100% was taken. In 2019/20, mature female biomass again, did not meet ADF&G criteria for opening a fishery, and there was no directed harvest.

In March 2020, the harvest control rule for Tanner crab was changed by the Alaska Board of Fisheries based on results from an extensive management strategy evaluation (MSE) conducted with input from industry stakeholders, NMFS and academic scientists, and ADF&G managers. The current HCR defines the period for calculating average mature biomass as 1982-2018, and determines exploitation rates on mature males using sliding scale functions of the ratios of MMB and mature female biomass to their long term
averages.

Data and assessment methodology. The SSC accepted a size-structured assessment model for use in harvest specifications in 2012 and classified the EBS Tanner stock as a Tier 3 stock. This year's assessment used the modeling framework TCSAM02, which was endorsed by the SSC in June 2017. The model is structured by crab size, sex, shell condition, and maturity. The model uses available data on quantity and size-composition from: the NMFS trawl survey; landings and discards by the directed fishery; and bycatch in the Bristol Bay red king crab, EBS snow crab, and groundfish fisheries. The model includes prior distributions on parameters related to natural mortality and catchability, and penalties on changes in recruitment and in the proportion maturing. There was limited new information for Tanner crab this year due to a closed directed fishery and a cancelation of 2020 NMFS EBS trawl survey. Input data sets were updated with the most recent information on bycatch and size composition data from other 2019/20 crab fisheries, as well as data on Tanner crab bycatch in the groundfish fisheries in 2019/20.

The model recommended by the CPT to set the OFL and the ABC is a revised model (Model 20.07) that incorporates the BSFRF trawl survey data from its cooperative "side-by-side" (SBS) catch comparison studies with the NMFS EBS shelf bottom trawl survey to better fix the scale of the NMFS survey data. Empirical availability curves for the BSFRF were estimated outside the assessment model using a generalized additive model with cubic splines. These were used in the model to relate the BSFRF estimates of absolute abundance (at spatial scales smaller than the stock distribution) and the stock abundance estimated by the assessment model. The CPT regarded this model as an improvement over last year's model because it made robust use of data from BSFRF catch comparison studies, which had not been used previously for Tanner crab.

Stock biomass and recruitment trends. The MMB at the time of mating is estimated to have been highest in the early 1970s (approximately 400 kt), with secondary peaks in 1991 (99 kt), 2008 (108 kt), and in 2014 (111 kt). The estimated MMB at

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

time of mating in 2019/20 was 56.15 kt and the projection for 2020/21 is 35.33 kt. Estimates of recruitment since 1999 have been generally low relative to the peaks estimated for the period prior to 1990. There was a relatively strong recruitment estimated for 2016, 2017, and 2018, but these estimates remain uncertain and will need to be confirmed by subsequent assessments.

OFL/ABC determination and catch specifications. The CPT recommends the OFL for this stock be based on the Tier 3 control rule. Application of the Tier 3 control rule requires a set of years for defining average recruitment corresponding to B_{MSY} under prevailing environmental conditions. This recommended time period is 1982 – 2019. The 1982 and onwards time period had been used in previous OFL determinations, but this year a decision was made to exclude the recruitment estimate for the terminal year in this calculation. This estimate is extremely uncertain this year due to the lack of survey information. Based on the estimated biomass at 15 February 2020, the stock is at 96% of B_{MSY}, and therefore is in Tier 3b. The F_{MSY} proxy (F35%) is 0.98 yr-1, and the 2020/21 F_{OFL} is 0.94 yr-1 under the Tier 3b OFL Control Rule, which results in a total OFL of 21.13 kt. The CPT recommends a 20% buffer to account for model uncertainty and stock productivity uncertainty be applied to the OFL to set ABC = 16.90 kt. The 20% buffer is the same that the SSC recommended for determination of the 2019/20 ABC. The CPT concluded that no additional buffer was needed to account for the cancelled NMFS EBS bottom trawl survey in 2020.

Table 11. Status and catch specifications (1000 t) for Tanner crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2016/17	14.58	77.96	0.00	0.00	1.14	25.61	20.49
2017/18	15.15	64.09	1.13	1.13	2.37	25.42	20.33
2018/19	20.54	82.61	1.11	1.11	1.90	20.87	16.70
2019/20	18.31	56.15	0.00	0.00	0.54	28.86	23.09
2020/21		35.31				21.13	16.90

Aleutian Islands Golden King Crab

Fishery information relative to OFL setting. The directed fishery has been prosecuted annually since the 1981/82 season. Management based on a formally established GHL began with the 1996/97 season. The Alaska Board of Fisheries adopted an abundance-based harvest strategy for the stock in March 2019. This fishery has been managed under the Crab Rationalization Program since 2005. Total mortality of AI golden king crab includes retained catch in the directed fishery, mortality of discarded catch, and bycatch in fixed-gear and trawl groundfish fisheries, though bycatch in other fisheries is low compared to mortality in the directed fishery. Total mortality in the post-rationalized fishery has ranged from 2,506 t in 2006/07 to 3,735t in 2019/20.

Data and assessment methodology. The assessment for AI golden king crab establishes a single OFL and ABC for the whole stock. However, separate models are evaluated for the EAG and the WAG owing to different abundance trends in each area. The current modeling framework was recommended by the CPT in September 2016 and approved by the SSC in October 2016. The model-based stock assessment involves fitting male-only population dynamics models to data on catches and discards in the directed fishery, discards in the groundfish fishery, standardized indices of abundance based on observer data, fish ticket data, length-frequency data for the directed fishery (landings and total catch), and mark-recapture data. This is the only crab assessment that relies solely on

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

fishery CPUE as an index of abundance, with the CPUE index standardization process subject to past CPT and SSC review.The CPT recommends Model 20.1b with mean recruitment based on the estimates for years 1987-2012 for OFL and ABC determination for 2020/21.

Stock biomass and recruitment trends. Estimated mature male biomass (MMB) for the EAG decreased from high levels until the 1990s after which the trend has been increasing. In contrast, the MMB for the WAG increased from a low in the 1990s until 2007/08 and then declined again, and has since recovered to the MMB levels of those in the mid-2000s. Recruitment for the EAG was variable and high during 2014-2016 while recruitment for the WAG was lower in recent years than during the 1980s. Stock trends reflected the fishery standardized CPUE trends in both areas.

OFL/ABC determinations and catch specifications. The CPT recommends that this stock be managed as a Tier 3 stock in 2020/21. A single OFL and ABC is defined for AIGKC. However, separate models are available by area. The CPT recommends that stock status be determined by adding the estimates of current MMB and B_{MSY} by area. This stock status is then used to determine the ratio of F_{OFL} to F35% by area, which is then used to calculate the OFLs by area, which are then added together to calculate an OFL for the entire stock. The SSC has concurred with this approach. The stock is currently estimated to be above BMSY in both areas therefore no adjustment is needed to the F_{OFL} to determine the combined OFL for both areas. As in 2019, the CPT recommends that the B_{MSY} proxy for the Tier 3 harvest control rule be based on the average recruitment from 1987-2012, years for which recruitment estimates are relatively precise.

Table 12. Status and catch specifications (1000 t) for Aleutian Islands golden king crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2016/17	N/A	N/A	2.515	2.593	2.947	5.69	4.26
2017/18	6.044	14.205	2.515	2.585	2.942	6.048	4.536
2018/19	5.880	17.848	2.883	2.965	3.355	5.514	4.136
2019/20	5.909	16.323	3.257	3.319	3.735	5.249	3.937
2020/21		14.774				4.798	3.599

St. Matthew Blue King Crab

Fishery information relative to OFL setting. The fishery was prosecuted as a directed fishery from 1977 to 1998. Harvests peaked in 1983/84 when 4,288 t were landed by 164 vessels. Harvest was fairly stable from 1986/87 to 1990/91, averaging 568 t annually. Harvest increased to a mean catch of 1,496 t 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 November 2000, Amendment 15 to the FMP was approved to implement a rebuilding plan for the St. Matthew Island blue king crab stock. The rebuilding plan included a harvest strategy identified in regulation by the Alaska Board of Fisheries, an area closure to control bycatch, and gear modifications. In 2008/09 and 2009/10, the MMB was estimated to be above B_{MSY} for two years and the stock declared rebuilt in 2009. The fishery re-opened in 2009/10, closed in 2013/14, opened from 2014/15 – 2015/16, and has been closed since 2016/17. Bycatch of non-retained blue king crab has occurred in the St. Matthew blue king crab fishery, the eastern Bering Sea snow crab fishery, and trawl and fixed-gear groundfish fisheries. The stock declined below the minimum stock size threshold in 2018 and was declared overfished.

Data and assessment methodology. The assessment is conducted in GMACS, which was first accepted for use by the SSC in June 2016. This assessment uses the same model configuration as last year. The model incorporates the following data: (1)

6.3.	Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).

commercial catch data; (2) annual trawl survey data; (3) triennial pot survey data; (4) bycatch data in the groundfish trawl and groundfish fixed-gear fisheries; and (5) ADF&G crab-observer composition data.

Stock biomass and recruitment trends. Following a period of low values after the stock was declared overfished in 1999, trawl-survey indices of stock abundance and biomass generally increased to well above average during 2007–2012. In 2013 survey biomass declined (~40% of the mean value) but was followed by average biomass estimates in 2014 and 2015, but with survey CVs of 77% and 45%, respectively). The 2016 survey biomass fell to 3,485 t, followed by continued declines to the 2018 survey estimate of 1,731 t. The 2019 survey estimate of 3,170 t represents an increase of 83% from 2018 but remains low in a historical context. Because little information about the abundance of small crab is available for this stock, recruitment has been assessed in terms of the number of male crabs within the 90–104 mm CL size class in each year. The 2019 trawl-survey area-swept estimate of 0.403 million males in this size class is the twelfth lowest in the 42-year time series since 1978 and follows two of the lowest observed recruitments in 2017 and 2018.

OFL and ABC determination. The stock assessment examines four model configurations. The CPT concurs with the author's recommendation to use the base model 16.0 for the 2020/21 crab year. This stock is in Tier 4. The CPT recommends that the full assessment period (1978/79–2019/20) be used to define the proxy for B_{MSY} in terms of average estimated MMBmating. The projected MMB estimated for 2020/21 under the recommended model is 1,120 t and the F_{MSY} proxy is the natural mortality rate (0.18^{-1} year) and F_{OFL} is 0.047, resulting in a mature male biomass OFL of 0.05 kt. The MMB/B_{MSY} ratio is 0.34. The author recommended and the CPT concurred with a 25% buffer on the OFL for the ABC which was a return to the correct buffer from a mistakenly applied 20% last year. The ABC based on this buffer is 0.04 kt.

Table 13. Status and catch specifications (1000 t) for St Matthew blue king crab. Shaded values are new estimates or projections based on the current assessment. Other table entries are based on historical assessments and are not updated except for total and retained catch.

Year	MSST	Biomass (MMB)	TAC	Retained Catch	Total Catch	OFL	ABC
2016/17	1.97	2.23	0.00	0.00	0.001	0.14	0.11
2017/18	1.85	2.05	0.00	0.00	0.003	0.12	0.10
2018/19	1.74	1.15	0.00	0.00	0.001	0.04	0.03
2019/20	1.67	1.06	0.00	0.00	0.001	0.04	0.03
2020/21		1.12				0.05	0.04

The stock was found to be below MSST in 2017/18 and was declared overfished, and the Council's recommended rebuilding plan will be effective by October 22, 2020. Total catch was less than the OFL in 2019/20 and hence overfishing did not occur.

Rebuilding Plan for SMBKC

The SMBKC stock was declared overfished on October 22, 2018. In order to comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), a rebuilding plan must be implemented prior to the start of the 2020/2021 fishing season. The Council established alternatives for analysis at its June 2019 meeting. Those alternatives were revised, and preliminary preferred alternatives were selected at the December 2019 meeting. The Council's preliminary preferred alternatives are highlighted in bold:

Alternative 1: No Action: State harvest strategy with no rebuilding plan.

Alternative 2: Set target rebuilding time frame for the number of years necessary to rebuild the stock to the B_{MSY} level at a probability ≥50%. The stock will be considered "rebuilt" once it reaches B_{MSY}.

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

Option 1: No directed fishing until the stock is rebuilt.
Option 2: Allow the directed fishery to open based on the state harvest strategy while the stock is rebuilding.

Based on the best available information on the biology of the SMBKC stock and environmental conditions, the time necessary to rebuild the stock will exceed 10 years. The SMBKC stock has been in a low productivity phase since 1996 and population recovery will be greatly influenced by 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 as a function of stock size in model-recruit parameters. The estimated time for rebuilding under the Council's preliminary preferred alternative, taking into account the biology of the species and current environmental conditions, is 25.5 years.

Management measures to further reduce potential bycatch of SMBKC in the groundfish fisheries are not proposed as part of the Council's rebuilding plan. In projections that apply average bycatch levels during rebuilding, the time for stock recovery was not differentiable from the "no bycatch" scenario. Additionally, the time for stock recovery was minimally affected in projections that used the maximum level of observed bycatch as a "worst case scenario" throughout rebuilding.

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. The directed fishery for SMBKC is managed under the State of Alaska harvest strategy and has been closed from the 2016/2017 season, prior to the stock being declared overfished. Measures to protect habitat and reduce bycatch potential include prohibitions on nonpelagic trawl gear in the St. Matthew Island Habitat Conservation Area (SMIHCA). Additionally, a 20 nm Steller sea lion closure area around the southern tip of Hall Island prohibits trawling, hook-and-line, and pot fisheries for pollock, Pacific cod, and Atka mackerel may help reduce SMBKC bycatch in those fisheries. Finally, State jurisdictional waters (0 to 3 nm from shore) surrounding St. Matthew, Hall, and Pinnacle Islands are closed to the taking of king and Tanner crab and to commercial groundfish fishing, further reducing the potential for SMBKC bycatch.

Consistent with MSA §304(e)(4)(A) provisions and MSA National Standard 1 guidance, the Council's preliminary preferred alternative (Alternative 2 / Option 2) rebuilds the stock in as short a time as possible, while also taking into account the needs of fishing communities. Given that the fishery has been intermittently prosecuted due to the relatively low but highly variable biomass in recent years, some vessels could re-enter the fishery as rebuilding occurs and benefits to home communities as well as the processing sector in St. Paul, AK could be expected. The fishery was last open during the 2015/2016 season and there have been limited openings with relatively low TACs over the last 20 years. Therefore, dependence on SMBKC is low compared to other BSAI crab fisheries but can be a significant source of revenue for these vessels and communities in years when the fishery is open. The Council's preliminary preferred alternative which follows the State harvest strategy would allow for some directed fishing opportunity after the stock has grown to the point where an opening would be allowed, while rebuilding continues. The timeline for full rebuilding of the fishery and associated community benefits is expected to be protracted under current environmental conditions. Greater flexibility during rebuilding would be more responsive to the uncertainty facing crab fisheries and affected communities over the next two decades. Option 2 provides flexibility by allowing limited fishing after the stock has rebuilt to the threshold level necessary for an opening under the State harvest strategy.

Constraints on Rebuilding from Recruitment. Recruitment assumptions in the rebuilding projections was the focus of the projection options. While many different future recruitment assumptions were explored, three are presented here to encompass the breath of possibilities. The three options are:

1. Random draws of past recruitment from the entire time series (random_all_yrs),

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

2. Random draws from recent past recruitment with a time frame taken from the breakpoint analysis (summarized below) performed on this stock (random_recent), and
3. Parametrization of a Ricker stock-recruit relationship using all years of the model (Ricker).

Projections that estimated future recruitment from random draws from past recruitment of the entire time series of the model (random_all_yrs) were optimistic in the rebuilding time frame (

Table 14. **Range of inputs and recruitment scenarios considered in stock rebuilding.**

Projection Name	Recruitment years	No directed fishing Ave. bycatch	No directed fishing Max bycatch	Fishing under SHS Ave. bycatch	Fishing under SHS Max bycatch
random_all_yrs	1978-2018	6.05 years	6.5 years	9.0 years	11.0 years
random_recent_yrs	1996-2018	> 100 years	> 100 years	> 100 years	> 100 years
Ricker S-R	1978-2018	14.5 years	15.2 years	25.5 years	26.8 years

,Figure 27). The recruitment assumption here allows for recruitment to reach high levels, like it has in the past, but the likelihood of such high recruitment occurring is low given the current climate regime in the Bering Sea. These projections were considered overly optimistic for the current status of the stock and the environment.

Table 14. Range of inputs and recruitment scenarios considered in stock rebuilding.

Projection Name	Recruitment years	No directed fishing Ave. bycatch	No directed fishing Max bycatch	Fishing under SHS Ave. bycatch	Fishing under SHS Max bycatch
random_all_yrs	1978-2018	6.05 years	6.5 years	9.0 years	11.0 years
random_recent_yrs	1996-2018	> 100 years	> 100 years	> 100 years	> 100 years
Ricker S-R	1978-2018	14.5 years	15.2 years	25.5 years	26.8 years

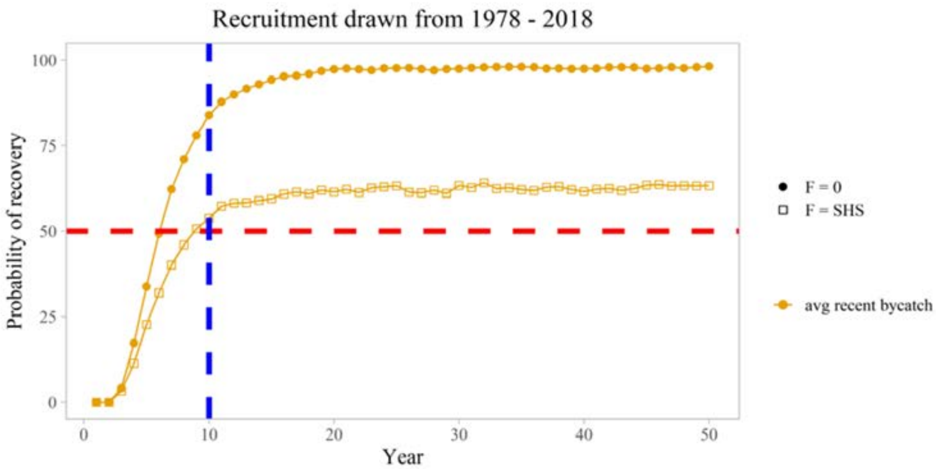

Figure 27. Probability of recovery using projections with random recruitment (random_all_yrs) drawn from the entire time series (1978-2018) under two direct harvest scenarios, all having average recent bycatch mortality (2014-2018). Direct harvest is either zero (F=0) or is set to harvest under the State of Alaska harvest strategy (F=SHS).

Projections that estimated future recruitment from random draws from recent recruitment (random_recent), that was defined in the recruitment breakpoint analysis, were pessimistic in the rebuilding time frame, never rebuilding over a 100-year time frame (

Table 14. **Range of inputs and recruitment scenarios considered in stock rebuilding.**

Projection Name	**Recruitment years**	**No directed fishing Ave. bycatch**	**No directed fishing Max bycatch**	**Fishing under SHS Ave. bycatch**	**Fishing under SHS Max bycatch**
random_all_yrs	1978-2018	6.05 years	6.5 years	9.0 years	11.0 years
random_recent_yrs	1996-2018	> 100 years	> 100 years	> 100 years	> 100 years
Ricker S-R	1978-2018	14.5 years	15.2 years	25.5 years	26.8 years

,Figure 28). While this recruitment assumption was realistic with respect to recent observed recruitment for this stock, it does not allow for recruitment to increase with time or improved stock conditions. Both the environment and stock status contribute to future recruitment, but which one is driving recruitment is not well defined, therefore it was considered pessimistic to assume that recruitment will never improve in the future. These projections do supply some of the expected outcomes in the worst-case scenario for this stock where recruitment and rebuilding are not possible under the current climate regime.

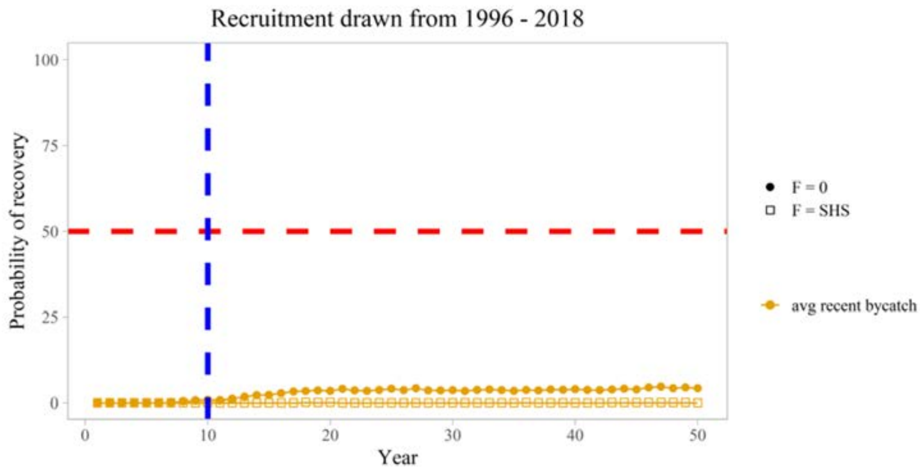

Figure 28. Probability of recovery using projections with random recruitment (random_recent) drawn from recent model years as defined by the recruitment breakpoint analysis (1996-2018) under two direct harvest scenarios, all having average recent bycatch mortality (2014-2018). Direct harvest is either zero (F=0) or is set to harvest under the State of Alaska harvest strategy (F=SHS).

The third recruitment assumption explored was a parametrization of the Ricker stock-recruit relationship based on Punt *et al.* (2012). This assumption allows for recruitment to fluctuate with stock size and incorporates variability into the fluctuation considering that the stock-recruitment relationship is not strong for this stock (Figure 29). The variability in the stock-recruit relationship allows for the possibility of increases in recruit and subsequent increases in stock size in a gradual manner, unlike the overly optimistic or pessimistic outlooks of the other recruitment assumptions.

For all of the alternatives, a Ricker stock-recruit relationship is proposed in the projections (Figure 30), since it incorporates stock status into the recruitment inputs and avoids choosing a time frame for random recruitment draws. This avoids conflict with the existing B_{MSY} proxy reference period, while also incorporating near-term ecosystem constraints on productivity. For estimating rebuilding times under the alternatives, it is considered unreasonable to use randomization that includes recruitment in the near future at levels seen prior to 1996. On the other hand, confining recruitment to the recent time frame can generate an unrealistically long rebuilding period.

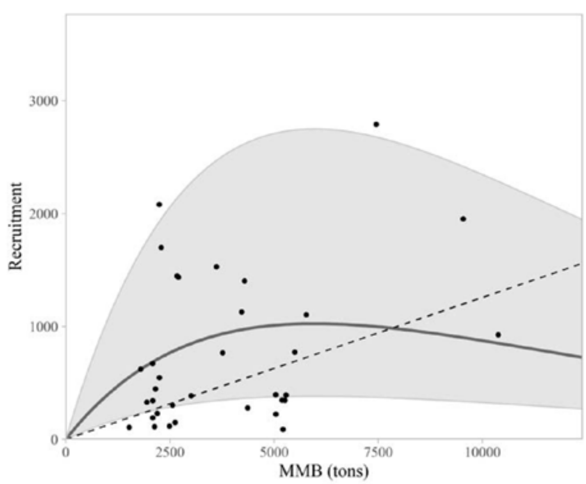

Figure 29. The approximated stock-recruit relationship for SMBKC based on methods from Punt *et al.* (2012). The solid line represents the fit, with the shaded area encompassing the 95% variability about this relationship.

Figure 30. Comparisons of probability of recovery with Ricker S-R relationship using the entire time series (1978-2018) under different bycatch scenarios and both F = 0 (Tmin) and F equivalent to the state harvest strategy (SHS). From the 2019 BSAI Crab SAFE.

Analysis of a Productivity Breakpoint. Breakpoint analysis explored the potential for historical changes in productivity that could have implications for the reference period for B_{MSY} as well as recruitment inputs in rebuilding projections. Two analyses converged on a brood stock breakpoint year of 1989, which would produce a break in recruitment in 1996 and is consistent with characterizations of wide-scale changes in Bering Sea ecosystem conditions in 1989 (e.g., Overland *et al.*, 2008). Although evidence clearly exists for a regime shift, redefining the B_{MSY} reference point was not done for assessing impacts to the rebuilding alternatives (Figure 31). Discussions at the September 2019 CPT meeting concluded that a revised (1996-2018) reference period may ignore the influence of fishing mortality in the history of the stock and is suggestive of "shifting baselines". Therefore, the definition of B_{MSY} based on 1978-2018 MMB is the effective rebuilding target, since it represents the B_{MSY} proxy in the approved 2019 BSAI Crab SAFE.

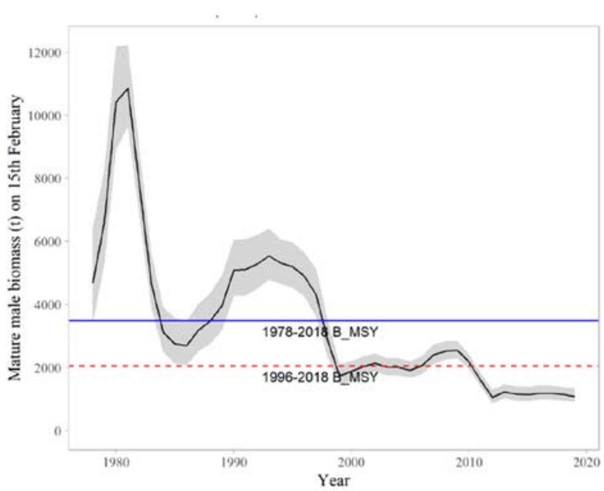

Figure 31. Computed B_{MSY} proxy (average mature male biomass) for the corresponding year ranges based on the 2019 assessment model with GMACS code updates.

Considerations/Discussion Points Regarding Closing the NC for SMBKC. The foregoing demonstrates that defining "overfished" for a given stock is not clear cut and can be somewhat arbitrary. The time series of recruitment estimates chosen for input to a stock assessment model largely determines results.

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**

There was a dramatic shift in ecosystem conditions in the late 1980s that had a dramatic negative impact on recruitment to the SMBKC stock from 1996 onwards which separated productivity regimes for the stock into two distinctly different pre- and post-shift periods.

While the CPT chose to define the B_{MSY} proxy based on the full time series of recruitment estimates, in the context of Ecosystem-Based Fishery Management, a case can be made for defining B_{MSY} based on the 1996-present time series of recruitment estimates. As shown in Figure 5, this dramatically lowers the estimate of B_{MSY}, which would put the 2020/21 above the MSST, i.e., not overfished.

In recent assessments using the full time series of recruitment estimates, MSST has been steadily dropping from 1.9 kt in 2016/17 to 1.67 kt in 2019/20. MMB was 1.12 kt in 2020/21 – a very small increase from 1.06 kt in 2019/20. It is not inconceivable that MMB could exceed MSST fairly soon with only minimal recovery in the context of the currently defined B_{MSY}.

Carry Over of NC

The "Extraordinary circumstances" provision of AK RFM Procedures 2 § 3.17 is used here as a basis for recommending carry over of the NC against SMBKC into this reassessment. The extraordinary circumstances being: (1) The NC was raised in the 2nd surveillance of the previous reassessment and 2 years is a very short time in which to observe a significant improvement in stock status; (2) Fishing pressure is not the sole contributor to the decline of this stock in recent years. Environmental/ecosystem changes associated with ocean warming appear to be impeding recruitment and stock recovery; (3) The fishery has been closed and will remain closed until there is improved recruitment.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that data and assessment procedures are installed measuring the position of the fishery in relation to the reference points. Accordingly, the stock under consideration is not overfished (i.e., it is above limit reference point or proxy) and the level of fishing permitted is commensurate with the current state of the fishery resources—maintaining its future availability and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing. Examples may include stock assessment reports or fishery management plans.*	☑

EVIDENCE:

The 2020 SAFE report demonstrates that status of BSAI crab stocks is well measured in relation to reference points, that management measures are consistent with these determinations and take account of changing productivity.

References:

Fedewa, E., B. Garber-Yonts and K. Shotwell. 2020a. Ecosystem and Socioeconomic Profile of the Saint Matthew Blue King Crab Stock. Appendix D. C1 SMBKC SAFE. October 2020.

Overland, J. E., S. Rodionov, S. Minobe, and N. Bond, 2008: North Pacific regime shifts: Definitions, issues, and recent transitions. Prog. Oceanogr., 77, 92–102.

Palof, K., J. Zheng and, J. Ianelli. 2020. Saint Matthew Island Blue King Crab Stock Assessment 2020. C1 SMBKC SAFE October 2020.

Public Review Draft: Environmental Assessment for a Proposed Amendment to the Fishery Management Plan for the Bering Sea and Aleutian Islands King and Tanner Crabs: Rebuilding Plan for Saint Matthew Island Blue King Crab. C3 St Matthew Blue King Crab Rebuilding June 2020.

Punt A. E., M.S.M Siddeek, B. Garber-Yonts, M. Dalton, L. Rugolo, D. Stram, B.J. Turnock, and J. Zheng. 2012. Evaluating the impact of buffers to account for scientific uncertainty when setting TACs: application to red king crab in Bristol Bay, Alaska. ICES Journal of Marine Science 69(4): 624-634.

SAI Global 2019. Alaska Responsible Fishery Management (RFM) Certification: 2nd Surveillance Report for The U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries. Report Code: AK/CRA/002.2/2018.

6.3.	**Data and assessment procedures that measure the position of the fishery in relation to the reference points shall be established. Accordingly, the stock under consideration shall not be overfished (i.e., above limit reference point or proxy) and the level of fishing permitted shall be commensurate with the current state of the fishery resources, maintaining its future availability, and taking into account that long-term changes in productivity can occur due to natural variability and/or impacts other than fishing (Appendix 1, Part 1).**								
	SAI Global 2020. Alaska Responsible Fishery Management (RFM) Certification: 3rd Surveillance Report for The U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries. Report Code: AK/CRA/003.2/219.								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**1**					**7**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									Medium
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Minor NC
Non-conformance Number (if applicable):									**1**

9.3.3.4 Supporting Clause 6.4.

6.4.	**Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse e on impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.**
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is an agreed process, system, or contingency plan in the eventuality that the data sources and analyses indicate that these reference points have been exceeded—detailing the appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource. Accordingly, the contingency plan/harvest control rule shall be agreed in advance to allow an appropriate management response to serious threats to the resource because of overfishing, adverse environmental changes, or other phenomena that may have adverse impacts on the fishery resource.*	☑
EVIDENCE: Management actions have been agreed to for instances where a stock assessment indicates that its reference points have been exceeded.	
Current status/Appropriateness/Effectiveness: *In the eventuality that the current level of the stock has exceeded target or limit reference points, the agreed and corresponding management action (as directed by the harvest control rule or framework) shall be immediately implemented and fishing reduced or halted as necessary. The harvest control rule is effective at keeping or bringing back the stock to acceptable and safe biological levels (i.e., to avoid overfishing/ed status). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.*	☑
EVIDENCE: The harvest rate is decreased when stock biomass is moving from upper to limit reference point and is reduced to zero when the stock reaches the limit reference point (O.5 B_{MSY}). At that point, a rebuilding plan is implemented. If overfishing has occurred or the stock is overfished, the Magnuson-Stevens Act (MSA) requires the Council to immediately end overfishing and rebuild stocks. The MSA also requires that Fishery Management Plans (FMPs) incorporate accountability measures to prevent the ACL from being exceeded and to correct any excesses in ACLs if they do occur. Under the BSAI crab FMP, specific accountability measures that have been used to prevent the ACL being exceeded include individual fishing quotas (IFQs) and measures to ensure IFQs are not exceeded. Accountability measures could include seasonal, area and gear allocations, closed areas, bycatch limits, in-season fishery closures, gear restrictions, limited entry, catch shares and observer and vessel monitoring requirements. In addition, the ACL and TAC have been reduced if the ACL was exceeded in the previous fishing year. All such measures are designed to allow close monitoring of catch levels from all sources, to react to specific bycatch problems and to provide a database for evaluating potential consequences of future management actions. Ecosystem and Socioeconomic Profiles (ESPs) have recently been included as part of the SAFE report for SMBKC and BBRKC and are planned for other BSAI crab stocks in the coming years. These evaluate a broad suite of indicators which include some that monitor environmental changes impacting recruitment in crab stocks. These have been used to inform risk evaluation contribute to the ACL/TAC decision-making process.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that management actions are agreed should data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans are agreed in advance for the appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse*	☑

6.4.	**Management actions shall be agreed to in the eventuality that data sources and analyses indicate that these reference points have been exceeded. Accordingly, contingency plans shall be agreed in advance to allow an appropriate management response to serious threats to the resource as a result of overfishing, adverse environmental changes, or other phenomena that may have adverse e on impacts on the fishery resource (Appendix 1, Part 2). Such measures may be temporary and shall be based on best scientific evidence available.**

impacts on the fishery resource. Such measures may be temporary and are based on best scientific evidence available. Examples may include stock assessment reports or fishery management plans.	

EVIDENCE:
Summaries from the FMP and 2020 SAFE report provided in supporting clauses 6.1 and 6.2 substantiate that agreed management responses to serious threats to the resource are in place for BSAI crab fisheries.

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)** =	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.3.3.5 Supporting Clause 6.5.

6.5	**Measures shall be introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts shall be made to ensure that resources and habitats critical to the well-being of such stocks, which have received adverse impacts by fishing or other human activities, are restored.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process that identifies depleted stocks, resources, and habitats. A depleted stock is usually a stock, which has been overfished, the stock status is below limit reference point, and the ability of the stock to recover has been impaired.*		☑
EVIDENCE: The status of BSAI crab stocks is assessed annually in relation to target and limit reference points and, if determined to be overfished, remedial measures are implemented as required. NOAA Fisheries also conducts and reviews environmental analyses of impacts of a wide variety of human activities to ensure these have minimal impact on essential fish habitat and marine life in Alaska.		
Current status/Appropriateness/Effectiveness: *There is evidence that where depleted or adversely impacted stocks, resources, and habitats have been identified, efforts have been made to ensure they are restored or allowed to recover (i.e., ideally within a two generations timescale). Underperforming salmon stocks that do not meet their escapement goals shall be appropriately managed within the stock of concern framework by the State of Alaska.*		☑
EVIDENCE: Details of the rebuilding plan developed for the SMBKC stock provided in supporting clause 6.3 demonstrate that efforts are made by resource management to restore any depleted stock. Conservation activities conducted by NOAA fisheries include protecting EFH, mitigating damage to and enhancing/restoring habitat affected by human activity with a focus on habitat used by federally-managed fish species located offshore, nearshore, in estuaries and in freshwater areas.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that measures are introduced to identify and protect depleted stocks and those stocks threatened with depletion, and to facilitate the sustained recovery/restoration of such stocks. Also, efforts are made to ensure that resources and essential habitats critical to the wellbeing of the stocks, which have been adversely impacted by fishing or other human activities, are restored. Examples may include laws and regulations, fishery management plans, and stock assessment reports.*		☑
EVIDENCE: Links provided in evidence for supporting clause 4.5 demonstrate efforts to identify and protect depleted stocks. Similarly, links in supporting clauses 5.1.2 and 5.2 evidence demonstrate the monitoring of essential fish habitat and its restoration when adversely impacted by human activities.		
References:		

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.3.4 Fundamental Clause 7. Precautionary approach

Management actions and measures for the conservation of stock and the ecosystem shall be based on the precautionary approach. Where information is deficient a suitable method using risk management shall be adopted to consider uncertainty.

9.3.4.1 Supporting Clause 7.1.

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.**[111]
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There are management measures, regulations, and laws that command or direct the use of the precautionary approach (PA) for conservation, management, and exploitation of the aquatic resources under assessment. This could either take the form of an explicit commitment to the application of the PA, or be evidenced by an overarching approach applied throughout the management literature.*	☑
EVIDENCE: The precautionary approach is applied to conservation, management and exploitation of the BSAI crab resources in order to protect them and preserve their environment.	
Current status/Appropriateness/Effectiveness: *The FAO Guidelines for the PA for fisheries management (FAO CCRF 1995) advocate a comprehensive management process that includes data collection, monitoring, research, enforcement, and review. More specifically, prior identification of desirable (target) and undesirable (limit) reference points must be carried out, and measures are required that will avoid undesirable outcomes with high probability and correct them promptly should they occur. The guidelines suggest that this be achieved through rules that specify in advance what action should be taken when specified deviations from operational targets are observed (i.e., harvest control rules). Furthermore, the guidelines suggest that a management plan should not be accepted until it has been shown to perform effectively in terms of its ability to avoid undesirable outcomes (for example through simulation trials). Lastly, the absence of adequate scientific information should not be used as a reason for postponing or failing to take measures to conserve target species, associated or dependent predator, or non-target species and their environment (https://www.sciencebase.gov/catalog/item/50538887e4b097cd4fce2446). There is evidence for the practical application of the PA for resource management and conservation. Note that the PA may be integrated into stock assessment practices, specific management measures enacted for everyday fisheries operations, or other measures. Application of the PA considers enhanced fisheries (e.g., at the policy level) where appropriate, and relevant uncertainties are considered using a suitable method of risk management (e.g., evaluation of potential impacts of increased hatchery releases on wild salmon), including that associated with the use of introduced or translocated species.*	☑
EVIDENCE: Article VIII, Section 4 of the State of Alaska's Constitution is titled Sustained Yield and dictates that: "Fish, forests, wildlife, grasslands, and all other replenishable resources belonging to the State shall be utilized, developed, and maintained on the sustained yield principle, subject to preferences among beneficial users."[112].	

[111] FAO Technical Guidelines for Responsible Fisheries No. 2 – Precautionary approach to capture fisheries and species introductions. http://www.fao.org/docrep/003/w3592e/w3592e00.htm
[112] //w3.legis.state.ak.us/docs/pdf/citizens_guide.pdf

7.1.	**The precautionary approach shall be applied widely to conservation, management, and exploitation of ecosystems to protect them and preserve the ecosystem. This should take due account of fishery enhancement procedures, where appropriate. Absence of scientific information shall not be used as a reason for postponing or failing to take conservation and management measures. Relevant uncertainties shall be taken into account through a suitable method of risk management, including those associated with the use of introduced or translocated species.**[111]

The principle of sustained yield management is a basic tenet of conservation: the annual harvest of a biological resource should not exceed the annual regeneration of that resource. Maximum sustained yield is the largest harvest that can be maintained year after year. State law defines maximum sustained yield as "the achievement and maintenance in perpetuity of a high level annual or regular periodic output of the various renewable resources of the state land consistent with multiple use" (AS38.04.910). The qualifying phrase "subject to preferences among beneficial uses" signals recognition by the delegates that not all the demands made upon resources can be satisfied, and that prudent resource management based on modern conservation principles necessarily involves prioritizing competing uses[113].

In addition, the MSA dictates the development of FMPs for all the federally managed/overseen fisheries. The NPFMC treats OFL (MSY) as an upper limit rather than a target. Catches are in line with the TAC and well below the OFL to take into account the risks involved when calculating MSY. The BSAI crab stocks are managed under a tier system rule based on stock knowledge. Status determination criteria are calculated using a five-tier system that accommodates varying levels of uncertainty of information. The system incorporates new scientific information and provides a mechanism to continually improve the status determination criteria as new information becomes available. The higher the stock tier status, the more conservative the determination of OFL and ABC. The difference between OFL and ABC takes into account uncertainties considering both biological and socio-economic parameters. The ABC is a level of annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other specified scientific uncertainty and is set to prevent, with a greater than 50 percent probability, the OFL from being exceeded. Examples of applying a buffer to the OFL to derive the ABC are included in the stock status summaries of 6.3. The system is intrinsically precautionary and based on a comprehensive management process that is consistent with the FAO Guidelines for the Precautionary Approach (PA) (FAO CCRF 1995) summarized in above guidance.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the PA is applied to conservation, management, and exploitation of an ecosystem to protect them and preserve the ecosystem. Examples may include stock assessment reports, fishery management plans and other documents.*	☑

EVIDENCE:
Evidence provided for supporting clauses 6.1 and 6.2 demonstrates that a precautionary approach consistent with FAO guidelines is well established in management of BSAI crab fisheries.

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

[113] https://www.akleg.gov/basis/statutes.asp#38.04.910

9.3.4.2 Supporting Clause 7.1.1.

7.1.1.	**In implementing the PA, the fishery management organization shall take into account, *inter alia*, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality, the impact of fishing activities (including discards) on non-target and associated or dependent predators, and environmental and socioeconomic conditions.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system in place under which the potential uncertainties listed above can be examined and taken into account during the decision-making process.*	☑

EVIDENCE:
As implemented in management of BSAI crab fisheries, the precautionary approach takes into account uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities on non-target and associated or dependent species as well as environmental and socio-economic conditions.

Current status/Appropriateness/Effectiveness: *There is evidence to demonstrate that in the fishery under assessment, uncertainties considered include those associated with the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent predators, as well as environmental and socio-economic conditions.*	☑

EVIDENCE:
The mission of the NMFS Alaska Fisheries Science Center (ASFC) is to plan, develop, and manage scientific research programs which generate the best scientific data available for understanding, managing, and conserving the region's living marine resources and the environmental quality essential for their existence.

For each BSAI crab stock/fishery, the annual Crab SAFE report provides a detailed description of the data and methodology used in the stock assessment, any changes in approaches, the estimated status of the stocks in relation to pre-determined fisheries management reference points, advice on appropriate harvest levels, and an assessment of the relative success of existing state and federal fishery management programs (See evidence for supporting clauses 5.1, 6.1, 6.2 and 6.3). Stock assessments and associated reference points take account of uncertainties relating to the size and productivity of each stock.

Catch and fishing effort data are recorded by ADFG. ADFG on-board observers monitor fishing position, sample total and retained catch and document total catch, bycatch and effort and sampling of retained catches is carried out by shore-based observers. Data on crab bycatch in the trawl and fixed gear groundfish fisheries are obtained by the NMFS observer program. Collectively, these monitoring and observer programs provide the basis for reliable estimation of total removals from all crab stocks annually and are available to NMFS, ADFG, NPFMC and other agencies for their scientific, management and enforcement purposes (See evidence for supporting clauses 4.1, 4.1.1, 4.2).

Resource Ecology and Fisheries Management (REFM) Division at the NMFS AFSC conducts a program of research and data collection to support an ecosystem approach to management of BSAI crab stocks, examining climate and environmental changes. The Division also has a socio-economic program whose work includes evaluating economic impacts of fisheries rationalization programs, and compiling and evaluating socio-cultural information on Alaskan communities and traditional ecological knowledge. Economic and ecosystem assessments are provided to the Council on an annual basis. These provide a basis for scientific evaluation of how fish stocks, ecosystem relationships and user groups might be affected by fishery management actions and climate (See evidence for supporting clauses 4.5, 5.1, 5.1.2 and 5.2).

7.1.1.	**In implementing the PA, the fishery management organization shall take into account, *inter alia*, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality, the impact of fishing activities (including discards) on non-target and associated or dependent predators, and environmental and socioeconomic conditions.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in implementing the PA, the fishery management organization takes into account, inter alia, uncertainties relating to the size and productivity of the stocks, reference points, stock condition in relation to such reference points, levels and distribution of fishing mortality and the impact of fishing activities (including discards) on non-target and associated or dependent species, as well as environmental and socio-economic conditions. Examples may include stock assessment reports, fishery management plans and other documents.*	☑

EVIDENCE:
Abundant evidence is provided in supporting clauses cited above to demonstrate the management organization takes account of uncertainties related to stock status determination, levels of fishing mortality, impacts of fishing, environmental and socioeconomic conditions in implementing the precautionary approach.

References:									
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.3.4.3 Supporting Clause 7.1.2.

7.1.2.	In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *There is a process that identifies weaknesses in the scientific information available to fishery management organizations, and initiates additional research as necessary. The primary focus of this requirement is the status of the stocks under consideration.*	☑
EVIDENCE: The datasets from fishery and fishery-independent sources that are used in the annual assessment of each stock/fishery are updated by a team of ADFG and NMFS scientists familiar with and aware of potential inconsistencies in the data or their use in population estimation methods. Stock assessment reports note any deficiencies in data and identify any gaps which need to be filled by new research. Extensive peer review is an integral part of the stock assessment process detailed in the SAFE reports, ensuring a robust scientific analysis of fishery status. The assessments are peer reviewed by the full Crab Plan Team (CPT). Members of the CPT are employed by several agencies and are recognized experts in stock assessment and crab fisheries biology. The CPT provides comments and suggestions for improved methodology to the assessment authors who formally respond to all comments or suggestions. The CPT then makes recommendations on overfishing level (OFL) determinations, acceptable biological catch (ABC), stock status specifications and any other related issues to the Scientific and Statistics Committee (SSC) of the NPFMC. The SSC also provides comments and suggestions on the assessment which will be addressed in future SAFE reports.	
Current status/Appropriateness/Effectiveness: *There is evidence that such a process has been applied in the case of the fishery under assessment, including examples of initiated research. Depending on the situation, appropriate research or further analysis of the identified risk is initiated in a timely fashion.*	☑
EVIDENCE: The Bering Sea Fisheries Research Foundation (BSFRF) undertakes collaborative research with industry, ADFG and NMFS partners to improve the science of crab fishery management in the Bering Sea. All of their research projects over the past 15+ years of operation have focused on addressing priorities identified in assessments of individual stocks.[114].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the absence of adequate scientific information, appropriate research is initiated in a timely fashion. Examples may include various data or scientific reports.*	☑
EVIDENCE: BSFRF recently initiated a project to study RKC movements throughout different seasons to understand their distribution in relation to aragonite saturation level, an issue that was highlighted in the ESP appended to the 2020 SAFE report for BBRKC. This study uses acoustic tags that communicate with unmanned drones that sail at the surface of the water and can be deployed at times outside the fishing season when recaptures of crabs with conventional tags are made. This provides information on which habitats are used at different times of the year. Similarly, perusal of other BSFRF projects demonstrate a connection to ongoing refinement of the scientific basis of stock assessments.	

References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level:							Full Conformance

[114] https://bsfrf.org

7.1.2.	**In the absence of adequate scientific information, appropriate research shall be initiated in a timely fashion.**	
(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		
Non-conformance Number (if applicable):		

9.3.4.4 Supporting Clause 7.2.

7.2.	**In the case of new or exploratory fisheries, the fishery management organization shall adopt, as soon as possible, cautious conservation and management measures, including, *inter alia*, catch limits and effort limits. Such measures should remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment should be implemented. Management measures should, if appropriate, allow for the gradual development of the fisheries.**	
Relevance:	Not relevant. **Note.** This clause is only applicable for new or exploratory fisheries.	
	The BSAI crab fisheries under assessment are not new or exploratory.	
Evaluation Parameters		**Met?**
Process: *For new or exploratory fisheries, there is a process that allows immediate application of the PA, including catch and* *effort limits, and the possible adverse impact of such fisheries on the long-term sustainability of the stocks.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *There is evidence that catch and effort limits have been implemented, and other management measures, including the assessment of possible adverse impacts, have been performed for these fisheries.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the case of new or exploratory fisheries, the fishery management organization adopts, as soon as possible, cautious conservation and management measures, including, inter alia, catch and effort limits. Such measures remain in force until there are sufficient data to allow assessment of the impact of the fisheries on the long-term sustainability of the stocks, whereupon conservation and management measures based on that assessment are implemented. Management measures should, if appropriate, allow for the gradual development of the fisheries. Examples may include various data or scientific reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**		**Number of EPs NOT met**		**Overall score**
	10	**– (**		**x 3) =**	

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

9.4 Section C: Management Measures, Implementation, Monitoring, and Control

9.4.1 Fundamental Clause 8. Management measures

Management shall adopt and implement effective management measures designed to maintain stocks at levels capable of producing maximum sustainable yields, including harvest control rules and technical measures applicable to sustainable utilization of the fishery, and based upon verifiable evidence and advice from available objective scientific and traditional sources.

9.4.1.1 Supporting Clause 8.1.

8.1.	Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *The process by which management measures are developed for the fishery utilizes the best scientific evidence available, including traditional sources where these are verifiable, and also considers the cost-effectiveness and social impact of potential new measures. The assessment team shall provide evidence for the main type of management measures present in the fishery. Some of the main examples may include (but are not limited to) legal gear specifications, permit requirements, observer requirements, reporting requirements, limited access, vessel license limitations, size limits, sex restrictions, total allowable catch, in season adjustments, fishing seasons, geographical registrations areas, bycatch reduction devices, gear modification, minimizing waste and ghost fishing, closed waters, catch limits for other fisheries, and bycatch management.*	☑
EVIDENCE: Conservation and management measures are in place to ensure the long-term sustainability of BSAI crab resources at levels which promote optimum utilization that are based on verifiable and objective scientific and traditional, fisher and community sources. The NPFMC's fishery management plan (FMP) for BSAI crab species specifies stock status definitions, a five-tier approach for determining stock status, and a step-by-step framework for establishing final overfishing levels (OFLs) and permissible biological catches (ABCs). According to the MSA, the NPFMC's Science and Statistical Committee (SSC) determines scientific benchmarks, and the Council recommends quotas based on these benchmarks. The annual crab stock status determination criteria are calculated using a five-tier system that accommodates varying levels of information uncertainty and incorporates new scientific information, providing a mechanism for continuously improving the status determination criteria as more information becomes available. Please see below.	
Current status/Appropriateness/Effectiveness: *There is evidence that the overall framework of management measures in place is effective at achieving the long-term optimum yield, which is defined by the FAO as "the harvest levels for a species that achieves the greatest overall benefits, including economic, social and biological considerations." If the stock has been maintained above the limit reference point, this shall be taken as evidence that management measures are effective in avoiding overfishing.*	☑
EVIDENCE: The NPFMC's fishery management plan (FMP) for BSAI crab species specifies stock status definitions, a five-tier approach for determining stock status, and a step-by-step framework for establishing final overfishing levels (OFLs) and permissible biological catches (ABCs). According to the MSA, the NPFMC's Science and Statistical Committee (SSC) determines scientific benchmarks, and the Council recommends quotas based on these benchmarks. This division of responsibility is an important step toward minimizing overfishing and improving overfished stock recovery. The annual crab stock status determination criteria are calculated using a five-tier system that accommodates varying levels of information uncertainty and incorporates new scientific information, providing a mechanism for continuously improving	

8.1.	Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.

the status determination criteria as more information becomes available. Overfishing and overfished criteria, as well as ABC (= ACL) thresholds, are established under the system. The overfishing level for crab stocks is equivalent to MSY and is determined through the annual assessment process. Each crab stock is evaluated once a year to establish its status, and if catch predictions exceed the OFL, overfishing is taking place. The stock is overfished if yearly biomass estimations are less than MSST (0.5 Bmsy). The Magnuson-Stevens Act (MSA) requires NPFMC to quickly stop overfishing and rebuild stocks if overfishing has occurred or the stock has been overfished. The MSA further stipulates that the FMP must incorporate accountability procedures to prevent ACLs from being exceeded and to correct any overages that do occur.

The FMP specifies the optimal yield. The FMP contains data on economic, social, and environmental issues that are relevant to determining the best yield. The ideal yield range for each crab fishery is 0 to OFL capture. The OFL is the annualized MSY for crab stocks, and it is calculated through the tier system's annual evaluation process. This optimum yield range is intended to facilitate the achievement of the FMP's biological, economic, and social objectives under a variety of future conditions, taking into account the relatively volatile reproductive potential of crab stocks, the FMP's cooperative management structure, and the past practice of restricting or even prohibiting directed harvests of some stocks due to ecological concerns. It allows the SOA to estimate the optimal TAC levels below the OFL in order to avoid overfishing or to address other biological concerns that may impair a stock's reproductive capacity but are not reflected in the OFL. The SOA determines TACs at levels that maximize harvests, as well as associated economic and social benefits, under the FMP. When biological and ecological conditions warrant it, social advantages can be obtained.

The evidence for supporting clauses 6.1, 6.2, and 6.3 contains further material connected to the foregoing.

The National Environmental Policy Act (NEPA)[115] mandates the preparation of environmental impact statements (EISs) for major federal acts that have a significant impact on human health and the environment. NEPA is a thorough procedure that establishes checks and balances against environmental changes that may have an impact on ecosystems, natural processes, and the socioeconomic sphere of fisheries. An EIS[116] for the BSAI crab fisheries evaluates the environmental, social, and economic consequences of different management/rationalization plans for decision makers and the general public. In order to rationalize the crab fleet, the EIS analyzes safety, harvester efficiency, processing efficiency, and the distribution of benefits among the harvesting and processing sectors, consumers, captains and crew, and affected coastal communities.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that conservation and management measures are designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources. Examples may include reports, fishery management plans, regulations, or other management measures.*	☑

EVIDENCE:

NPFMC's fishery management plan (FMP) for BSAI crab stocks. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf

Environmental Assessment for Amendment 7 to the Fishery Management Plan for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands. https://www.fisheries.noaa.gov/resource/document/environmental-assessment-amendment-7-fishery-management-plan-commercial-king-and

NEPA Policy act. https://www.epa.gov/laws-regulations/summary-national-environmental-policy-act

https://ceq.doe.gov/get-involved/eis_filings.html

References:						
Numerical score:	**Starting score**	**–**	**Number of EPs NOT met**	**x 3**	**=**	**Overall score**

[115] https://www.epa.gov/nepa

[116] https://ceq.doe.gov/get-involved/eis_filings.html

8.1.	**Conservation and management measures shall be designed to ensure the long-term sustainability of fishery resources at levels which promote optimum utilization, and are based on verifiable and objective scientific and/or traditional, fisher, or community sources.**				
	10	**(**	**0**	**)**	**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					

9.4.1.2 Supporting Clause 8.1.1.

8.1.1.	When evaluating alternative conservation and management measures, the fishery management organization shall consider their cost-effectiveness and social impact.	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *The process by which management measures are developed for the fishery allows for consideration of the cost effectiveness and social impact of potential new or modified management measures.*		☑
EVIDENCE: When analyzing prospective conservation and management options for BSAI crab fisheries, the cost-effectiveness and social impact are considered. NPFMC acknowledges in its FMPs for Alaskan crab that its management approach recognizes the need to balance many competing uses of marine resources and different social and economic goals for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. Their annual FMPs include a substantial section on the economic and socioeconomic characteristics of the fisheries and communities in Alaska (Fissel *et al.*, 2018). Harvest levels for each crab species or that are set by the Council for a new fishing year are based on the best biological, ecological, and socioeconomic information available, and follow a rigorous and public peer-reviewed process. The Economic Data Report (EDR) data collection program under the guidance of the North Pacific Fishery Management Council (NPFMC), collects annually reported cost, revenue, ownership, and employment data from harvest and processing sector participants in the CR fisheries. This information is necessary to monitor and assess the economic effects of the CR program and support rigorous economic analysis to promote the goals and objectives of the Magnuson-Stevens Fishery Conservation and Management Act and the Fishery Management Plan. The NMFS AFSC's Resource Ecology and Fisheries Management (REFM) Division performs research and data collection to support an ecosystem approach to managing BSAI crab stocks, which includes looking at climatic and environmental changes. The Division also has a socio-economic program, which entails assessing the economic effects of fisheries rationalization projects as well as accumulating and evaluating socio-cultural data on Alaskan communities and traditional ecological knowledge. Annual economic and ecosystem assessments are presented to the Council. These serve as a foundation for scientific analysis of how fish populations, ecological linkages, and user groups may be impacted by fishery management and climate change.		
Current status/Appropriateness/Effectiveness: *There is evidence for the consideration of the cost-effectiveness and social impact of potential new or modified management measures.*		☑
EVIDENCE: When analyzing prospective conservation and management options for BSAI crab fisheries, the cost-effectiveness and social impact are considered. NPFMC acknowledges in its FMPs for Alaskan crab that its management approach recognizes the need to balance many competing uses of marine resources and different social and economic goals for sustainable fishery management, including protection of the long-term health of the resource and the optimization of yield. Their annual FMPs include a substantial section on the economic and socioeconomic characteristics of the fisheries and communities in Alaska (Fissel *et al.*, 2018). Harvest levels for each crab species or that are set by the Council for a new fishing year are based on the best biological, ecological, and socioeconomic information available, and follow a rigorous and public peer-reviewed process. Under regulations promulgated by the United States Secretary of Commerce. fishing and seafood processing businesses and associated participants in the Bering Sea and Aleutian Islands Crab Rationalization (CR), American Fisheries Act (AFA), and		

8.1.1.	When evaluating alternative conservation and management measures, the fishery management organization shall consider their cost-effectiveness and social impact.

Amendment 80 (ABO) fishery management programs, and groundfish trawl fisheries in the Gulf of Alaska (GOA Trawl), are subject to mandatory annual economic data collection censuses. referred to as Economic Data Reports (EDR)[117].

As developed by the North Pacific Fishery Management Council (Council) and implemented by National Marine Fisheries Service (NMFS). EDR requirements for regulated participants in these fisheries are specified under 50 CFR 680.6. 679.65.679.94. and 679.11 O. respectively. EDRs are intended to provide employment. cost. sales and other business data to inform the Council's oversight of fishery management through improved analyses of economic performance of affected harvesters and processors participating in these Alaska fisheries. and social and economic effects on associated communities. The Council placed a high priority on data quality assurance (QA) in design of EDR programs. The quality of the information submitted in EDRs is important. as the information will be used to analyze the effects of current and future fishery management decisions associated with the Crab Rationalization program and on the owners of vessels and processing plants submitting EDR data as well. as other stakeholders.

Finally, The Resource Ecology and Fisheries Management (REFM) Division of the NMFS AFSC runs a research program to support an ecosystem approach to managing BSAI crab stocks, which includes examining climate and environmental changes, as well as a socio-economic program that includes evaluating the economic impacts of fisheries rationalization programs and compiling and evaluating socio-cultural data on BSAI crabs. Fish stocks, ecological linkages, and user groups may be impacted by fishery management measures and climate change, according to economic and ecosystem evaluations.

Evidence Basis:	
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that in the evaluation of alternative conservation and management measures, their cost-effectiveness and social impact are considered. Examples may include reports, fishery management plans, regulations or other management measures.	☑

EVIDENCE:

Stock assessment and fishery evaluation report for the King and Tanner crab fisheries of the Gulf of Alaska and Bering Sea/Aleutian Islands area: Economic status of the BSAI King and Tanner crab fisheries off Alaska, 2019. https://meetings.npfmc.org/CommentReview/DownloadFile?p=84d483ac-bae8-437a-8649-bce5ff8480f3.pdf&fileName=D4%20Crab%20Economic%20SAFE.pdf

References:								
Numerical score:	**Starting score**	−	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[117] http://www.psmfc.org/alaska_crab/documents/2017_audit_results.pdf

9.4.1.3 Supporting Clause 8.1.2.

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**	
Relevance:	Relevant.	

Evaluation Parameters	**Met?**
Process: *The responsible fisheries management organizations has adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management.*	☑
EVIDENCE: BSAI crab fisheries are required to use gear and technologies that research has demonstrated are environmentally safe, cost effective and sufficiently selective to minimize catch, waste and discards of non-target species as well as the use of gear and practices that increase survival rates of escaping fish. Use of highly selective pots to minimize unwanted catch of target species as well as the bycatch of non-target species, along with development of handling practice to minimize mortality of discarded catch, have been key aspects of the management of BSAI crab fisheries for a long time. Regulations specify escape mechanisms (escape rings or specified mesh panel webbings) to be incorporated in crab pots to allow female and sublegal male crabs to escape and various devices may be added to pots to prevent capture of other species. Regulations also require incorporation of biodegradable twine as an escape mechanism on all pots to terminate catching and holding ability of lost pots. Crabbers are also constructing pots with larger web on the panels to allow for female and juvenile crabs to exit the pot before the gear is hauled back. This results in significantly less bycatch of non-targeted species and a higher catch rate of legal sized target crabs.	
Current status/Appropriateness/Effectiveness: *There is evidence of adoption and implementation of effective measures to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge. Please note that traditional knowledge should be verifiable. The strategy to ensure the management of bycatch and reduction of discards as part of fisheries management is being implemented successfully (e.g., there is a well-known track record of consistently setting conservative bycatch limits based on quality information and advice about bycatch); or bycatch is minimized to the greatest extent possible, especially for vulnerable species such as sharks, seabirds, turtles, and marine mammals, through mitigation measures that have been shown to be highly effective (e.g., observer coverage and procedures, bycatch caps, utilization measures, full catch accounting, on-deck techniques, avoidance mechanisms and gear technology, etc.). Also, the fishery is not a leading cause of a high level of mortality for any species of concern (e.g., not a Category I fishery for marine mammal bycatch as designated by the National Marine Fisheries Service).*	☑
EVIDENCE: Use of highly selective pots to minimize unwanted catch of target species as well as the bycatch of non-target species, along with development of handling practice to minimize mortality of discarded catch, have been key aspects of the management of BSAI crab fisheries for a long time. All aspects of gear performance and discard mortality have been extensively researched. Pots and ring nets are the specified legal commercial gear in these fisheries. Various devices may be added to pots to minimize bycatch of non-target crabs and other species. Regulations specify escape mechanisms (escape rings or specified mesh panel webbings) to be incorporated in crab pots to allow female and sublegal male crabs to escape and various devices may be added to pots to prevent capture of other species. Regulations also require incorporation of biodegradable twine	

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**

as an escape mechanism on all pots to terminate catching and holding ability of lost pots. Crabbers are also constructing pots with larger web on the panels to allow for female and juvenile crabs to exit the pot before the gear is hauled back. This results in significantly less bycatch of non-targeted species and a higher catch rate of legal sized target crabs.Example of this is that the fishery is not included in Category I fishery for marine mammal bycatch as designated by the National Marine Fisheries Service[118].

After rationalization, vessel numbers decreased which resulted in a slower paced fishery with decreased rates of lost fishing gear and allowing for longer soak times that increase escapement of undersized and female crabs. Longer seasons resulting from rationalization and the slower pace of the fishing has allow for improved fishing and handling methods to reduce mortality of all catch components.

Upon retrieval of crab pots, a wide range of sorting and discard techniques are currently used by the crab fleet but the basic elements of the process are essentially the same on all vessels. After the pot has been retrieved, crabs are dumped into totes or onto a sorting table. As the male crabs of marketable size are separated from the rest of the catch and placed into circulating water tanks, the crab to be discarded are returned to the sea in a variety of methods, ranging from being tossed overboard, dragged in totes and dumped into an outflow chute, or placed directly into an outflow ramp of various designs. More sophisticated systems using automated conveyor belts and sorting tables that minimize handling and return discarded catch to the sea rapidly have also been introduced.

On-board observers in all fisheries record discards and estimates of total discard mortality are included in total fishery removals. This has provided considerable incentive to minimize unwanted catch to the fullest extent possible. Their reports demonstrate catches are dominated by legal crab of the target species, with much smaller amounts of other species.

The National Environmental Policy Act (NEPA) requires preparation of EISs for major federal actions significantly affecting the quality of the human environment. The NEPA EIS process provides checks and balances against changes to the environment that may impact ecosystems and natural processes. An EIS for the BSAI crab fisheries provides decision makers and the public with an evaluation of the environmental impacts of fishing.

In addition to the practical aspects of why by-catch is low, ADFG regulation (5 AAC 93.310.) requires operators of all crab fishing gear to minimize incidental harvest of non-target species.

Fishery regulations in Alaska are extremely detailed with regard to the configuration of acceptable gear for use in each fishery, as well as how to deal with impacts on fishery resources and other users due to gear selectivity and fishing. For example, see the Southeast regulations regarding gear specifications.

ADFG has participated in research programs on an international basis on issues such as fishing gear selectivity and improvements to fishing methods and strategies.

Additional related information can be found in supporting clauses 8.5, 8.7 and throughout clause 12.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the responsible fisheries management organizations have adopted and implemented effective measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management. Examples may include stock assessment, bycatch or other ecosystem assessment reports.*	☑

[118] https://www.federalregister.gov/documents/2021/01/14/2021-00570/list-of-fisheries-for-2021

8.1.2.	**Responsible fisheries management organizations shall adopt and implement measures necessary to ensure the management of bycatch and reduction of discards as part of fisheries management (1) in accordance with the PA, as reflected in Article 6 of the UN Fish Stocks Agreement, and as set out in Article 6.5 and 7.5 of the Code; (2) in accordance with the responsible use of fish as set out in the Code; and (3) based on the best scientific evidence available, taking into account fishers' knowledge.**

EVIDENCE:
The availability and adequacy of evidence is sufficient to substantiate that ADFG is managing by catch and discards as part of fisheries management.
5 AAC 93.310, 5AAC 39.155

References:	List of Fisheries for 2021 [1] https://www.federalregister.gov/documents/2021/01/14/2021-00570/list-of-fisheries-for-2021							
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.1.4 Supporting Clause 8.2.

8.2.	**The fishery management organization shall prohibit dynamiting, poisoning, and other similar destructive fishing practices.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There are management measures, or regulations, or laws that prohibit destructive fishing practices.*	☑
EVIDENCE: Dynamiting, poisoning and other comparable destructive fishing practices are prohibited in BSAI crab fisheries.	
Current status/Appropriateness/Effectiveness: *The regulations or laws effectively prohibit dynamiting, poisoning, and other similar destructive fishing practices.*	☑
EVIDENCE: Dynamiting, poisoning and other comparable destructive fishing practices are prohibited in Alaska. The BSAI crab FMP authorizes the use of pot gear to harvest the crab resources.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization prohibits dynamiting, poisoning, and other similar destructive fishing practices. Examples may include laws, fishery management plans, regulations, and enforcement data.*	☑
EVIDENCE: NPFMC's fishery management plan (FMP) for BSAI crab stocks. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf	

References:									
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.1.5 Supporting Clause 8.3.

8.3.	**The fishery management organization shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.**
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a process that allows for identifying and consulting with domestic parties (giving due recognition where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood) having a legitimate interest in the use and management of the fisheries resource.*	☑

EVIDENCE:

All domestic parties with a legitimate interest in the use and management of BSAI crab fisheries have been identified and recognition is given to the traditional practices, needs and interests of indigenous people and local fishing communities. Arrangements are in place to consult all interested parties to gain their collaboration in achieving responsible fisheries.

The Crab Rationalization Program[119] allocates BSAI crab resources to harvesters, processors, and coastal communities that have been involved in or rely on these fisheries. The Program is a limited-access system that strikes a balance between the interests of several groups that rely on these fisheries. By ending the race for fish, the Program addresses conservation and management issues associated with the previous derby fishery, reduces bycatch and associated discard mortality, and increases crab fishermen's safety. Harvesters and processors receive share allocations, as well as incentives to join fishery cooperatives, which improve efficiencies, provide economic stability, and allow for compensated reductions of excess capacity in the harvesting and processing sectors.

Current status/Appropriateness/Effectiveness: *In accordance with national laws and regulations, there is evidence that domestic parties having a legitimate interest in the use and management of the fishery (as described above) have been identified and encouraged to collaborate in the fisheries management process.*	☑

EVIDENCE:

The Crab Rationalization Program allocates BSAI crab resources to harvesters, processors, and coastal communities that have been involved in or rely on these fisheries. The Program was developed over a 6-year period by the North Pacific Fishery Management Council to accommodate the unique dynamics and needs of the BSAI crab fisheries. The program was launched in 2005, and it builds on the Council's previous experiences with the Individual Fishing Quota (IFQ) programs for halibut and sablefish, as well as the American Fisheries Act (AFA) cooperative program for Bering Sea pollock. The Program is a limited-access system that strikes a balance between the interests of several groups that rely on these fisheries. By ending the race for fish, the Program addresses conservation and management issues associated with the previous derby fishery, reduces bycatch and associated discard mortality, and increases crab fishermen's safety.

Harvesters and processors receive share allocations, as well as incentives to join fishery cooperatives, which improve efficiencies, provide economic stability, and allow for compensated reductions of excess capacity in the harvesting and processing sectors. Community development quota (CDQ) allocations and regional landing and processing requirements, as well as several community protection measures, protect community interests.

Limits on the amount of Processor Quota Share (PQS) and Individual Processing Quota (IPQ) that can be used outside of communities with a historic reliance on crab fisheries, which means that more than 3% of a crab fishery was processed

[119] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/bering-sea-and-aleutian-islands-crab-rationalization-program

8.3.	**The fishery management organization shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.**

there, are the most common community protection measures. Adak, Akutan, Unalaska/Dutch Harbor, False Pass, King Cove, Kodiak, Port Moller, Saint George, and Saint Paul are the nine Eligible Crab Communities (ECCs). 1) Right of First Refusal (ROFR) and 2) Quota Share (QS) Purchase are the two main safeguards. An ECC may enter into a contract with a PQS holder before NMFS issues any PQS, guaranteeing the ECC first rights to any PQS proposed for sale for use outside that community. IPQ has its own set of requirements. Adak is exempt from the ROFR. Each ECC has the option of purchasing QS and leasing the IFQ to community members. If a community purchases QS, it will be required to submit an annual report to NMFS.

Quota share allocation, processor quota share allocation, IFQ and individual processing quota issuance, quota transfers, use caps, crab harvesting cooperatives, Gulf of Alaska groundfish fisheries protections, arbitration system, monitoring, economic data collection, and cost recovery fee collection are all components of the Crab Rationalization Program.

The Community Development Quota (CDQ) Program[120] was established in 1992 with the goal of encouraging fisheries-related economic development in economically distressed native villages in western Alaska. The program is a federal fisheries program that involves eligible communities that have formed six CDQ groups, or regional organizations. The program involves 65 communities located within a fifty-mile radius of the Bering Sea coast. Pollock, halibut, Pacific cod, crab, and bycatch species were among the CDQ groups that received a portion of the Bering Sea and Aleutian Island harvest. During the Magnuson-Stevens Act's reauthorization in 1996, the CDQ program was given permanent status. The Alaska Native Claims Settlement Act was used as a model for the program.

The BOF[121] and the NPFMC[122] are open public processes that ensured that the Crab Rationalization Program and the Community Development Quota Program were thoroughly scrutinized by the public. Any individual or group can submit proposals for discussion of crab fisheries management and research on an ongoing basis. The BOF meets in coastal Alaska communities, while the NPFMC meets in Alaskan communities as well as Washington and Oregon communities to provide public opportunities. When it is not possible to participate in person, written suggestions are accepted.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization seeks to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition is given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements are made to consult all the interested parties and gain their collaboration in achieving responsible fisheries. Examples may include laws, fishery management plans, regulations, and meeting records.*	☑

EVIDENCE:

Bering Sea and Aleutian Islands Crab Rationalization Program. https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/bering-sea-and-aleutian-islands-crab-rationalization-program

Community Development Quota Program. https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/community-development-quota-cdq-program

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**

[120] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/community-development-quota-cdq-program#:~:text=The%20Community%20Development%20Quota%20(CDQ,iii)%20to%20alleviate%20poverty%20and

[121] http://www.adfg.alaska.gov/index.cfm?adfg=fisheriesboard.main

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

8.3.	**The fishery management organization shall seek to identify domestic parties having a legitimate interest in the use and management of the fishery. When deciding on use, conservation, and management of the resource, due recognition shall be given, where relevant, in accordance with national laws and regulations, to the traditional practices, needs, and interests of indigenous people and local fishing communities which are highly dependent on these resources for their livelihood. Arrangements shall be made to consult all the interested parties and gain their collaboration in achieving responsible fisheries.**	
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)		High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		Full Conformance
Non-conformance Number (if applicable):		

9.4.1.6 Supporting Clause 8.4.

8.4.	**Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a system to measure fleet capacity and maintain regularly updated data on all fishing operations. Research has been conducted to determine or estimate the fishing capacity commensurate with the sustainable use of the resource. There are mechanisms in place to measure the total fishing capacity within the unit of certification, and to reduce this capacity if it is determined to exceed the sustainable level.*	☑
EVIDENCE: Mechanisms are in place to reduce capacity to levels commensurate with sustainable use of the BSAI crab resources. Fleet capacity has been measured and is monitored. Statistics are updated regularly on all fishing operations and a record is maintained of all authorizations to fish these resources The BSAI crab fisheries are rationalized fisheries with limited access. Since 2002, fishing capacity has been limited. Following the reduction of the fleet, there was a significant amount of consolidation, and surviving vessel ownership has tended to concentrate in fewer and larger areas. Since 2006, the crab fleet's capacity has been fixed, and the Alaska Commercial Fisheries Entry Commission and the NMFS's Restricted Access Management Program (RAM) have been regularly monitoring it (CFEC).	
Current status/Appropriateness/Effectiveness: *There is evidence of the size of fleet capacity, and of data describing fishing operation, and that the mechanisms described above are successful at maintaining the effective fishing capacity of the unit of certification at a level commensurate with the sustainable use of the resource. Management mechanisms, which restrict the application of fishing capacity, such as quotas, shall be considered valid mechanisms in relation to this parameter. The core emphasis of this requirement is to ensure that exploitation is sustainable. Assessment teams should ensure that fisheries are within catch limit recommendations to determine whether excess capacity is having an effect on resource overexploitation.*	☑
EVIDENCE: The BSAI crab fisheries are rationalized fisheries with limited access. Since 2002, fishing capacity has been limited. Following the reduction of the fleet, there was a significant amount of consolidation, and surviving vessel ownership has tended to concentrate in fewer and larger areas. Since 2006, the crab fleet's capacity has been fixed, and the Alaska Commercial Fisheries Entry Commission and the NMFS's Restricted Access Management Program (RAM)[123] have been regularly monitoring it (CFEC)[124]. RAM is in charge of regulating permit programs in the Alaska Region, particularly those that restrict access to federally controlled North Pacific fisheries. RAM's duties include informing the public about the program, determining eligibility and issuing permits, processing transfers, collecting landing fees, and other related tasks. It has compiled a list of groundfish and crab licenses under the License Limitation Program (LLP). Initial LLP licenses are awarded to individuals based on the operations of qualified boats. By limiting the number of participants, the CFEC aids in the conservation and economic health of Alaska's commercial fisheries. In both limited and unlimited fisheries, the CFEC issues permits and vessel licenses to authorized individuals, as well as providing due process hearings and appeals as needed. The RAM and the CFEC both keep records of all fishing permits issued on their websites.	

[123] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/restricted-access-management-program
[124] https://www.cfec.state.ak.us

8.4.	**Where excess capacity exists, mechanisms shall be established to reduce capacity to levels commensurate with sustainable use of the resource. Fleet capacity operating in the fishery shall be measured and monitored. The fishery management organization shall maintain, in accordance with recognized international standards and practices, statistical data, updated at regular intervals, on all fishing operations and a record of all authorizations to fish allowed by them.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fleet capacity operating in the fishery is monitored and measured, and statistical data on all fishing operations allowed is updated and maintained. Where excess capacity exists, mechanisms are established to reduce capacity to levels commensurate with sustainable use of the resource. Examples may include fleet reports or other documents or reports.*	☑

EVIDENCE:

NMFS's Restricted Access Management Program (RAM). https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/restricted-access-management-program

Alaska Commercial Fisheries Entry Commission (CFEC). https://www.cfec.state.ak.us/annrpts/AR2019.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.1.7 Supporting Clause 8.4.1.

8.4.1.	**Studies shall be promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort.**

Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a need and a process that allows, as appropriate, for studies to understand the costs, benefits, and effects of* *alternative management options designed to rationalize fishing.*	☑

EVIDENCE:

Legislation was passed in 1973 to establish a "limited entry" system to allow the state to limit the number of participants in a specific fishery. State statute AS 16.43.140 states, "after January 1, 1974, a person may not operate gear in the commercial taking of fishery resources without a valid entry permit or a valid interim-use permit issued by the commission.

The Alaska Commercial Fisheries Entry Commission (CFEC) helps to conserve and maintain the economic health of Alaska's commercial fisheries by limiting the number of participating fishers in certain fisheries, including all crab fisheries. CFEC issues permits and vessel licenses to qualified individuals in both limited and unlimited fisheries, and provides due process hearings and appeals for those individuals' denied permits.

Current status/Appropriateness/Effectiveness: *There is evidence for studies conducted on alternative management options designed to rationalize fishing.*	☑

EVIDENCE:

In the early 1970s, the Alaska government recognized that the state's fishery resources could not sustainably provide livelihoods for an ever-increasing number of fishermen. Governor Egan then proposed that the only option was to limit the amount of fishing permits provided (ADFG, 2009). In 1973, legislation was established to create a "restricted entry" system, which allowed the state to limit the number of people who may participate in a particular fishery. A person may not operate gear in the commercial taking of fisheries resources without a valid entry permission or a valid interim-use permit issued by the commission after January 1, 1974, according to state code AS 16.43.140.

By limiting the number of fishermen who can participate, the Alaska Commercial Fisheries Entry Commission (CFEC) strives to safeguard and maintain the economic health of Alaska's commercial fisheries. In both limited and unlimited fisheries, the CFEC issues permits and vessel licenses to qualifying individuals, as well as hearings and appeals for those denied permits. Participants in a fishery who consider that the number of gear operators should be limited in order to protect the resource and the fishery's economic health can start the limited entry process. If CFEC research suggests that limiting admission to the fishery might assist solve the problem, the commission determines a limited number of licenses based on previous participation levels. The CFEC then creates a point system to rate qualified candidates based on how much hardship they would face if they were not granted an admission permit. The following are the basic criteria for determining hardship: establishing economic dependence on the fishery (which could include determining the percentage of income derived from the fishery and the amount of investment in a vessel and gear); and past history of participation in the fishery, including the consistency and number of years that applicant participated.

To qualify for an eligible period prior to the set qualification date, a person must have lawfully participated in the fishery, possessed the necessary licenses, and made at least one landing of fish. Each limited fishery has its own application time, which is often a few months long. Everyone who is qualified to apply must do so within the deadline. Alternative methods of limited entry for harvest quota-managed fisheries are still being researched by CFEC. Limited access permits, interim-use permits, and vessel permits are the three basic categories of licenses issued by CFEC. Permanent licenses for limited fisheries are known as limited entry licenses. Applicants that obtained a sufficient number of points on their applications will receive

8.4.1.	**Studies shall be promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort.**

them. Only a few types of entry permits must be renewed each year, and the majority of them can be transferred to another individual after they've been issued (e.g., sold, or inherited). Annual interim-use permits are provided for all commercial fisheries that are not subject to entry restrictions, as well as applications awaiting permanent licenses. Vessel permits (as opposed to vessel licenses) are issued once a year to vessels that are qualified to fish for Bering Sea crab or weathervane scallops. A limited entrance or interim-use permit allows the holder to use BOF-approved gear in a certain commercial fishery. The term "fishery" refers to a particular mix of fishery resource(s), gear type(s), and geographic location(s). Fishery regulations limit the gear that can be used for commercial fishing. Mesh size and gear length are two examples of constraints. The Commercial Fisheries Entry Commission's aim is to promote the economic health and stability of Alaska's commercial fishing industry, as well as conservation and sustainable yield management of fisheries resources, as stated in the previous section. CFEC has a research unit entrusted with providing economic analysis and studies on fishery limitation to its commissioners and, on occasion, the Board of Fisheries. CFEC delivers data directly to 12 Alaska Regional Development Organizations that support and encourage locally-driven economic development in areas where commercial fishing is the primary source of revenue (2016 CFEC Annual Report) The Alaska Fisheries Business Help Project, a searchable database of organizations, agencies, and corporations that provide services to individuals and businesses in the seafood industry, is part of the Alaska Sea Grant program's economic assistance to fishermen.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that studies are promoted that provide an understanding of the costs, benefits, and effects of alternative management options designed to rationalize fishing, especially options relating to excess fishing capacity and excessive levels of fishing effort. Examples may include various evaluation or reports on fishing rationalization.*	☑

EVIDENCE:
Ten-Year Program Review for the Crab Rationalization Management Program in the Bering Sea/ Aleutian Islands.
https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Crab/Crab10yrReview_Final2017.pdf

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.4.1.8 Supporting Clause 8.5.

8.5.	**Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *The management system has taken into account technical measures, where and as appropriate (i.e., some fisheries do not have the requirement for a minimum fish size), to the fishery and stock under assessment, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners.*		☑
EVIDENCE: Measures are in place in BSAI crab fisheries that restrict sizes that can be retained, require escape mechanisms to protect undersize and female crabs, establish closed seasons and closed areas and reserve areas for local, aboriginal fisheries. The BSAI crab FMP gives the state the authority to change size limitations in accordance with state rules. The state can examine the following factors when determining minimum size limits: 1) maturity size, 2) reproductive capability protection, 3) market and other economic concerns, 4) natural and discard death rates, 5) growth rates, and 6) yield per recruit. Biological considerations are typically utilized to create minimum legal size limitations in order to meet conservation goals.		
Current status/Appropriateness/Effectiveness: *Technical measures are related to sustainability objectives, ensuring sustainable exploitation of the target species, and minimizing the potential negative impacts of fishery activities on non-target species, ETP species, and the physical environment.*		☑
EVIDENCE: The BSAI crab FMP[125] gives the state the authority to change size limitations in accordance with state rules. The state can examine the following factors when determining minimum size limits: 1) maturity size, 2) reproductive capability protection, 3) market and other economic concerns, 4) natural and discard death rates, 5) growth rates, and 6) yield per recruit. Biological considerations are typically utilized to create minimum legal-size limitations in order to meet conservation goals. Processor/harvester agreements are used to acquire preference for larger crabs based on market and other economic considerations. The minimal commercial size restriction for each location was calculated by adding the expected dimensional growth of males during a two-year period to the size when 50% of the male population is sexually mature. This would ordinarily offer each male at least one chance to procreate before becoming vulnerable to the fisheries. Female crabs cannot be seized unless a surplus is confirmed to be available. The surplus would be determined by the number of crabs above the optimum yield threshold utilized in the spawning stock calculation. Despite the fact that the FMP allows for the experimental capture and processing of females during years of high abundance, industry has showed little interest. Female crabs are not only smaller than males of the same age, but they also have a lower proportion of recoverable meat than males of the same size. To reduce handling mortality rates, undersized males and females must be thrown from crab vessels as soon as possible. Crabs are protected during the molting and mating stages of their life cycle by fishing seasons. Closed seasons have been established to enhance crab populations' reproductive potential based on one or more of the following factors: 1) Any male crab breeding population that may form dense schools prior to and during yearly migrations into shallow water breeding sites is protected. Red king crabs have been known to migrate in this manner, and other crabs may do it as well. 2) Molting periods should be considered such that the shells have hardened sufficiently to allow handling with minimal damage or mortality. 3) Protection of the environment Because of the significant death rates that can be imposed on nonlegal crab, the FMP specifically prohibits the use of trawls and entanglement gear for crab catching. In the BSAI crab fisheries, pots and ring nets are the only allowed commercial gear. The golden king crab fishery now allows many pots tied to a ground line. To		

[125] https://www.fisheries.noaa.gov/management-plan/bering-sea-aleutian-islands-king-and-tanner-crabs-management-plan

8.5.	**Technical measures regarding the stock under consideration shall be taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons or areas, areas reserved for particular (e.g., artisanal fisheries), and protection of juveniles or spawners.**

reduce bycatch, several devices can be fitted to pots. Escape mechanisms (escape rings or specified mesh panel webbings) must be incorporated in crab pots to allow female and sublegal male crab to escape, and biodegradable twine must be incorporated as an escape mechanism on all pots to terminate the catching and holding ability of lost pots, according to regulations. When needed, the FMP authorizes the application of pot limitations to achieve the FMP's ecological, economic, and social objectives.

The link provided below contains a list of all current regulations in existence in each BSAI crab fishery. http://www.adfg.alaska.gov/index.cfm?adfg=regulations.main

FMPs must describe and identify Essential Fish Habitat (EFH), minimize the adverse effects of fishing on EFH to the degree practical, and identify alternative actions to maintain and enhance EFH. The BSAI crab FMP describes crab EFH and contains ecological and biological needs for each stage of the species' life cycle. The EFH regulations outline how to identify habitat regions that are of significant significance (HAPCs). HAPCs are intended to give conservation and management efforts more focus, and they may require further protection from negative effects. To safeguard EFH from fishing risks, the Aleutian Islands Habitat Conservation Area and the Aleutian Islands Coral Habitat Protection Areas were established. Non-pelagic trawl gear is forbidden year-round in the former, except in defined regions, and bottom contact gear and anchoring by federally allowed fishing vessels are restricted in the latter. The Alaska Seamount Habitat Protection Areas, which ban the use of bottom contact gear and anchoring by a federally permitted fishing vessel, and the Bowers Ridge Habitat Conservation Zone, which prohibits the use of movable bottom contact gear, have been designated as HAPCs within EFH (see further discussion in the evidence section of supporting clause 12.9).

State laws ban commercial king crab fishing within 10 miles of mean lower low water around St. Lawrence, King, and Little Diomede Islands, as well as a state closure to safeguard the Norton Sound subsistence king crab fishery, are also recognized in the FMP. In order to achieve state subsistence criteria, the state may designate new closed water areas or enlarge or reduce existing state closed water areas.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that technical measures regarding the stock under consideration are taken into account, where appropriate, in relation to fish size, mesh size, gear, closed seasons, closed areas, areas reserved for particular (e.g., artisanal) fisheries, and protection of juveniles or spawners. Examples may include fishery management plans, regulations or various other reports.*	☑

EVIDENCE:

NPFMC's fishery management plan (FMP) for BSAI crab stocks. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf

Details of all regulations currently in place in each BSAI crab fishery can be found at the link provided below.
http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2017-2020_cf_king_tanner_crab.pdf

Essential Fish Habitat. https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.4.1.9 Supporting Clause 8.5.1.

8.5.1	**Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism by which management measures are developed to minimize the catch, waste and discarding of non-target species and the impact of the fishery on associated, dependent, and ETP species. This system shall include the development of specific management objectives.*	☑

EVIDENCE:

Appropriate measures are applied to minimize:

- catch, waste and discards of non-target species (both fish and non-fish species); and
- impacts on associated, dependent or endangered species

The BSAI crab fisheries are subjected to appropriate conservation and management easures in order to reduce non-target catch, waste, and discards (crab, fish and non-fish species). The Crab FMP (NPFMC 2011) describes the following gear modifications.

The FMP defers to the State design specifications for commercial crab pots and ring nets. Furthermore, the FMP gives the the authority to establish bycatch limits for additional crab species in the crab fisheries regulated under this FMP

Current status/Appropriateness/Effectiveness: *There are measures in place to minimize catch, waste, and discards of nontarget species (both fish and non-fish species). These measures are considered effective at achieving the specific management objectives described in the process parameter. There are measures in place to minimize impacts on associated, dependent, or endangered species. These measures are considered effective at achieving the specific management objectives described in the process parameter.*	☑

EVIDENCE:

1. Measures to reduce non-target species capture, waste, and discards.

The BSAI crab fisheries under consideration here have relatively low non-target species catches, and are thus frequently referred to as "clean" fisheries. As stated in clause 12.6, crab is the most common non-target species caught in each of the five fisheries. The guided pot fishery catches a small amount of groundfish such as Pacific cod, Pacific halibut, yellowfin sole, and sculpin (*Myoxocephalus* spp). (Barnard and Burt 2007; Barnard and Burt 2008; Gaeuman 2010). Echinoderms (sea stars and sea urchins), snails, non-FMP crabs (hermit crabs and lyre crabs), and other invertebrates are among the invertebrates caught in bycatch (sponges, octopus, anemone, and jellyfish). Low amounts of bycatch of these species usually have no effect on their abundance (NMFS 2004). Clause 12.6 delves deeper into the species composition of bycatch.

The BSAI crab fisheries are subjected to appropriate conservation and management measures in order to reduce non-target species catch, waste, and discards (crab, fish and non-fish species). The Crab FMP (NPFMC 2011) describes the following gear modifications:

The FMP defers to the State design specifications for commercial crab pots and ring nets. In the BS/AI area, the allowed commercial gear for catching crab is pots and ring nets (see Section 8.1.1). The state presently allows multiple pots attached to a ground line in brown (golden) king crab fisheries. To reduce king crab bycatch, the State of Alaska presently mandates tunnel-eye heights in pots fishing for *C. bairdi* or *C. opilio* in the Bering Sea to not exceed 3 inches. To allow female and sublegal male crab to escape, escape mechanisms may be incorporated or mesh size adjusted; the State currently specifies escape rings or mesh panels in regulation for pots used in the BS/AI *C. bairdi*, *C. opilio*, and brown (golden) king crab fisheries, the Bristol Bay king crab fishery, and the Pribilof District king crab fishery. State regulations also mandate the use of biodegradable string as an escape mechanism on all pots, which will disable a pot's catching and holding capacity if it is misplaced.

8.5.1	**Appropriate measures shall be applied to minimize catch, waste, and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species.**

Furthermore, the FMP gives the State the authority to establish bycatch limits for additional crab species in the crab fisheries regulated under this FMP. Because the same fishermen participate in both fisheries, bycatch regulation in the directed fishery frequently entails no or little allocation.

The impact of ghost fishing of lost crab and groundfish pots in the EBS on fish and non-target invertebrates has yet to be determined. The term "ghost fishing" refers to fishing with abandoned or lost gear. Crab trapped in abandoned pots may starve to death, although the effect of ghost fishing on crab stocks is uncertain. Since 1977, crab pots have been required to be supplied with degradable escape methods like as cotton thread or twine to prevent starving mortality in lost pots. Pots with no escape mechanisms could keep catching and killing crab for a long time. For king crab pots, High and Worlund (1979) calculated a 15-year effective fishing life. The ADF&G mandates that each crab pot contain a biodegradable string panel that will prevent ghost fishing in lost pots after 30 days. According to recent research, even biodegradable twine can survive in lost pots for up to 89 days (Barnard 2008), which is three times longer than the time (30 days) required to trigger irreversible malnutrition in crabs (Paul *et al.*, 1994). Crabbers and pot manufacturers testified that all contemporary pots used in Bering Sea crab fisheries have escape devices (NPFMC 2007).

2. Efforts to reduce negative effects on related, dependent, or endangered species.
The crab stocks under review are not commonly regarded as key prey species, as stated in article 12.7. As a result, there is no indication that their removal will have a negative influence on linked or dependent species. Furthermore, BSAI crab fisheries have a very low risk of affecting endangered species (see clause 12.5.1 and 12.12). As a result, existing State and Federal procedures to protect and restore endangered species, as defined by the endangered species legislation and, where applicable, the marine mammal protection acts, are acceptable for BSAI crab fisheries.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that, appropriate measures are applied to minimize catch, waste and discards of non-target species (both fish and non-fish species), and impacts on associated, dependent, or endangered species. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
NPFMC's fishery management plan (FMP) for BSAI crab stocks. https://www.npfmc.org/wp-content/PDFdocuments/fmp/Crab/CrabFMP.pdf
Details of all regulations currently in place in each BSAI crab fishery can be found at the link provided below.
http://www.adfg.alaska.gov/static/regulations/fishregulations/pdfs/commercial/2017-2020_cf_king_tanner_crab.pdf
Essential Fish Habitat. https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat

References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x	3)	=	**Overall score**
	10		**0**				**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.1.10 Supporting Clause 8.6.

8.6	**Fishing gear shall be marked in accordance with the State's legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is regulation for gear marking.*	☑
EVIDENCE: Gear used in BSAI crab fisheries has to be marked so the owner can be identified **Alaska Administrative Code 34.051** and **Alaska Administrative Code 35.051** requires king and tanner crab gear marking as	
Current status/Appropriateness/Effectiveness: *Fixed gear is marked according to national legislation, and lost fixed gear can be identified back to owner.*	☑
EVIDENCE: **Alaska Administrative Code 34.051** requires king crab gear marking as follows: 1) At least one buoy on each king crab pot or ring net must be legibly marked with the permanent ADFG vessel license plate number of the king crab vessel operating the gear. The buoy must bear only the number of the vessel used in operating the gear. The number shall be painted on the top one-third of the buoy in numerals at least four inches high, one-half inch wide, and in a color contrasting to that of the buoy. The buoy markings must be visible on the buoy above the water surface when the buoy is attached to the crab pot. 2) In registration areas where a king crab pot limit is in effect, each king crab pot must have one identification tag issued by the department placed on the main buoy or on the trailer buoy if more than one buoy is attached to the pot. 3) Identification tags are issued before each fishing season, are uniquely numbered for each registration year, and will be issued at the time of vessel registration for that vessel only. The vessel owner, or the owner's agent, shall apply for identification tags at a department office designated to issue the tags. Replacement of tags lost during the season is permitted if the vessel operator submits a sworn statement or affidavit describing how the tags were lost and listing the numbers of the lost tags. Tags shall be renewed annually before each fishing season.[126]. The above referenced requirements for the marking of king crab pot gear (as set forth in AA34.051) are not applicable to the Aleutian Islands golden king crab fishery. Use of longline pot gear for AIGKC is set forth in the Alaska Administrative Code 5 AAC 34.625 Lawful gear for Registration Area O[127]: (b) Pots used to take golden king crab (2) may be operated only from a shellfish longline; a buoy is not required for each pot, but each end of the longline must be marked by a cluster of four buoys; one buoy in the cluster must be marked in accordance with 5 AAC 34.051 and have the initials "SL" to identify it as a shellfish longline; for purposes of this subsection "a shellfish longline" is a stationary, buoyed, and anchored line with at least 10 shellfish pots attached. **Alaska Administrative Code 35.051** requires Tanner crab gear marking as follows: At least one buoy on each Tanner crab pot or ring net must be legibly marked with the permanent ADFG vessel license plate number of the Tanner crab vessel operating the gear. The buoy must bear only the number of the vessel used in operating the gear. The number shall be painted on the top one-third of the buoy in numerals at least four inches high and one-half inch wide, in a color contrasting to that of the buoy. The buoy markings must be visible on the buoy above the water surface when the buoy is attached to the crab pot[128]	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing gear is marked in accordance with State's legislation in order that the owner of the gear can be identified. Gear marking*	☑

[126] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section051.htm
[127] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section625.htm
[128] http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter035/section051.htm

8.6	**Fishing gear shall be marked in accordance with the State's legislation in order that the owner of the gear can be identified. Gear marking requirements shall take into account uniform and internationally recognizable gear marking systems.**
requirements take into account uniform and internationally recognizable gear marking systems. Examples may include various fleet reports and regulations.	

EVIDENCE:
5 AAC 34.051. King crab gear marking requirements.
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section051.htm
5 AAC 34.625. Lawful gear for Registration Area O.
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter034/section625.htm
5 AAC 35.051. Tanner crab gear marking requirements.
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter035/section051.htm

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

9.4.1.11 Supporting Clause 8.7.

8.7.	**The fishery management organization and relevant groups from the fishing industry shall measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent predators. The use of fishing gear and practices that lead to discarding the catch shall be discouraged, and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices, and gears shall be phased out accordingly.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *The management system and relevant groups from the fishing industry have encouraged the development of technologies and operational methods to reduce waste and discard of the target species. Relevant groups includes fishers, processers, distributers, and marketers. There are mechanisms in place by which the selectivity, environmental impact, and cost-effectiveness of gears included in the unit of certification are measured.*	☑
EVIDENCE: BSAI crab fisheries are required to use gear and technologies that research has demonstrated are environmentally safe, cost effective and sufficiently selective to minimize catch, waste and discards of non-target species as well as the use of gear and practices that increase survival rates of escaping fish. Use of highly selective crab traps to reduce unwanted catch of target and non-target species, along with development of handling practice to minimize mortality of discarded catch, have been key aspects of the management of BSAI crab fisheries for a long time. There has been extensive investigation into every area of gear performance and discard mortality. In these fisheries, the only allowed commercial gear is pots and ring nets. To reduce bycatch of non-target crabs and other species, various devices can be put to pots. Escape mechanisms (escape rings or specific mesh panel webbings) must be included in crab pots to allow female and sublegal male crabs to escape, and different devices may be added to prevent other species from being caught. Biodegradable string must also be used as an escape device on all pots in order to prevent lost pots from being caught and held. Crabbers are also making pots with broader web on the panels so that female and juvenile crabs can escape before the gear is dragged back. As a result, there is much less non-targeted bycatch and a higher catch rate of legal-sized target crabs.	
Current status/appropriacy/efficacy: *These technologies and operational procedures have been applied. The strategies in use are effective in decreasing non-target species waste and discards. According to the relevant scientific authority of the fishery, the gears used in the fishery are appropriate in terms of selectivity, environmental impact, and cost-effectiveness. Methods are regarded successful if proof exists that the fishery under consideration does not pose a major danger of overfishing of non-target species*	☑
EVIDENCE: Use of highly selective crab pots to reduce unwanted catch of target and non-target species, along with development of handling practice to minimize mortality of discarded catch, have been key aspects of the management of BSAI crab fisheries for a long time. There has been extensive investigation into every area of gear performance and discard mortality. In these fisheries, the only allowed commercial gear is pots and ring nets. To reduce bycatch of non-target crabs and other species, various devices can be put to pots. Escape mechanisms (escape rings or specific mesh panel webbings) must be included in crab pots to allow female and sublegal male crabs to escape, and different devices may be added to prevent other species from being caught. Biodegradable string must also be used as an escape device on all pots in order to prevent lost pots from being caught and held. Crabbers are also making pots with broader web on the panels so that female and juvenile crabs can escape before the gear is dragged back. As a result, there is much less non-targeted bycatch and a higher catch rate of legal-sized target crabs.	

8.7.	**The fishery management organization and relevant groups from the fishing industry shall measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent predators. The use of fishing gear and practices that lead to discarding the catch shall be discouraged, and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices, and gears shall be phased out accordingly.**

Following the rationalization, vessel numbers reduced, resulting in a slower-paced fishery with lower rates of lost fishing gear and longer soak durations, allowing for more escapement of undersized and female crabs. Longer seasons, as a result of rationalization, and a slower tempo of fishing, have enabled better fishing and handling techniques to reduce mortality of all catch components.

The crab fleet today employs a variety of sorting and discard strategies while retrieving crab pots, although the basic aspects of the process are largely the same on all vessels. Crabs are put into containers or onto a sorting table when the pot is collected. The crabs to be discarded are returned to the sea in a variety of ways, including being tossed overboard, dragged in totes and dumped into an outflow chute, or placed directly into an outflow ramp of various designs, as the male crabs of marketable size are separated from the rest of the catch and placed into circulating water tanks. More advanced technologies, like as automated conveyor belts and sorting tables, have been implemented to reduce handling and quickly return unwanted catch to the sea.

Discards are recorded by on-board observers in all fisheries, and estimates of total discard mortality are factored into overall fishery removals. This has offered a strong incentive to reduce the amount of undesirable catch to the greatest extent possible. Their records show that legal crab of the target species dominates captures, with significantly lesser amounts of other species[129].

EISs are required by the National Environmental Policy Act (NEPA)[130] for large federal actions that have a significant impact on the quality of the human environment. The NEPA EIS process acts as a check and balance against environmental changes that may have an impact on ecosystems and natural processes. An EIS for the BSAI crab fishery provides an assessment of the environmental implications of fishing to decision makers and the general public.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant groups from the fishing industry measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost effective gear, technologies and techniques, that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent species. Examples may include various reports, regulations, or other data.*	☑

EVIDENCE:

Summary of the 2012/2013 Mandatory Crab Observer Program Database for the Bering Sea/Aleutian Islands Commercial Crab Fisheries. http://www.adfg.alaska.gov/FedAidPDFs/FDS13-54.pdf

NOAA's National Environmental Policy Act (NEPA) compliance. https://www.fisheries.noaa.gov/topic/laws-policies#national-environmental-policy-act

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level:								Full Conformance

129 http://www.adfg.alaska.gov/FedAidPDFs/FDS13-54.pdf

130 https://www.fisheries.noaa.gov/topic/laws-policies#national-environmental-policy-act

8.7.	**The fishery management organization and relevant groups from the fishing industry shall measure performance and encourage the development, implementation, and use of selective, environmentally safe, and cost-effective gear, technologies, and techniques that are sufficiently selective as to minimize catch, waste, discards of non-target species (both fish and non-fish species), and impacts on associated or dependent predators. The use of fishing gear and practices that lead to discarding the catch shall be discouraged, and the use of fishing gear and practices that increase survival rates of escaping fish shall be promoted. Inconsistent methods, practices, and gears shall be phased out accordingly.**	
(10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		
Non-conformance Number (if applicable):		

9.4.1.12 Supporting Clause 8.8.

8.8.	**Technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques—shall be applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There has been development of technologies, materials, and operational methods that minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, and a system to minimize pollution and waste.*		☑
EVIDENCE: Selective, environmentally safe and cost-effective fishing gear and techniques have been developed and applied in BSAI crab fisheries to minimize the loss of gear and the ghost fishing effects of lost or abandoned gear, pollution and waste. After the BSAI crab fisheries were rationalized, vessel numbers reduced, resulting in a slower-paced fishery with lower rates of lost fishing gear and longer soak durations, allowing for the escapement of undersized and female crab.		
Current status/Appropriateness/Effectiveness: *Technologies, materials, and operational methods that minimize the loss of fishing gear and ghost fishing by lost or abandoned gear are applied whenever appropriate. Also, these measures are effective in minimizing, to the extent practicable, pollution and waste.*		☑
EVIDENCE: After the BSAI crab fisheries were rationalized, vessel numbers reduced, resulting in a slower-paced fishery with lower rates of lost fishing gear and longer soak durations, allowing for the escapement of undersized and female crab. Crabbers are making pots with bigger web on the panels so that female and juvenile crab can exit before the gear is hauled back. According to Alaska Administrative Code 39.145, the following escape measures are required for ghost fishing for shellfish and bottom-fish pots: 1) A sidewall, which may include the tunnel, must have an aperture equal to or exceeding 18 inches in length, with the exception of shrimp pots, where the opening must be at least six inches in length. A single strand of untreated, 100 percent cotton twine, no greater than 30 thread, must be laced, stitched, or tied together to close the aperture. Only one end of the cotton twine should be tied. The entrance must be parallel to the bottom of the pot and within six inches of it. It is not permitted to tie or loop the cotton thread around the web bars. As a substitute for the above requirement, the pot lid tie-down straps on Dungeness crab pots may be secured to the pot at one end by a single loop of untreated, 100 percent cotton twine no larger than 60 thread; the pot lid must be secured so that, when the pot is lifted, the pot lid does not fall off. The lid will no longer be securely closed when the twine fades. 2) Instead of complying with 1) of this section, all king crab, Tanner crab, shrimp, various shellfish, and bottom fish pots must meet the following requirements: Except for shrimp pots, which must have an entrance of at least six inches in length, a sidewall, which may include the tunnel, must have an opening of at least 18 inches in length. A single strand of treated or untreated twine, no longer than 36 thread, must be laced, stitched, or tied together to close the opening. A galvanic timed release (GTR) device, designed to release in less than 30 days in salt water, must be built into the length of twine so that when the device releases, the rope no longer secures or obstructs the pot's entrance. Only the ends of the twine and the attachment points on the galvanic timed-release device may be knotted. The entrance must be parallel to the bottom of the pot and within six inches of it. It is not permitted to tie or loop the twine around the web bars. 3) A registered commercial fishing vessel or a vessel used for personal use, sport, or subsistence fishing may not have any bottom fish or shellfish pot gear that does not have an opening or rigging as specified on board the vessel or in the water,		

8.8.	**Technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques—shall be applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste.**

in fishing or stored condition, in an area open to commercial, personal use, sport, or subsistence fishing with pot gear, including a pot storage area[131].

On the footnote referenced in evidence for supporting clause 8.1.3, there is a five-year review of the crab rationalization management program, which includes a consideration of lost pots and ghost fishing.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate those technologies, materials, and operational methods or measures—including, to the extent practicable, the development and use of selective, environmentally safe, and cost-effective fishing gear and techniques—are applied to minimize the loss of fishing gear, the ghost fishing effects of lost or abandoned fishing gear, pollution, and waste. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
5 AAC 39.145. Escape mechanism for shellfish and bottom fish pots.
http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section145.htm

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

131 http://www.touchngo.com/lglcntr/akstats/aac/title05/chapter039/section145.htm

9.4.1.13 Supporting Clause 8.9.

8.9.	**The intent of fishing selectivity and fishing impacts-related regulations shall not be circumvented by technical devices. Information on new developments and requirements shall be made available to all fishers.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a system that makes available information on new developments and requirements to all fishers to avoid circumvention of fishing regulations.*		☑
EVIDENCE: The intent of fishing selectivity and fishing impacts related regulations are not circumvented by technical devices in BSAI crab fisheries and information on new developments and requirements are made available to all fishers. Prior to each fishing season, the ADFG inspects pots and vessel holding tanks. State Fish & Wildlife Troopers enforce all regulations at sea, and the ADFG on-board observer program collects information that can be used for enforcement		
Current status/Appropriateness/Effectiveness: *The adopted methods are successful and effective and fishing regulations are made known to the participants. Enforcement data are highlighting significant violations.*		☑
EVIDENCE: Prior to each fishing season, the ADFG inspects pots and vessel holding tanks. State Fish & Wildlife Troopers enforce all regulations at sea, and the ADFG on-board observer program collects information that can be used for enforcement. There is no proof that gadgets were used to get around the intent of the gear regulations. Professional organizations and the licensing system make information on new gear innovations and any relevant regulatory requirements readily available to harvesters.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the intent of fishing selectivity and fishing impacts-related regulations is not circumvented by technical devices. Information on new developments and requirements is made available to all fishers. Examples may include various data and reports.*		☑
EVIDENCE: State of Alaska Mandatory Shellfish Onboard Observer Program. http://www.adfg.alaska.gov/fedaidpdfs/RIR.4K.2002.09.pdf, https://www.arlis.org/docs/vol1/157020329/157020329-2002A.pdf Alaska Wildlife Troopers. https://dps.alaska.gov/AWT/Home		
References:		

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.1.14 Supporting Clause 8.10.

8.10	**Assessment and scientific evaluation shall be carried out on the impacts of habitat disturbance on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the impacts of such introductions shall be monitored.**	
Relevance:	Not relevant. **Note**: This clause is not applicable if new gear has not been introduced in the past 3 years.	
	This Clause is not relevant because no new gear has been introduced in the past 3 years	
Evaluation Parameters		**Met?**
Process: *New gear has been recently introduced on a commercial scale within the last 3 years, or there is a plan to introduce new gear in the foreseeable future.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *An appropriate assessment of potential impacts has been carried out. There is evidence to suggest that the assessment is adequate to support habitat conservation and fishery management purposes. Additionally, there is a monitoring regime in place.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that assessment and scientific evaluation is carried out on the implications of habitat disturbance impact on the fisheries and ecosystems prior to the commercial-scale introduction of new fishing gear, methods, and operations. Accordingly, the effects of such introductions are monitored. Examples may include various regulations, data, and reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**		**Number of EPs NOT met**			**Overall score**
	10	**– (**		**x 3**	**) =**	

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.4.1.15 Supporting Clause 8.11.

8.11.	International cooperation shall be encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a system of international information exchange to allow knowledge to be shared.*	☑
EVIDENCE: There has been extensive international cooperation/collaboration with respect to research focused on fishing gear selectivity, fishing methods and strategies as well as the dissemination of results and transfer of technology from such research. Alaska has a long history of actively fostering all facets of international fisheries research. In collaboration with ADFG, NMFS, and the NPFMC, the Alaska Sea Grant College Program has been sponsoring and directing the Lowell Wakefield Fisheries Symposium series since 1982. These symposia provide a venue for sharing information on the biology, management, economics, and processing of a variety of fish and crab species	
Current status/Appropriateness/Effectiveness: *There is evidence for international information exchange, such as meeting records or other information.*	☑
EVIDENCE: Alaska has a long history of actively fostering all facets of international fisheries research. In collaboration with ADFG, NMFS, and the NPFMC, the Alaska Sea Grant College Program has been sponsoring and directing the Lowell Wakefield Fisheries Symposium series since 1982. These symposia provide a venue for sharing information on the biology, management, economics, and processing of a variety of fish and crab species. The series is well-known around the world for its quality and scope. "Impacts of a Changing Environment on the Dynamics of High-Latitude Fish and Fisheries," the theme of the upcoming 31st Wakefield Symposium, is a topic of critical importance to Alaskan crab fisheries and management. Several more international symposia on northern latitude crab species and their fisheries have been held in Alaska. They provide a forum for broad international cooperation in fisheries research and dissemination of findings on all aspects of fishing practices when taken together[132].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that international cooperation is encouraged for research programs involving fishing gear selectivity, fishing methods and strategies, dissemination of the results of such research programs, and the transfer of technology. Examples may include various data and reports.*	☑
EVIDENCE: Proceedings of all Lowell Wakefield Fisheries symposia in the series can be found at the link. https://alaskaseagrant.org/events/wakefield-fisheries-symposium/	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

132 http://seagrant.uaf.edu/conferences/wakefield/proceedings.html

9.4.1.16 Supporting Clause 8.12.

8.12	**The fishery management organization and relevant institutions involved in the fishery shall collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behaviour of target and non-target species regarding such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is collaborative research into fishing gear selectivity, fishing methods, and strategies.*	☑
EVIDENCE: There has been extensive collaboration on research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species in relation to such fishing gear in the case of BSAI crab fisheries. In the case of Alaskan crab fisheries, the subject of fishing gear selectivity, fishing tactics and strategies, as well as the behavior of target and non-target species in response to such gear, has been extensively investigated. A separate annual SAFE study examines the economic elements of these fisheries in depth.	
Current status/Appropriateness/Effectiveness: *There is evidence of such research, and the results have been applied accordingly in fisheries management.*	☑
EVIDENCE: In the case of Alaskan crab fisheries, the subject of fishing gear selectivity, fishing tactics and strategies, as well as the behavior of target and non-target species in response to such gear, has been extensively investigated. A separate annual SAFE study examines the economic elements of these fisheries in depth. See the evidence and web links supplied in support of clause 5.1. This type of publication ensures widespread collaboration and standardization of linked methodologies.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization and relevant institutions involved in the fishery collaborate in developing standard methodologies for research into fishing gear selectivity, fishing methods and strategies, and on the behavior of target and non-target species in relation to such fishing gear—as an aid for management decisions and with a view to minimizing non-utilized catches. Examples may include various data and reports.*	☑
EVIDENCE: Annual Crab SAFE reports. https://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/2020/SAFE_2020_Complete.pdf Ten-Year Program Review for the Crab Rationalization Management Program in the Bering Sea/ Aleutian Island. https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Crab/Crab10yrReview_Final2017.pdf	

References:									
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			0					10
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.4.1.17 Supporting Clause 8.13.

8.13	**Where appropriate, policies shall be developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed.**	
Relevance:	Not relevant.	
	State and federal management authorities have established policies for the use of artificial reefs and fish aggregation devices in the coastal waters of Alaska. However, no habitat modifications are undertaken for the purpose of enhancement of BSAI crab stocks. There is no evidence to suggest they have benefitted from ecosystem enhancement through the use of artificial structures and such is neither practical nor appropriate for these crab species. As such, supporting clause 8.13 is not applicable.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism in place for identifying potential for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. This mechanism ensures that where artificial structures are deemed appropriate, environmental protection, safety, and navigation are considered in their application.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *This mechanism has been applied to the stocks under consideration, resulting in the conclusion to either use artificial structures, or that artificial structures are inappropriate. Care has been taken in the selection of materials to use in constructing artificial reefs, the selection of sites for their deployment, and to ensure that relevant conventions concerning the environment and the safety of navigation have been observed.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that where appropriate, policies are developed for increasing stock populations and enhancing fishing opportunities through the use of artificial structures. The fishery management organization shall also ensure that, when selecting the materials to be used in the creation of artificial reefs, as well as when selecting the geographical location of such artificial reefs, the provisions of relevant international conventions concerning the environment and the safety of navigation are observed. Examples may include various laws, data and reports.*		☐
EVIDENCE:		
References:		

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10				

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	Low/Medium/High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Critical NC/Major NC/Minor NC/Full Conformance
Non-conformance Number (if applicable):	

9.4.2 Fundamental Clause 9. Appropriate standards of fishers' competence

Fishing operations shall be carried out by fishers with appropriate standards of competence in accordance with international standards, guidelines and regulations.

9.4.2.1 Supporting Clause 9.1.

9.1.	**States shall advance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There are implemented education programs for fishers (e.g., health and safety, fisheries management framework, rule and regulation, etc.).*		☑
EVIDENCE: Advanced education and training programs are readily available and required by fishers to enhance their skills and professional qualifications. Some of these programs are as follows: North Pacific Fishing Vessel Owners Association (NPFVO). AVTEC-Institute Alaska's of Technology Alaska Marine Safety Education Association's (AMSEA) marine safety instruction		
Current status/Appropriateness/Effectiveness: *These programs are effective in training fishers, in line with international standards and guidelines.*		☑
EVIDENCE: Many professional crab fishing vessel crew members must pass a large and diverse training program provided by the North Pacific Fishing Vessel Owners Association (NPFVO). Firefighting on a ship, damage control, man-overboard, MARPOL, and other topics are covered in training[133]. Through a Coast Guard-mandated program on emergency exercises, the Sitka-based Alaska Marine Safety Education Association has trained over 10,000 fishermen in marine safety and survival. AVTEC-Institute Alaska's of Technology[134] is part of the Alaska Department of Labor and Workforce Development. The Alaska Maritime Training Center is one of its main sections. Its mission is to promote safe maritime operations by efficiently training captains and crew members for jobs in Alaska's maritime industry. The Alaska Maritime Training Center is a United States Coast Guard-approved instruction facility that provides maritime training in accordance with USCG/STCW regulations (STCW is the international Standards of Training, Certification, & Watchkeeping). Customized training is available in addition to the standard courses to fulfill the specific demands of maritime companies. Their world-class ship simulator, state-of-the-art computer-based navigational laboratory, and modern classrooms equipped with the latest instructional delivery technology are used to deliver courses. The Center's objective is to equip Alaskans with the skills and technical knowledge they need to succeed in the state's ever-changing marine industry. The Alaska Maritime Training Center has a collaboration with the Maritime Learning System to provide mariners with online training for entry-level USCG licenses, endorsements, and renewals in a number of courses, in addition to their on-campus classroom training. The University of Alaska Sea Grant Marine Advisory Program[135] (MAP) offers education and training in a variety of fishing-related areas. The Alaska Young Fishermen's Summit is also organized by MAP. Each session is a three-day intensive training covering all areas of Alaska fisheries and is aimed at young Alaskans from coastal villages. In addition, through courses and		

[133] http://www.npfvoa.org
[134] http://www.avtec.edu/AMTC.htm
[135] http://seagrant.uaf.edu/map/fishbiz/index.php

9.1.	**States shall advance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs shall take into account agreed international standards and guidelines.**

workshops established in collaboration with local communities and CDQ groups, MAP provides training and technical assistance to fishermen and seafood processors in Western Alaska.

Commercial fishers, subsistence boaters, and leisure boaters can all benefit from the Alaska Marine Safety Education Association's (AMSEA) marine safety instruction. The US Coast Guard accepts AMSEA's Fishing Vessel Drill Conductor Trainings as meeting the training requirements for fishermen onboard commercial fishing vessels[136].

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States enhance, through education and training programs, the education and skills of fishers and, where appropriate, their professional qualifications. Such programs take into account agreed international standards and guidelines. Examples may include various data, websites.*	☑

EVIDENCE:
North Pacific Fishing Vessel Owners association (NPFVO). https://npfvoa.org/
AVTEC-Alaska's Institute of Technology. https://avtec.edu/AMTC.htm
University of Alaska Sea Grant Marine Advisory Program (MAP). https://alaskaseagrant.org/marine-advisory/, http://fishbiz.seagrant.uaf.edu
Alaska Marine Safety Education Association (AMSEA) - Safety and Survival Training. https://www.edumaritime.net/alaska/alaska-marine-safety-education-association-amsea-sitka

References:								
Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x 3**	**)**	**=**	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[136] http://amsea.org

9.4.2.2 Supporting Clause 9.2.

9.2.	States, with the assistance of relevant international organizations, shall endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF (1995), as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There are relevant measures of the FAO CCFR and other applicable environmental and other standards being exposed to fishers for their training.*	☑
EVIDENCE: All those engaged in BSAI crab fishing operations are provided information on the most important provisions of the FAO CCRF (1995), as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations, as part of required education and training.	
Current status/Appropriateness/Effectiveness: *These programs are effective in training fishers, in line with international standards, guidelines, and key CCRF principles. The presence of general training programs for fishermen (e.g., health and safety, fisheries management framework, rule and regulation, etc.) shall be evidence that the key principles of the CCRF have been filtered down from management to fishermen. Furthermore, the existence of laws and regulation with which fishermen are compliant demonstrate further compliance to this clause.*	☑
EVIDENCE: Alaska's fisheries are fully compliant with the FAO Code of Conduct for Responsible Fisheries. All engaged in fishing operations undergo required training, as per evidence provided in supporting clause 9.1. During their training they also become familiar with the FAO CCFR and other standards associated with responsible fishing operations. Related information can be found at the link provided below in references[137].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States, with the assistance of relevant international organizations, endeavor to ensure, through education and training, that all those engaged in fishing operations be given information on the most important provisions of the FAO CCRF, as well as provisions of relevant international conventions and applicable environmental and other standards that are essential to ensure responsible fishing operations. Examples may include various data, websites.*	☑
EVIDENCE: Related information can be found at the link provided, https://www.alaskaseafood.org/rfm-certification/.	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[137] http://sustainability.alaskaseafood.org/fao

9.4.2.3 Supporting Clause 9.3.

9.3.	**The fishery management organization shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their State's laws.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a system to collect and maintain fisher records.* *Current Status/Appropriateness/Effectiveness:* *Evidence Basis:*		☑
EVIDENCE: Records of all BSAI crab fishers are maintained as part of license and permit programs which contain information on their service and qualifications, including certificates of competency. The Restricted Access Management Program (RAM) is in charge of overseeing permit systems in the Alaska Region, including those that restrict access to federally regulated fisheries in the North Pacific. RAM's duties include informing the public about the program, determining eligibility and issuing permits, processing transfers, collecting landing fees, and other associated tasks the Alaska Commercial Fisheries Entry Commission (CFEC) issues permits and vessel licenses to authorized individuals, as well as providing due process hearings and appeals as needed.		
Current status/Appropriateness/Effectiveness: *These records are considered accurate and effective for management purposes.*		☑
EVIDENCE: The Restricted Access Management Program (RAM)[138] is in charge of overseeing permit systems in the Alaska Region, including those that restrict access to federally regulated fisheries in the North Pacific. RAM's duties include informing the public about the program, determining eligibility and issuing permits, processing transfers, collecting landing fees, and other associated tasks. Groundfish and crab licenses from the License Limitation Program (LLP) are accessible online through the RAM. By limiting the number of fishermen who can participate, the Alaska Commercial Fisheries Entry Commission (CFEC)[139] strives to safeguard and maintain the economic health of Alaska's commercial fisheries. In both limited and unlimited fisheries, the CFEC issues permits and vessel licenses to authorized individuals, as well as providing due process hearings and appeals as needed. All fishermen data for which fishing permits are issued are kept on the RAM and CFEC websites. For IFQ, fishermen must have a CFEC gear card as well as a RAM permission. Links to related information can be found in the references section below.		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization maintains, as appropriate, records of fishers which, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their national laws. Examples may include various data or reports.*		☑
EVIDENCE: The Restricted Access Management Program (RAM), https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/restricted-access-management-program The Alaska Commercial Fisheries Entry Commission (CFEC), https://www.cfec.state.ak.us/annrpts/AR2019.pdf		
References:		

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10

[138] https://www.fisheries.noaa.gov/alaska/sustainable-fisheries/restricted-access-management-program
[139] https://www.cfec.state.ak.us/annrpts/AR2019.pdf

9.3.	The fishery management organization shall, as appropriate, maintain records of fishers which shall, whenever possible, contain information on their service and qualifications, including certificates of competency, in accordance with their State's laws.

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.3 Fundamental Clause 10. Effective legal and administrative framework

An effective legal and administrative framework shall be established, and compliance ensured, through effective mechanisms for monitoring, surveillance, control, and enforcement for all fishing activities within the jurisdiction.

9.4.3.1 Supporting Clause 10.1.

10.1.	**Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There are clear mechanisms established for fisheries monitoring, surveillance, control, and enforcement.*	☑
EVIDENCE: Between the USCG and the AWT, there is a coordinated effort focusing on at-sea enforcement. Both state and federal laws must be enforced under combined supervision, and both state and federal agents actively perform at-sea enforcement. The USCG is in charge of enforcing the major federal vessel rules, such as safety at sea, narcotics enforcement, vessel compliance with ESA and EFH requirements, and ensuring that federal permits, observer coverage, licenses, and VMS in the crab fisheries are all in order. AWT has vessels capable of conducting at-sea compliance with gear laws, hauling and confiscating crab pots, sampling crab harvests at sea, ensuring that sex and size standards are satisfied, and ensuring that the vessels have all requisite state and federal licenses. Additionally, AWT, in collaboration with ADFG area biologists and technicians, inspects vessels dockside, conducts hold inspections, and monitors harvested crab offloads for compliance.	
Current status/Appropriateness/Effectiveness: *These mechanisms are effective, and include effective observer programs, inspection schemes, and vessel monitoring systems where appropriate for the type of fishery under assessment. Monitoring, surveillance, control, and enforcement mechanisms can be considered effective if they are sufficiently broad to cover the entirety of the unit of certification, there is evidence that rules and regulations are consistently enforced, and there is no evidence of frequent or widespread violation of fishery regulations. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified. With respect to fisheries on the high seas, the legal obligations of UNCLOS and UNFSA have particular relevance. Evidence of the performance of the legal framework can be derived from assessing conformance with requirements covering compliance and enforcement. Specifically, the assessment team shall document the general level/type of fisheries controls (e.g., number of boarding's, reprimands) and the respective level of fisheries violations (e.g., %) on a yearly basis.*	☑
EVIDENCE: Between the USCG and the AWT, there is a coordinated effort focusing on at-sea enforcement. Both state and federal laws must be enforced under combined supervision, and both state and federal agents actively perform at-sea enforcement. The USCG is in charge of enforcing the major federal vessel rules, such as safety at sea, narcotics enforcement, vessel compliance with ESA and EFH requirements, and ensuring that federal permits, observer coverage, licenses, and VMS in the crab fisheries are all in order. AWT has vessels capable of conducting at-sea compliance with gear laws, hauling and confiscating crab pots, sampling crab harvests at sea, ensuring that sex and size standards are satisfied, and ensuring that the vessels have all requisite state and federal licenses. Additionally, AWT, in collaboration with ADFG area biologists and technicians, inspects vessels dockside, conducts hold inspections, and monitors harvested crab offloads for compliance. The entire crab collection is carried out by American vessels in Alaskan seas. In Alaska's EEZ, no foreign fleets are permitted to fish. The majority of IFQ/IPQ breaches, as well as size, sex, and season violations, are enforced at offloading since the fisheries was rationalized in 2005.	

10.1.	Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.

Crab regulations are primarily enforced at sea by the NMFS Office of Law Enforcement, which uses the United States Coast Guard's at-sea platforms, and ashore by the NMFS Office of Law Enforcement and the State of Alaska's Division of Wildlife Troopers (AWT). The AWT vessel E/V Stinson also undertakes at-sea enforcement, checking gear and catch for legal specifications, but it spends roughly 90% of its time on dockside enforcement of offloaded crab. Alaska fisheries rules and regulations are enforced by the United States Coast Guard (USCG) and the National Marine Fisheries Service (NMFS) Office of Law Enforcement (OLE).

Table 15. Summary of USGG Enforcement Activities 2017-2019.

	2017	2018	2019	2020
Bristol Bay Red King Crab Boardings	7	0	9	5
Violations	0	0	0	0
St. Mathew Blue King Crab Boardings	0	0	0	0
Violations	0	0	0	0
Tanner Crab, Bering Sea Snow Boardings	3	5	3	5
Violations	1	0	0	1
Tanner Crab, Bairdi Boardings	0	1	1	0
Violations	0	0	0	0
Aleutian Island Golden King Crab Boardings	1	2	3	3
Violations	0	0	0	0

Violations:
2017- Expired visual distress signals
2020- Expired visual distress signals

NOAA OLE
NOAA's Office of Law Enforcement is in charge of enforcing the law Special Agents and Enforcement Officers help safeguard and conserve the nation's living marine resources by performing a number of activities. OLE special agents and enforcement officers board fishing vessels at sea and perform extra patrols on land, in the air, and at sea in collaboration with other local, state, and federal agencies to enforce these regulations. The crab rationalization program is enforced by the Office of Legal Enforcement (OLE). OLE officers also inspect and cross-check records at landings and processors for reconciliation, and they keep a careful eye on Prohibited Species Catch in non-crab fisheries.

OLE Special Agents and Enforcement Officers undertake complicated criminal and civil investigations, board fishing vessels at sea, examine fish processing factories, review internet sales of wildlife products, and patrol on land, air, and sea. NOAA Agents and Officers have the option of assessing civil fines directly to the violation in the form of Summary Settlements (SS) or referring the case to the Office of General Counsel for Enforcement and Litigation at NOAA (GCEL).

AWT
The C Detachment of the Alaska Wildlife Troopers covers the Island of Kodiak, King Salmon, Dillingham, and the Aleutian Islands. Detachment headquarters is located in Kodiak and under the command by a Lieutenant, Sergeants in Dutch Harbor, King Salmon, and Kodiak assist with the overall supervision of this region. Posts within the region include: Dutch Harbor, Kodiak, Dillingham, King Salmon, Iliamna, and Cold Bay (Seasonal Posting). This detachment has enforcement responsibility for Commercial Fisheries in Salmon, Herring, Crab, and Ground fish.

10.1.	**Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.**

<u>Description of AWT enforcement activities</u>

Inspections of crab at the port during product offloads to processing facilities are the focus of enforcement. Enforcement officers search for crab of the proper species, sex, and size allowed by rule during the fishing season. The tunnel dimensions of the pot, which are required by regulation for the crab species being targeted, control bycatch of crab and non-crab species. The usage of crab pots with precise tunnel eye opening diameters where the crab crawl into the pots reduces bycatch of diverse crab species among targeted crab. Because of the size of their carapaces, other crab species are prevented from entering the pots. All crab is then sorted by the fisherman, who keep the crabs while discarding any unlawful or undersized crabs or fish caught alive at sea. It is extremely rare to see by catch of non-crab species such as halibut or other finfish in an active fishing crab pot over many years of Enforcement's inspection of crab pot gear on the fishing grounds.

Crab pot gear for the Red, Tanner, and Golden crab fisheries is inspected at sea and on land to ensure compliance with established requirements. Enforcement examines gear for criteria such as escape mechanisms if the pot is lost, escape rings or mesh size to allow small immature crabs to filter out of the pots during fishing, and legality. Tunnel eye perimeter holes, as well as identification markings on the buoys of the vessel that is operating the gear. Only five vessels actively fish for Golden King Crabs, which are caught using long lined pots. Because of the way it is fished, this gear can only be inspected on the fishing vessel that is operating it or on the shore. Enforcement receives or finds very few reports of illicit fishing activity in the Golden King Crab Fishery due to the exceptionally low number of active fishers and active contact between vessel operators and State fishery management.

Overall, crab fisheries in Bristol Bay, the East Bering Sea, and St. Mathew Island have moderate to high levels of compliance.

<u>Reported Violations for BSAI Crab from 2017-2019</u>

BB Red King:
2017 1 vessel cited for illegal escape mechanism on pot gear
2017 1 vessel cited for illegal sized escape mesh on pot gear
2018 1 vessel cited for taking crab less than legal size
2019 1 vessel cited for taking crab less than legal size
2020 1 vessel cited for taking Red King Crab without first registering with ADF&G

Golden King Crab:
2020 2 vessels cited for taking crab less than legal size

Bairdi Tanner:
2018 1 vessel cited for failing to register prior to fishing
2019 1 vessel cited for failing to register prior to fishing

No reported violations found for Snow Crab and Blue King Crab fisheries.

Crab Observer Program

The ADFG has required various levels of observer coverage aboard vessels participating in the BSAI crab harvests since 1988. The ADFG Observer report for 2013/2014 summarizes commercial crab fisheries as observed by crab observers on floating-processor vessels, catcher-processor vessels, and catcher vessels, as well as historical data for comparison. Estimates of CPUE, as well as information on the size and shell quality of both captured and kept crabs, are included in the primary data summaries. Catch rates by soak duration and depth, female reproductive state, sampled pot lift locations, species composition of sampled pot lifts, and overall legal tally results are among the additional details.

10.1.	**Effective mechanisms shall be established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher, or community approaches, provided their performance could be objectively verified.**

Dockside inspections

The majority of crab data comes from a dockside sampling operation. ADFG employees supply dockside samplers (port samplers) as an independent data source for evaluating the accuracy of CPUE estimations for retained lawful crab. They'll also contact AWT if a violation is discovered during an inspection. Prior to each fishing season, ADFG technicians and Wildlife Troopers inspect pots and vessel holding tanks.

Vessel Monitoring System

Any vessel used to harvest crab in the rationalized crab fisheries must have a functioning VMS transmitter on board. The VMS must be transmitting when the following two conditions are met:

- the vessel is operating in any reporting area off Alaska; and,
- the vessel has crab pots or crab pots hauling equipment, or a crab pot launcher onboard

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate those effective mechanisms are established for fisheries monitoring, surveillance, control, and enforcement measures including, where appropriate, observer programs, inspection schemes, and vessel monitoring systems, to ensure compliance with the conservation and management measures for the fishery in question. This could include relevant traditional, fisher or community approaches, provided their performance could be objectively verified. Examples may include rules and regulations, enforcement reports.*	☑

EVIDENCE:

NOAA Enforcement Report, https://meetings.npfmc.org/CommentReview/DownloadFile?p=4f3b5b44-2eaf-49e2-b84e-934d71e37e5e.pdf&fileName=B4%20NOAA%20OLE%20Report.pdf

17th US COAST GUARD DISTRICT ENFORCEMENT REPORT, https://meetings.npfmc.org/CommentReview/DownloadFile?p=f304112c-809f-422c-820d-5cfae801fffd.pdf&fileName=B6%20USCG%20Report.pdf

Alaska Wildlife troopers, https://dps.alaska.gov/AWT/detachments

Gaeuman, W. B. 2014. Summary of the 2013/2014 mandatory crab observer program database for the Bering Sea/Aleutian Islands commercial crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 14-49, Anchorage, http://www.adfg.alaska.gov/fedaidpdfs/FDS14-49.pdf

References:							
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x	3)	=	**Overall score**
	10		**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)							High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)							Full Conformance
Non-conformance Number (if applicable):							

9.4.3.2 Supporting Clause 10.2.

10.2.	**Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism or system established to maintain a record of fishing authorizations.*	☑
EVIDENCE: According to federal laws, 50CFR679, all vessels collecting BSAI crab must be authorized and permitted to fish. A Federal Crab Vessel Permit is required for all crab vessels participating in the BSAI rationalized crab fishery (FCVP). Vessels participating in directed fishing for LLP groundfish species in the GOA or BSAI, or fishing in any BSAI LLP crab fisheries, must have a Federal LLP license as of January 1, 2000.	
Current status/Appropriateness/Effectiveness: *This mechanism is effective for maintaining updated records of fishing authorizations and ensuring fishing vessels operate with appropriate authorization.*	☑
EVIDENCE: According to federal laws, 50CFR679[140], all vessels harvesting BSAI crab must be authorized and permitted to fish. Without specific permission, fishing vessels are not permitted to operate on the resource in question. A Federal Crab Vessel Permit (FCVP)[141] is required for all crab vessels participating in the BSAI rationalized crab fishery. Owners of any vessel engaged in the rationalized crab fisheries (CR crab, including IFQ/IPQ fisheries; CDQ fisheries except Norton Sound king crab; and the golden king crab allocation to Adak) are required to submit an annual FCVP. SFP (Stationary Floating Processor), CPR (catcher-processor), and CAT (Catch-and-Transfer) are the three types of operation endorsements (catcher vessel). This permit has VMS and logbook reporting requirements. A copy of the permit must be carried on board any fishing vessel and must be available for examination by an authorized officer at any time. Vessels participating in directed fishing for LLP groundfish species in the GOA or BSAI, or fishing in any BSAI LLP crab fisheries, must have a Federal LLP license as of January 1, 2000[142]. An original LLP license that is onboard the vessel must be used to name the vessel.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels are not allowed to operate on the stock under consideration in question without specific authorization. Examples may include various data.*	☑
EVIDENCE: Regulations: PART 679—FISHERIES OF THE EXCLUSIVE ECONOMIC ZONE OFF ALASKA, https://www.ecfr.gov/cgi-bin/text-idx?SID=e928699f8903a416bed34b9bcaae6903&mc=true&node=pt50.13.679&rgn=div5 Federal Crab Vessel Permit (FCVP), https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska License Limitation Program (LLP), https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10							**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High

140 https://www.ecfr.gov/cgi-bin/text-idx?SID=e928699f8903a416bed34b9bcaae6903&mc=true&node=pt50.13.679&rgn=div5
141 https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska
142 https://www.fisheries.noaa.gov/alaska/commercial-fishing/permits-and-licenses-issued-alaska

10.2.	Fishing vessels shall not be allowed to operate on the stock under consideration in question without specific authorization.

Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.3.3 Supporting Clause 10.3.

10.3.	**States involved in the fishery shall, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside the States jurisdiction.**
Relevance:	Not relevant. **Note.** Not applicable if the fishery does not occur outside the State's EEZ.
	This Clause is not relevant because the crab fisheries under assessment here are harvested exclusively within the Alaska EEZ only. Those fisheries are not part of any international agreement or part of a framework of sub-regional or regional fisheries management organizations or arrangements

Evaluation Parameters	**Met?**
Process: *There is a mechanism or system established to conduct enforcement operations outside the State's jurisdiction.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *transboundary, shared, straddling, highly migratory or high seas, then the Standard need only be concerned with the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level for the fishery of which the unit of certification is a part. If the unit of certification is part of a States fleet fishing on a transboundary, shared, straddling, highly migratory or high seas stock, then it is still likely to be the effectiveness and suitability of the monitoring, surveillance, control, and enforcement activities at the States level that shall be assessed. If the unit of certification covers all the fishing on the stock under consideration, then the monitoring, surveillance, control, and enforcement of all of the States fleets is of concern and shall be assessed (to ensure full consideration of total fishing mortality on the stock under consideration).*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States involved in the fishery do, in accordance with international law, and within the framework of fisheries management organizations or arrangements, cooperate to establish systems for monitoring, control, surveillance, and enforcement of applicable measures with respect to fishing operations and related activities in waters outside their States jurisdiction. Examples may include enforcement reports.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	**(**	**Number of EPs NOT met**	x 3	**)**	=	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.4.3.4 Supporting Clause 10.3.1.

10.3.1.	**Fishery management organizations which are members of or participants in fisheries management organizations or arrangements, shall implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities that undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States shall also proceed, as necessary, to assist other States in achieving the objectives of the FAO CCRF (1995), and should make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State.**
Relevance:	Not relevant. **Note:** Not applicable if the fishery does not occur outside the State's Exclusive Economic Zone.
	This Clause is not relevant because the crab fisheries under assessment here are harvested exclusively within the Alaska EEZ only. Those fisheries are not part of any international agreement or part of a framework of sub-regional or regional fisheries management organizations or arrangements.

Evaluation Parameters	**Met?**
Process: *There are regulations established against vessels flying the flag of non-member or non-participant States, which may engage in activities that undermine the effectiveness of conservation and management measures established by fisheries management organizations.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *These measures are effective in deterring such practices.*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organizations which are members of or participants in fisheries management organizations or arrangements implement internationally agreed measures adopted in the framework of such organizations or arrangements and consistent with international law to deter the activities of vessels flying the flag of non-members or non-participants engaging in activities which undermine the effectiveness of conservation and management measures established by such organizations or arrangements. In that respect, port States also proceed, as necessary, to achieve and to assist other States in achieving the objectives of the FAO CCRF, and make known to other States details of regulations and measures they have established for this purpose without discrimination for any vessel of any other State. Examples may include enforcement or other reports.*	☐
EVIDENCE:	

References:									
Numerical score:	**Starting score**	–	**(**	**Number of EPs NOT met**	x	3	**)**	=	**Overall score**
	10								
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									
Non-conformance Number (if applicable):									

9.4.3.5 Supporting Clause 10.4.

10.4.	**Flag States shall ensure that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish.**	
Relevance:	Not relevant. **Note:** Not applicable if no foreign vessels fish in the State's EEZ, or if its vessels do not fish in high seas or in another State's EEZ.	
	This Clause is not relevant because the entire crab harvests are conducted in Alaskan waters by American vessels. No foreign fleet is allowed to fish in the Alaska's EEZ. All fishing vessels must be at least 75% U.S. ownership.	
Evaluation Parameters		**Met?**
Process: *There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *These vessels have been issued with a Certificate of Registry and they are required to carry it on board.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the flag State ensures that no fishing vessels are entitled to fly their flag, fish on the high seas or in waters under the jurisdiction of other States, unless such vessels have been issued with a Certificate of Registry and have been authorized to fish by the competent authorities. Such vessels shall carry on board the Certificate of Registry and their authorization to fish. Examples may include various laws, regulations, and other data or reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	–	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10								
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									
Non-conformance Number (if applicable):									

9.4.3.6 Supporting Clause 10.4.1.

10.4.1.	**Fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State shall be marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels.**	
Relevance:	Not relevant. **Note:** Not applicable if no foreign vessels fish in the State's EEZ or if its vessels do not fish in high seas or in another State's EEZ.	
	This Clause is not relevant because the entire crab harvests are conducted in Alaskan waters by American vessels. No foreign fleet is allowed to fish in the Alaska's EEZ. All fishing vessels must be at least 75% U.S. ownership.	
Evaluation Parameters		**Met?**
Process: *There are foreign vessels fishing in State's EEZ. State's EEZ vessels do not fish in high seas or in another State's EEZ.*		☐
EVIDENCE:		
Current status/Appropriateness/Effectiveness: *Foreign vessels authorized to fish in the State's EEZ or its vessels fishing in another State's EEZ have been marked accordingly to international guidelines.*		☐
EVIDENCE:		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that fishing vessels authorized to fish on the high seas or in waters under the jurisdiction of a State other than the flag State, are marked in accordance with uniform and internationally recognizable vessel marking systems such as the FAO Standard Specifications and Guidelines for Marking and Identification of Fishing Vessels. Examples may include various laws, regulations, and other data or reports.*		☐
EVIDENCE:		
References:		

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10				

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	
Non-conformance Number (if applicable):	

9.4.4 Fundamental Clause 11. Framework for sanctions

There shall be a framework for sanctions for violations and illegal activities of adequate severity to support compliance and discourage violations.

9.4.4.1 Supporting Clause 11.1.

11.1.	**States laws of adequate severity shall be in place that provide for effective sanctions.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *The system of States laws is of adequate severity to provide for effective sanctions.*		☑
EVIDENCE: The Magnuson-Stevens Act (MSA) provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy). In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator. On March 16, 2011, NOAA issued a new Penalty Policy that provided guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA.		
Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that States laws are of adequate severity to provide for effective sanctions. The evidence here includes largely (a) whether laws set out effective penalty provisions and the courts respond in a manner that deters further or repeat offenses, (b) the views of the industry, other stakeholders, and the general public, and (c) the outcomes and associated trends of the enforcement efforts when measured against appropriate performance indicators.*		☑
EVIDENCE: The Magnuson-Stevens Act (MSA)[143] provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy): 1. Issuance of a citation (a type of warning), usually at the scene of the offense (see 15 CFR part 904, subpart E). 2. Assessment by the Administrator of a civil money penalty. 3. For certain violations, judicial forfeiture action against the vessel and its catch. 4. Criminal prosecution of the owner or operator for some offenses. In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. In sum, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator. On March 16, 2011, NOAA issued a new Penalty Policy that provided guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA. In that Policy, the NOAA General Counsel's Office committed to periodic review of the Penalty Policy to consider revisions or modifications as appropriate. The July 2014 revised version of the Penalty Policy is a result of that review. The purpose of the 2014 Policy is to ensure that; 1. civil administrative penalties and permit sanctions are assessed in accordance with the laws that NOAA enforces in a fair and consistent manner; 2. penalties and permit sanctions are appropriate for the gravity of the violation;		

[143] https://www.law.cornell.edu/cfr/text/50/600.740

11.1.	States laws of adequate severity shall be in place that provide for effective sanctions.

3. penalties and permit sanctions are sufficient to deter both individual violators and the regulated community as a whole from committing violations;
4. economic incentives for noncompliance are eliminated; and
5. compliance is expeditiously achieved and maintained to protect natural resources.[144]191

Under the new revised Policy, NOAA expects to continue to promote consistency at a national level, provide greater predictability for the regulated community and the public, maintain transparency in enforcement, and more effectively protect natural resources.

For significant violations, the NOAA attorney may recommend charges under NOAA's civil administrative process (see 15 C.F.R. Part 904), through issuance of a Notice of Violation and Assessment of a penalty (NOVA), Notice of Permit Sanction (NOPS), Notice of Intent to Deny Permit (NIDP), or some combination thereof. Alternatively, the NOAA attorney may recommend that there is a violation of a criminal provision that is sufficiently significant to warrant referral to a U.S. Attorney's office for criminal prosecution.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that States laws of adequate severity are in place that provide for effective sanctions. Examples may include various laws, regulations, and other data or reports.*	☑

EVIDENCE:
NOAA Enforcement Policy 50CFR600.740 Enforcement policy, https://www.law.cornell.edu/cfr/text/50/600.740

Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions. NOAA Office of the General Counsel – Enforcement Section, https://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x 3	)	=	**Overall score**
	10			**0**				**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								Full Conformance
Non-conformance Number (if applicable):								

[144] https://www.gc.noaa.gov/documents/Penalty%20Policy_FINAL_07012014_combo.pdf

9.4.4.2 Supporting Clause 11.2.

11.2.	Sanctions applicable to violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force to affect authorization to fish and/or to serve as masters or officers of a fishing vessel in the event of noncompliance with conservation and management measures.
Relevance:	Relevant

Evaluation Parameters	Met?
Process: *The system of sanctions in place is sufficiently severe to deter violations and illegal activities. The system shall be considered adequate in severity if the potential sanctions include fines, suspension or withdrawal of permission to fish, and confiscation of catch or equipment.*	☑

EVIDENCE:

The Magnuson-Stevens Act (50CFR600.740 Enforcement policy) provides four basic enforcement remedies for violations as described in Evidence (below). In some cases, the Magnuson-Stevens Act requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine. The 2011 Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions issued by NOAA Office of the General Counsel – Enforcement and Litigation, provides guidance for the assessment of civil administrative penalties and permit sanctions under the statutes and regulations enforced by NOAA.

Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that sanctions for violations of regulations (e.g., suspension, withdrawal, or refusals of fishing permit or of the right to fish) are adequate in severity to secure compliance and discourage violations.*	☑

EVIDENCE:

The MSA provides four basic enforcement remedies for violations (50CFR600.740 Enforcement policy):

1. Issuance of a citation, usually at the scene of the offense (see 15 CFR part 904, subpart E).
2. Assessment by the Administrator of a civil money penalty.
3. For certain violations, judicial forfeiture action against the vessel and its catch.
4. Criminal prosecution of the owner or operator for some offenses.

In some cases, the MSA requires permit sanctions following the assessment of a civil penalty or the imposition of a criminal fine (Figure 27 Magnuson Stevens Penalty Matrix). In summary, the MSA treats sanctions against the fishing vessel permit to be the carrying out of a purpose separate from that accomplished by civil and criminal penalties against the vessel or its owner or operator.

NOAA’s OLE Agents and Officers can assess civil penalties directly to the violator in the form of Summary Settlements (SS) or can refer the case to NOAA's Office of General Counsel for Enforcement and Litigation (GCEL). GCEL can then assess a civil penalty in the form of a Notice of Permit Sanctions (NOPs) or Notice of Violation and Assessment (NOVAs), or they can refer the case to the U.S. Attorney's Office for criminal proceedings. For perpetual violators or those whose actions have severe impacts upon the resource criminal charges may range from severe monetary fines, boat seizures and/or imprisonment may be levied by the United States Attorney's Office.

11.2.	**Sanctions applicable to violations and illegal activities shall be adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions shall also be in force to affect authorization to fish and/or to serve as masters or officers of a fishing vessel in the event of noncompliance with conservation and management measures.**

Magnuson-Stevens Penalty Matrix

	Level of Intent			
Harm to the Resource or Regulatory Program, Offense Level	A Unintentional	B Negligent	C Reckless	D Willful
I	Written warning-$1,000	Written warning-$1,500	Written warning-$2,000	Written warning-$2,500
II	Written warning-$2,000	$2,000-$5,000	$5,000-$10,000	$10,000-$15,000
III	$2,000-$5,000	$5,000-$10,000	$10,000-$15,000	$15,000-$25,000
IV	$5,000-$15,000	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000-$80,000 and permit sanction of 20-60 days*
V	$15,000-$25,000	$25,000-$50,000 and permit sanction of 10-20 days*	$50,000- $80,000 and permit sanction of 20-60 days*	$60,000- $100,000 and permit sanction of 60-180 days*
VI	$25,000-$50,000	$50,000-$80,000 and permit sanction of 20-60 days*	$60,000-$100,000 and permit sanction of 60-180 days*	$100,000-statutory maximum and permit sanction of 1 year-permit revocation*

Figure 32. Magnuson Stevens Penalty Matrix.

There are very few repeat offenders. Sanctions include the possibility of temporary or permanent revocation of fishing privileges. Withdrawal or suspensions of authorizations to serve as masters or officers of a fishing vessel are also among the enforcement options. Within the USA EEZ, penalties can range up through forfeiture of the catch to forfeiture of the vessel, including financial penalties and prison sentences.

Finally, the cooperation of citizens and industry is cultivated through programs such as AWT's Fish & Wildlife Safeguard program, which encourages the reporting of violations, and "leverages" the range of enforcers.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that, sanctions applicable in respect of violations and illegal activities are adequate in severity to be effective in securing compliance and discouraging violations wherever they occur. Sanctions are in force that affects authorization to fish and/or to serve as masters or officers of a fishing vessel, in the event of non-compliance with conservation and management measures. Examples may include various laws, regulations, and other data or reports.*	☑

EVIDENCE:
Policy for the Assessment of Civil Administrative Penalties and Permit Sanctions NOAA Office of the General Counsel – Enforcement Section, https://www.gc.noaa.gov/documents/enforcement/draft-penalty-policy.pdf
Alaska Wild Troopers Fish and Wildlife Safeguard,
https://dps.alaska.gov/awt/safeguard#:~:text=Wildlife%20Safeguard's%20purpose%20is%20to,Troopers%20related%20to%20this%20program%3F

References:									
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)									High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)									Full Conformance
Non-conformance Number (if applicable):									

9.4.4.3 Supporting Clause 11.3.

11.3.	**Fisheries management organizations shall ensure that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. Fisheries management organizations shall ensure the consistent and transparent application of sanctions.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *The system of sanctions in place are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions.*	☑
EVIDENCE: All commercial catch of crab in Alaska must be reported to ADFG through Fish Tickets or eLandings documentation, within 7 days of landing or first purchase of the resource. As such, all legal commercial crab catch in Alaska is reported. Sanctions for illegal commercial harvest of crab in Alaska are severe, and established through the state's Fish and Game Code AS 16.5, with pertinent detail provided through AS 16.43.850 – as 16.43.880230. Penalties include fines, prison time, suspension of permits, as well as seizure of catch, gear and/or vessel.	
Current status/Appropriateness/Effectiveness: *There is evidence to substantiate that sanctions for violations of regulations are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. Sanctions are applied transparently and consistently across the board.*	☑
EVIDENCE: The nature and process of application for sanctions is clearly described in AS 16.43.850, with respect to the number and frequency of violations. Through state statute, Alaska established a system of demerit points attributable to the number and frequency of violations, that result in increasingly severe penalties. A list of individuals with demerit points (all commercial fisheries, including BSAI crab fisheries) is published online and maintained by Alaska's Commercial Fisheries Entry Commission.	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fisheries management organization ensures that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. The fisheries management organization also ensures the consistent and transparent application of sanctions. Examples may include various laws, regulations, and other data or reports.*	☑
EVIDENCE: The online and publicly accessible list of commercial fishermen with demerit points, published by Alaska's Commercial Fisheries Entry Commission, both tracks and discourages participants in the fishery from committing violations. Demerits ultimately result in severe penalties, suspension of fishing permits and use of vessel in the fishery. CFEC will suspend a permit holder's commercial crab fishing privileges for a period of one year if the permit holder accumulates 12 or more demerit points in a consecutive 36-month period as a result of convictions for violations of commercial fishing laws in the BSAI crab fishery. Likewise, a permit will be suspended for two years if 16 or more points are accumulated in a 36-month period, or three years if 18 or more points are accumulated in a 36-month period. AS 16.43.860 states that a permit holder who is suspended from fishing will not be allowed crew in the fishery and will not be able to lease or rent his/her vessel for use in the BSAI crab fishery for which the permit holder's fishing privileges are suspended.	
References:	

11.3.	**Fisheries management organizations shall ensure that sanctions for IUU fishing by vessels and, to the greatest extent possible, nationals under its jurisdiction are of sufficient severity to effectively prevent, deter, and eliminate IUU fishing and to deprive offenders of the benefits accruing from such fishing. This may include the adoption of a civil sanction regime based on an administrative penalty scheme. Fisheries management organizations shall ensure the consistent and transparent application of sanctions.**

Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	

9.4.4.4 Supporting Clause 11.4.

11.4.	**Flag States shall take enforcement measures towards fishing vessels entitled to fly their flag, which have been found by the State to have contravened applicable conservation and management measures. The State shall, where appropriate, make the contravention of such measures an offense under national legislation.**
Relevance:	Not relevant. **Note:** Not applicable if no foreign vessels fish in the State's EEZ or if its vessels do not fish in high seas or in another State's EEZ.
	This clause is not relevant because the entire crab harvests are conducted in Alaskan waters by American vessels. No foreign fleet is allowed to fish in the Alaska's EEZ. All fishing vessels must be at least 75% U.S. ownership.

Evaluation Parameters	**Met?**
Process: *If applicable, the system of enforcement measures is effective for foreign vessels fishing in the State's EEZ or for its vessels fishing in high seas or in another State's EEZ.*	☐
EVIDENCE:	
Current status/Appropriateness/Effectiveness: *There is evidence to substantiate enforcement action in these cases (i.e., boarding, violations).*	☐
EVIDENCE:	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that flag States take enforcement measures with fishing vessels entitled to fly their flag if the vessels have been found by the State to have contravened applicable conservation and management measures. These enforcement measures will include, where appropriate, making the contravention of such measures an offense under national legislation. Examples may include various laws, regulations, and other data or enforcements reports.*	☐
EVIDENCE:	

References:								
Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	) =	**Overall score**
	10							
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)								
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)								
Non-conformance Number (if applicable):								

9.5 Section D: Serious Impacts of the Fishery on the Ecosystem

9.5.1 Fundamental Clause 12. Impacts of the fishery on the ecosystem

Considerations of fishery interactions and effects on the ecosystem shall be based on the best scientific evidence available, local knowledge where it can be objectively verified, and a risk assessment-based management approach for determining most probable adverse impacts. Adverse impacts of the fishery on the ecosystem shall be appropriately assessed and effectively addressed.

9.5.1.1 Supporting Clause 12.1.

12.1.	**The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that allows assessment and monitoring of environmental factors (e.g., climatic, oceanographic) on target and associated species in the same ecosystem, and that assess the relationships between species in the ecosystem.*	☑
EVIDENCE: There is an established process for assessment and monitoring of environmental factors that may impact on BSAI crab stocks and associated species in the same ecosystem, and the relationship between them. The Crab FMP (NPFMC, 2011) specifies a research and management objective that, among other things, aims to define oceanographic conditions important to maximizing productivity of crab stocks. The Council has a process[145] for ranking research priorities. For 2022-2024, two issues of greatest relevance to BSAI crab stocks were: 1) development of stock-specific ecosystem indicators and incorporation into stock assessments; and 2) investigation of spatial distribution and movement of crabs relative to life history events and fishing. Rationale for the latter was to better understand how rapidly changing environmental conditions in the EBS are driving changes in the distribution of commercial crab stocks. NOAA Fisheries prepares annual Ecosystem Status Reports for the Gulf of Alaska, Bering Sea and Aleutian Islands[146]. The purpose of the Alaska Ecosystem Status Reports is to provide stronger links between Alaska ecosystem research and fishery management and spur new understanding of the connections between ecosystem components by bringing together the results of diverse research efforts.	
Current status/Appropriateness/Effectiveness: *There is evidence that assessments have been conducted to determine the impacts of environmental factors on the target and associated or dependent species (to the stock) in the same ecosystems, and on the relationships among these species. The results of these studies are in sufficient detail to allow informed management of the fishery. This requirement is intended to provide information about the current understanding of the overall marine ecosystem structure and relationships among the various species, coupled with environmental monitoring. More information about the effects of the fishery on specific ecosystem components (e.g., associated bycatch and ETPs species interactions, gear-habitat disturbance, ecosystem and food-webs impacts, etc.) are assessed in the following clauses of this section.*	☑
EVIDENCE: Assessments of the impacts of environmental factors on target stocks and species belonging to the same ecosystem are conducted on an annual or more frequent basis. NPFMC and NMFS regularly assess the impacts of environmental factors on BSAI crab stocks (e.g., Crab SAFE; NPFMC, 2020) and other species belonging to the same ecosystem (e.g., BSAI Groundfish SAFE[147]). Ecosystem assessments for BSAI crab fisheries are updated annually in the BSAI Crab SAFE. In 2019, an Ecosystem and Socioeconomic Profile (ESP) was introduced for St. Matthew Blue King Crab stock (Fedewa *et al.*, 2019). In	

[145] https://www.npfmc.org/research-priorities/
[146] https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands
[147] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

12.1.	The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem.

2020, ESPs were included for SMBKC and BBRKC stock assessments (Fedewa *et al.*, 2020a, b). These ESP followed a new standardized framework for evaluating ecosystem and socioeconomic considerations, and may be considered a proving ground for potential operational use in main stock assessments. For a more detailed description of ESPs, see Introductory Section 6.4.

Additionally, the status of habitats and ecosystems are monitored within the broader framework of Alaska's large marine ecosystems and results are updated and published annually (e.g., Siddon, 2020; Ortiz and Zador, 2020). Collectively, these ecosystem assessments consider target stocks, associated or dependent species, and the relationship among populations in the ecosystem.

In 2018, the Council approved the Bering Sea Fisheries Ecosystem Plan (NPFMC, 2019), thereby formalizing its commitment to ecosystem-based fisheries management (EBFM) of the Bering Sea. The Council has acknowledged that moving toward EBFM is an ongoing process and as new information or tools become available the Council will respond by improving the fishery management program. The BS FEP will serve as a framework for continued incorporation of ecosystem goals and actions in regional management. The BS FEP sits alongside the Fishery Ecosystem Plan already developed for the Aleutian Islands (NPFMC, 2007) and it augments ongoing efforts for monitoring ecosystems in the Alaska Region (e.g., Siddon and Zador, 2019; Siddon, 2020).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization assesses the impacts of environmental factors on target and other species belonging to the same ecosystem or associated with or dependent upon the target species, and the relationship among the populations in the ecosystem. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
See references cited above.

References:

Fedewa, E., Garbor-Yonts, B., and Palof, K. 2019 Ecosystem and Socioeconomic Profile of the Saint Matthew Blue King Crab stock in the Bering Sea. September 2019. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

Fedewa, E., Garber-Yonts, B., and Shotwell, K. 2020a. Appendix D. Ecosystem and Socioeconomic Profile of the Saint Matthew Blue King Crab Stock. September 2020. In: Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC. October 2020. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

Fedewa, E., Garber-Yonts, B., and Shotwell, K. 2020b. Appendix E. Ecosystem and Socioeconomic Profile of the Bristol Bay Red King Crab Stock. September 2020. NPFMC. October 2020. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

NPFMC, 2007. Aleutian Islands Fishery Ecosystem Plan. December, 2007. 198 p. https://www.npfmc.org/aleutian-islands-fishery-ecosystem-plan/

NPFMC, 2011. Fishery Management Plan for Bering Sea and Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council. October 2011. 229 p. https://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf

NPFMC, 2019. Bering Sea Fishery Ecosystem Plan. North Pacific Fishery Management Council. January 2019. 133 p. https://meetings.npfmc.org/CommentReview/DownloadFile?p=c334ad33-4139-4b5a-b205-a8b7c5028562.pdf&fileName=D6%20Final%20BS%20FEP%20Jan%202019.pdf

NPFMC, 2020. Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC, Anchorage, AK. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

NPFMC, 2021. NPFMC Research Priorities for 2022 - 2024. 19 p. https://www.npfmc.org/research-priorities/

12.1.	The fishery management organization shall assess the impacts of environmental factors on target stocks and associated or dependent species in the same ecosystem, and the relationship among the populations in the ecosystem.
	Ortiz, I., and Zador, S. (Eds.) 2020. Ecosystem Status Report 2020 Aleutian Islands. Nov 17, 2020. https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea Siddon, E. and Zador, S. (Eds.) 2019. Ecosystem Status Report 2019: Eastern Bering Sea. EBS Ecosystem Status. 223 p. https://apps-afsc.fisheries.noaa.gov/refm/reem/ecoweb/index.php

Numerical score:	Starting score	–	(	Number of EPs NOT met	x	3	)	=	Overall score
	10			0					10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.2 Supporting Clause 12.2.

12.2.	**The most probable adverse impacts from human activities, including fishery effects on the ecosystem/environment, shall be assessed and, where appropriate, addressed and or/corrected, taking into account available scientific information and local knowledge. This may take the form of an immediate management response or a further analysis of the identified risk. In this context, full consideration should be given to the special circumstances and requirements in developing fisheries, including financial and technical assistance, technology transfer, training, and scientific cooperation. In the absence of specific information on the ecosystem impacts of fishing on the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.** **Note:** Clause 12.2 is a non-scoring clause with no associated Evaluation Parameters.

9.5.1.3 Supporting Clause 12.2.1.

12.2.1.	The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on main associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk, the more generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of nontarget fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑
EVIDENCE: The Council, NMFS and ADF&G have established processes for the detection of potentially adverse impacts to nontarget catch/associated species taken in BSAI crab fisheries. In addition, monitoring processes are in place to ensure that potentially adverse impacts to nontarget catch/associated species do not arise in BSAI crab fisheries. ADF&G implements a mandatory observer program for BSAI crab fisheries (Schwenzfeier *et al.*, 2012). Non target catches, including discards of target stocks (females, undersized males) and stocks other than the "stock under consideration" are recorded in an observer database which is maintained by ADF&G (see Gaeuman (2014) for more details on observer sampling methods). Observer results are provided regularly to stock assessment authors who incorporate this information into annual stock assessments.	
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on main associated species (e.g. recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑
EVIDENCE: Fishery management organizations have considered the most probable adverse impacts of BSAI crab fisheries on associated species (NMFS, 2004; Chilton *et al*., 2011). Fishery impacts on associated species are monitored on an ongoing basis through the mandatory observer program (Schwenzfeier *et al*., 2012) and potential impacts are considered during annual stock assessment activities (*e.g.*, NPFMC 2020). The pot gear used for crab in the BSAI is relatively selective and the consensus view among experts is that the primary associated species in the BSAI crab fisheries are non-retained crabs which are species managed under the Crab FMP. Females and sub-legal crabs which are brought up in pots with legal males may account for up to two thirds of the total catch (NMFS, 2004). Non-target crab species are taken together with the target species as well. The preponderance in bycatch of FMP	

12.2.1.	The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

crabs was illustrated in the previous BSAI King and Tanner crab full assessment report (Global Trust, 2017) with observer data summaries from Gaeuman (2014).

For the purposes of the present assessment, however, it was necessary to look more closely at the bycatch data in order to identify breakpoints at 80% and 95% levels in the 'bycatch species profile' (BSP). This was done to comply with RFM guidance Part 3, Appendix 1, of the RFM Standard Version 2.1 which requires the assessment team to use the BSP to distinguish main and minor associated species. Observer data summaries were provided by ADF&G covering the most recent fishing year for which data were available (M. Stichert, pers. comm.). Table 16 summarizes main and minor associated species for each Unit of Assessment. These data support the conclusion that the main associated species in the five units under assessment are FMP crab species.

Table 16. Summary data for main and minor associated species in BSAI crab units of assessment (observer data from ADF&G).

	BBRKC	SMBKC	AIGKC	EBS Snow	EBS Tanner
No. Target	24,740	35,655	75,669	860,855	24,169
No. Non-Target	31,227	63,820	63,505	85,685	30,063
No. Non-Target, FMP Crabs (%)	29,438 (94.3%)	52,218 (81.8%)	55,667 (87.7%)	69,465 (81.1%)	23,934 (79.6%)
No. Non-Target, All Other Taxa (%)	1,789 (5.7%)	11,602 (18.2%)	7,838 (12.3%)	16,220 (18.9%)	6129 (20.4%)
Main* Associated Species	FMP Crabs	FMP Crabs	FMP Crabs	FMP Crabs	FMP Crabs
Minor* Associated Species	snail unident. (1.52%)	snail unident. (7.79%), circumboreal toadcrab (2.99%), Pacific cod (2.32%), hermit crab unident. (1.91%)	brittle star unident. (2.51%), sponge unident. (1.69%), hydroid unident. (1.23%), Distochopora sp. (1.22%), basket star (0.92%)	snail unident. (15.1%)	snail unident. (19.1%)

**RFM guidance identifies main associated species as those taxa contributing to the top 80% of total bycatch in the Bycatch Species Profile (BSP), and minor associated species as those taxa those taxa contributing to the next 15% of total bycatch in the BSP (i.e., taxa representing between 80% and 95% of total bycatch).*

As discussed previously (e.g., Supporting Clause 4.1), all removals and mortalities of FMP crabs - whether from crab fisheries, groundfish fisheries or scallop fisheries - is accounted for in annual stock assessment activities. Accordingly, these catches (including discards) are appropriately monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts were to arise, effective remedial action would be taken.

As illustrated in the BSP summary table (above), the EBS crab fisheries do catch a small number of other species as bycatch. However, these species fall below the BSP 80% threshold for being categorized as 'main' associated species. They are therefore discussed further under Supporting Clause 12.2.2 in relation to minor associated species.

12.2.1.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on main associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these nontarget species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

In addition to the references cited above, the following datasets and/or reports substantiate adequate consideration of UoC impacts on main associated species:

- Detailed observations on catch composition from mandatory crab observer program[148]
- Annual Crab SAFE reports[149]

References:

Barnard, D.R. and R. Burt. 2007. Alaska Department of Fish and Game summary of the 2005/2006 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 07-02, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds07-02.pdf

Barnard, D.R. and R. Burt. 2008. Alaska Department of Fish and Game summary of the 2006/2007 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 08-17, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds08-17.pdf

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Gaeuman, W. B. 2010. Summary of the 2008/2009 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 10-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS10-01.pdf

Gaeuman, W. B. 2014. Summary of the 2013/2014 mandatory crab observer program database for the Bering Sea/Aleutian Islands commercial crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 14-49, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/fds14-49.pdf

Global Trust, 2017. Alaska Responsible Fisheries Management Certification: Full Assessment and Certification Report for the U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries, December 7, 2017, 376 p. https://www.alaskaseafood.org/rfm-certification/certified-fisheries/alaska-crab/

NMFS, 2004. Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement. NOAA NMFS, NPFMC. August 2004. 1003 p. https://alaskafisheries.noaa.gov/sites/default/files/analyses/crabeis0804-chapters.pdf

Schwenzfeirer, M., M. Salmon, E. Evans, E. Henry, and L. Ward. 2012. Annual report of the onboard observer program for the Bering Sea and Aleutian Islands crab fisheries, 2011/2011. Pages 195-251 [In] Fitch, H., M. Schwenzfeier, B. Baechler, T. Hartill, M. Salmon, M. Deiman, E. Evans, E. Henry, L. Wald, J. Shaishnikoff, K. Herring, and J. Wilson (2012) Annual management report for the

148 http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=401

149 https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

12.2.1.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on main associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**
	commercial and subsistence shellfish fisheries of the Aleutian Islands, Bering Sea and the Westward Region's Shellfish Observer Program, 2010/11. Alaska Department of Fish and Game, Fishery Management Report No. 12-22, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/fmr12-22.pdf

Numerical score:	Starting score	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)					High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)					Full Conformance
Non-conformance Number (if applicable):					-

9.5.1.4 Supporting Clause 12.2.2.

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on minor associated species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations (proxies), then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*	☑

EVIDENCE:

As noted in Supporting Clause 12.2.1, the Council, NMFS and ADF&G have established processes for the detection of potentially adverse impacts to nontarget catch/associated species taken in BSAI crab fisheries. In addition, monitoring processes are in place to ensure that potentially adverse impacts to nontarget catch/associated species do not arise in BSAI crab fisheries. ADF&G implements a mandatory observer program for BSAI crab fisheries (Schwenzfeier *et al*., 2012). Non-target catches, including discards of target stocks (females, undersized males) and stocks other than the "stock under consideration", are recorded in an observer database which is maintained by ADF&G (see Gaeuman (2014) for details on observer sampling methods). Observer results are provided regularly to stock assessment authors who incorporate this information into annual stock assessments.

Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

The BSAI Tanner and King crab fisheries catch a small number of other species as bycatch. The composition of bycatch in these fisheries, as well as potential adverse impacts arising from such interactions, was reviewed as part of Final Environmental Impact Statement (EIS) for the Bering Sea and Aleutian Islands Crab fisheries (NMFS, 2004). Chilton *et al*. (2011) provided an updated review of the directed fishery contribution to mortality of competitors and predators. Conclusions can be summarized as follows: A limited number of groundfish, such as Pacific cod, Pacific halibut, yellowfin sole, and sculpin (*Myoxocephalus* spp.), are caught in the directed pot fishery (Barnard and Burt 2007; Barnard and Burt 2008; Gaeuman 2010). The invertebrate component of bycatch includes echinoderms (stars and sea urchin), snails, non-FMP crab (hermit crabs and lyre crabs), and other invertebrates (sponges, octopus, anemone, and jellyfish). Typically, low levels of bycatch of these species do not impact their abundance (NMFS, 2004).

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

NMFS (2004) concluded its review of benthic species caught as bycatch in the crab pot fisheries as follows:

> *Crab pot bycatch is deemed insignificant for any population of other benthic species routinely caught in the major eastern Bering Sea crab fisheries. Fishes including Pacific cod, yellowfin sole, Pacific halibut, sculpin, walleye pollock, other flatfish, and skates all have very high abundance relative to the level of estimated pot bycatch. Gastropods and echinoderms comprise a major portion of the total biomass of the eastern Bering Sea and small losses due to pot bycatch would have little significance. In some cases, crab pot bycatch have become part of small dedicated fisheries as for snails, octopus, and Korean hair crab. Minor losses of other invertebrates are not estimable but assumed to be relatively insignificant. In addition, the minor amount of these species caught as bycatch does not result in declines in species diversity because it does not cause a decline in any species abundance. From this information, NOAA Fisheries concludes that status quo has an insignificant effect on the population levels of benthic species caught as bycatch.*

As noted in Supporting Clause 12.2.1, new RFM guidance (Part 3, Appendix 1, of the RFM Standard Version 2.1) requires the assessment team to use data on a fishery's Bycatch Species Profile (BSP) to distinguish main and minor associated species. Breakpoints for main associated species (at 80% of total bycatch) were presented in SC 12.2.1. Minor associated species, *i.e*. those taxa between the thresholds at 80% and 95% of bycatch, are discussed here. Minor associated species include the following taxa/categories:

- unidentified snails (BBRKC, SMBKC, EBS Snow, EBS Tanner)
- Pacific cod (SMBKC; approaching 'minor' threshold in BBRKC, EBS snow, EBS tanner)
- circumboreal toadcrab (SMBKC)
- hermit crab unident. (SMBKC)
- brittle star unident. (AIGKC)
- basket star (AIGKC)
- sponge unident., hydroid unident., and *Distochopora* sp. (AIGKC)

<u>Unidentified Snails</u>

Numerically, the category 'unidentified snails' predominated and was the most abundant minor associated species (Bycatch Species Profile data, see table presented in Supporting Clause 12.2.1). NMFS (2004) reported that snails (including *Neptunea borealis*) were the second most common bycatch category after Pacific cod. An estimated 354,000 snails were taken as bycatch in BSAI crab fisheries in 2000. Various species of *Neptunea* were common occupants of recovered Bering Sea crab pots (B. Stevens, NOAA Fisheries Kodiak Lab, personal observation). This genus of snails is the most dominant in the middle and outer shelf areas of the southeast Bering Sea (Jewett and Feder, 1981). There was historically a small, Japanese fishery for snails in the Bering Sea since 1971. A United States snail fishery began in 1992 and lasted less than a decade with a peak harvest in 1996 of 3.5 million pounds (lbs.) (worth over $1 million U.S. dollars). Since 1998, no fishing effort for snails has occurred in the Bering Sea. Leon *et al*. (2017) provides an historic overview of fisheries for *Neputnea* and other sea snails in the Alaska.

The NMFS eastern Bering Sea trawl survey provides distribution and relative abundance information on Bering Sea snail populations. However, differential catchability of various species of snails makes accurate population estimates difficult (Leon *et al*., 2017). NMFS (2004) deemed that crab pot bycatch is insignificant for any population of other benthic species routinely caught in the major eastern Bering Sea crab fisheries. Gastropods and echinoderms comprise a major portion of the total biomass of the eastern Bering Sea and small losses due to pot bycatch would have little significance. Although the quantity of snails observed in pots may appear large, the proportion of snail biomass in bycatch may be less owing to the small average size of snails relative to the other taxa taken in crab pots (J. Goen, BSCCG, personal observation). Additionally,

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

mortality rates associated with snail discards are unknown but may be low relative to finfish and crab due to snails having heavy outer shells.

Pacific Cod

Pacific cod, *Gadus macrocephalus,* is a widely distributed and highly abundant representative of the greater groundfish community which is managed by NPFMC as a tier 3 stock in the Eastern Bering Sea (Thompson *et al.*, 2020). NFMFS (2004) reported that cod were caught as bycatch in greatest abundance in both Bering Sea snow crab and Bristol Bay king crab fisheries. According to NMFS, the 376,000 cod estimated as bycatch in 2000 crab pot fisheries are relatively insignificant in comparison to the average 220,000 metric tons (mt) taken annually by all dedicated fisheries for Pacific cod in the BSAI (hook and line, trawl and pot fisheries data from 1994-1998).

As noted in Supporting Clause 12.2.9, crab pots are often baited with Pacific cod. In some crab fisheries, regulations (5 AAC 34.825 (k) and 5 AAC 35.525 (d)) allow deployment of a specified number of groundfish-configured pots targeting Pacific cod for use as bait (Gaeuman, 2014). Therefore, some of the Pacific cod used as bait in BSAI crab fisheries may derive from a targeted fishing effort and some may be taken as bycatch in a crab pot, and it may not be possible to distinguish between the two (J. Goen, personal communication). Nonetheless, the salient point is that stock assessment process for Pacific cod adequately accounts for such mortality in the "bait for crab fishery" (Table 2.4.1 in Thompson *et al.*, 2020).

Non-FMP Crab

Examination of the SMBKC bycatch species profile indicates that the circumboreal toad crab, *Hyas coarctatus*, and unidentified hermit crab may be considered minor associated species. Other crab species caught as bycatch include lyre crabs, and Korean hair crab (*Erimacrus isenbeckii*). Korean hair crab supported a very small dedicated commercial fishery north of the Pribilof Islands. The Korean hair crab bycatch in the Bering Sea amounted to the estimated catch from the 2000 Bering Sea hair crab fishery. This fishery was closed as of 2001 until there is evidence of hair crab recruitment. Information on distributions and abundances of circumboreal toad crab, lyre crab and hermit crab are lacking. Effects of crab pot bycatch are unknown, but experts believe the typically low levels of bycatch of these species do not impact their abundance (NMFS 2004; Chilton *et al.*, 2011). The NMFS eastern Bering Sea trawl survey provides distribution and relative abundance information on Bering Sea populations of hermit crabs and other non-commercial crab species (Lauth *et al*., 2019). However, differential catchability of various species of crabs makes accurate population estimates difficult (Leon *et al*., 2017).

Brittle star, Basket star and Other Echinoderms

Examination of the AIGKC bycatch species profile indicates that unidentified species of brittle stars and basket stars may be considered minor associated species. NMFS (2004) reported that almost 100,000 sea stars, 27,000 brittle stars, 7,000 basket stars and 4,000 sea urchins were estimated to be taken as bycatch during the 2000 BSAI crab fishing seasons. Sea stars were caught in all three crab fisheries but not identified to species. Those taken are most likely of the genera *Asterias, Pycnopodia* and/or *Gorgonocephalus*. In the southeast Bering Sea, king and snow crabs rank as the greatest component of total invertebrate epifaunal (animals that live on top of the sea floor) biomass. The sea star (*Asterias amurensis*) represents 12 percent of the biomass at bottom depths 40-100 m, replaced by basket stars (*Gorgonocephalus caryi*) representing 7 percent of total biomass at depths >100 m (Jewett and Feder, 1981). In northeastern Bering Sea, sea urchins and basket stars comprise 22 percent and 56 percent, respectively, of the invertebrate species at bottom depths >40 m (Jewett and Feder, 1981). Since these species represent such a large proportion of the benthic community, loss due to bycatch mortality in the crab fisheries would not be expected to adversely impact their populations. The NMFS eastern Bering Sea trawl survey provides distribution and relative abundance information on Bering Sea populations of echinoderms (Lauth *et al*., 2019).

12.2.2.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.**

<u>Other Benthic Invertebrates</u>

The AIGKC bycatch species profile indicates at least three other benthic invertebrate taxa that may be considered minor associated species: sponge unident., hydroid unident., and *Distochopora* sp. (Stylasteridae, hydrocoral). NMFS (2004) noted that sponge and corals are routinely hauled up with crab pots that fish deeper waters along the Aleutian Islands for golden king crab, and that AIGKC was the only crab fishery identified [in the Final EIS] as potentially adversely effecting benthic habitat. Golden king crabs are taken in areas consisting of rough, uneven bottom at depths of 100-400 fathoms (600 to 2,400 feet). Fishery effort is concentrated on rocky substrata and pinnacles in the Aleutian Islands and at the entrances to passes between the islands. Such habitats are home to many sessile (attached) animals including gorgonian corals, anemones, sea stars, crinoids (a type of echinoderm), and sponges. ADF&G oversees the mandatory crab observer program which collects data on the types and frequency of benthic invertebrate bycatch. RFM guidance indicates that biotic components such as corals, hydroids and sponges are HAPC biota. Thus, the potential for AIGKC to have adverse impacts on these other benthic invertebrates is explored further under fishing effects on habitats (see Supporting Clauses 12.2.6 and 12.2.7).

The assessment team notes that a multi-year summary analysis of the observer database for non-target species is currently unavailable. Therefore, it is recommended that the ADF&G observer database for BSAI crab fisheries should be summarized to provide a better picture of trends in non-target species interactions over time.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on minor associated species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

In addition to the references cited above, the following datasets and/or reports substantiate adequate consideration of UoC impacts on minor associated species:

- Detailed observations on catch composition from mandatory crab observer program[150]
- Annual Crab SAFE reports[151]

References:

Barnard, D.R. and R. Burt. 2007. Alaska Department of Fish and Game summary of the 2005/2006 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 07-02, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds07-02.pdf

Barnard, D.R. and R. Burt. 2008. Alaska Department of Fish and Game summary of the 2006/2007 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 08-17, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/fds08-17.pdf

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

[150] http://www.adfg.alaska.gov/index.cfm?adfg=wildlifenews.view_article&articles_id=401

[151] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

12.2.2.	The fishery management organization shall consider the most probable adverse impacts of the unit of certification on minor associated species (Appendix 1, Part 3 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) shall be monitored and shall not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible. If such impacts arise, effective remedial action shall be taken.

Gaeuman, W. B. 2010. Summary of the 2008/2009 mandatory shellfish observer program database for the rationalized crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 10-01, Anchorage. http://www.adfg.alaska.gov/FedAidPDFs/FDS10-01.pdf

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Leon, J. M., J. Shaishnikoff, E. Nichols, and M. Westphal. 2017. Annual management report for shellfish fisheries of the Bering Sea–Aleutian Islands Management Area, 2015/16. Alaska Department of Fish and Game, Fishery Management Report No. 17-10, Anchorage. http://www.adfg.alaska.gov/static/regulations/regprocess/fisheriesboard/pdfs/2016-2017/statewide/WR3_FMR17-10.pdf

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Numerical score:	Starting score	– (	Number of EPs NOT met	x 3)	=	Overall score
	10		0			10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.5 Supporting Clause 12.2.3.

12.2.3.	There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a process to set outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).*	☑
EVIDENCE: The Council has established a process to set outcome indicators reflecting management objectives for non-target species in BSAI crab fisheries that ensures avoidance of adverse impacts (Chilton *et al*., 2011). In addition, there is a process for monitoring fishery performance against outcome indicators which entails review of results from the mandatory crab observer program by stock assessment authors during preparation of the Ecosystem Considerations chapter of annual stock assessment reports[152], as well as review and consolidation of monitoring results into the annual Alaska Ecosystem Status Reports[153] for the Bering Sea and Aleutian Islands.	
Current status/Appropriateness/Effectiveness: *There is evidence that outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible) have been achieved. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑
EVIDENCE: There are outcome indicators for non-target stocks taken in the BSAI crab fisheries under assessment. These outcome indicators are consistent with achieving management objectives for non-target stocks (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible). <u>Crab Bycatch (crab FMP species)</u> The largest component of bycatch in BSAI crab fisheries is crab (undersized, female, and non-target species; see clause 12.2.1). For those crab species falling within the scope of the BSAI king and Tanner crab FMP (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 (NPFMC, 2011), outcome indicators are explicitly incorporated into the Council's five-tiered system for stock assessment. Non-target crab bycatch of FMP species in directed crab fisheries, as well as FMP crab bycatch in other fisheries (such as the groundfish fisheries) is assessed yearly and corrected appropriately through yearly stock assessment activities, and through the formulation of overfishing levels (OFLs), acceptable biological catches (ABCs), annual catch limits (ACLs), and total allowable catches (TACs). These determinations and actions are all documented in the yearly crab SAFE report compiled by ADF&G, NMFS and NPFMC scientists (*e.g.*, NPFMC, 2020a). Annual trawl surveys (Zacher *et al*., 2019) collect fishery-independent data on the distribution and abundance of crab, groundfish, and other benthic resources in the eastern Bering Sea. These data are used to estimate population abundances for the management of commercially important species in the region. <u>Finfish Bycatch</u> The ADF&G observer program collects data to monitor bycatch in BSAI crab fisheries (see Supporting Clause 12.2.1 and 12.2.2). Finfish, especially Pacific cod, but also halibut, yellowfin sole and sculpin may account for a large proportion of estimated crab pot bycatch (NMFS, 2004). These species are widely distributed and highly abundant representatives of the greater groundfish community. Pacific cod is managed by NPFMC as a tier 3 stock in the Eastern Bering Sea (Thompson *et*	

[152] https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/
[153] https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

12.2.3.	There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).

al., 2020) and yellowfin sole is managed as a tier 1 stock in BSAI (Spies *et al*., 2020). As such, there are outcome indicators whose explicit aim is to avoid overfishing. BSAI sculpin was formerly managed as a tier 5 stock but in April 2019 the Council proposed to designate sculpins in the BSAI and GOA as non-target ecosystem component species[154]. Similarly, outcome indicators (reference points) exist for Pacific halibut, a species managed by the International Pacific Halibut Commission (IPHC)[155]. Halibut fisheries are closely monitored, heavily regulated, and the resource is currently healthy (not overfished and fishing intensity below reference level; IPHC, 2021). In the Final Environmental Impact Statement for BSAI crab fisheries, it was concluded that the effects on species caught as bycatch in the BSAI crab fisheries are insignificant (NMFS, 2004).

Invertebrate Bycatch (excluding crab FMP species)
Data on invertebrate bycatch are also collected in the ADF&G observer program (see Supporting Clause 12.2.1). These data were reviewed by NFMS during preparation of the Final Environmental impact Statement for BSAI crab fisheries (2004). The following excerpt from the Final EIS discusses invertebrate bycatch:

> Echinoderms: Within the BSAI almost 100,000 sea stars, 27,000 brittle stars, 7,000 basket stars and 4,000 sea urchins were estimated to be taken as bycatch during the 2000 BSAI crab fishing seasons. Sea stars were caught in all three crab fisheries but not identified to species. Those taken are most likely of the genera *Asterias, Pycnopodia* and/or *Gorgonocephalus*. In the southeast Bering Sea, king and snow crabs rank as the greatest component of total invertebrate epifaunal (animals that live on top of the sea floor) biomass. The sea star (*Asterias amurensis*) represents 12 percent of the biomass at bottom depths 40-100 m, replaced by basket stars (*Gorgonocephalus caryi*) representing 7 percent of total biomass at depths >100 m (Jewett and Feder, 1981). In northeastern Bering Sea, sea urchins and basket stars comprise 22 percent and 56 percent, respectively, of the invertebrate species at bottom depths >40 m (Jewett and Feder, 1981). Since these species represent such a large proportion of the benthic community, loss due to bycatch mortality in the crab fisheries would not be expected to affect their populations.
>
> Non-FMP Crab: Other crab species caught as bycatch include, lyre crabs, hermit crabs and Korean hair crab (*Erimacrus isenbeckii*). Korean hair crab supported a very small dedicated commercial fishery north of the Pribilof Islands. The Korean hair crab bycatch in the Bering Sea amounted to the estimated catch from the 2000 Bering Sea hair crab fishery. This fishery was closed as of 2001 until there is evidence of hair crab recruitment. Information on distributions and abundances of lyre and hermit crab are lacking. Effects of crab pot bycatch are unknown at this time.
>
> Other Invertebrates: Octopus (*Octopus dofleini*) were caught primarily in the Bering Sea snow crab fishery. Octopus are a crab predator and compete with crabs for prey. Since 1995, there has been a small fishery for octopus in the Bering Sea comprised of bycatch from various groundfish fisheries (ADF&G, 2001). During 2000, there is still wastage of this resource; 40,000 lbs. of octopus were discarded at sea compared to the 16,000 lbs. that were retained for fish meal and bait. The effect of octopus mortality due to crab pot bycatch is unknown.
>
> Jellyfish and sea anemones would not be expected to sustain significant impacts from crab pot fishing. Biomass of jellyfish has increased tenfold in the Bering Sea in the past decade with greatest increase occurring over the mid-shelf domain, at 50-100 m depths (NMFS, 2003b).
>
> Sponge and corals are routinely hauled up with crab pots that fish deeper waters along the Aleutian Islands for golden king crab. An estimated 22,500 sponges were destroyed by crab pot fishing in 2000. It is assumed that these sessile organisms are not able to reattach to the substrate when returned to the water and thus will die. Destruction of sponge and corals may be crucial to some species of small benthic organisms including newly settled crabs as they provide valuable habitat structure and protection from predation. The ADF&G shellfish observer program has begun to collect coral bycatch data and species composition in the Aleutian Islands golden king crab

[154] https://www.npfmc.org/sculpins-ecosystem/
[155] https://iphc.int/

12.2.3.	**There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).**

fisheries to learn about amount caught as bycatch and the variety of coral species. ADF&G, in collaboration with NOAA Fisheries, is developing A Field Guide to Alaskan Corals (Wing and Barnard, in prep.) to enable data collection of corals caught in the golden king crab fishery. The extent of coral bycatch is presumed to be insignificant because the golden king crab fisheries occur in a small percentage of coral habitat.

Note: gastropods or sea snails are considered in Supporting Clause 12.2.2 (above) and are not discussed further here.

Crab pot bycatch is deemed insignificant for any population of other benthic species routinely caught in the major eastern Bering Sea crab fisheries. Fishes including Pacific cod, yellowfin sole, Pacific halibut, sculpin, walleye pollock, other flatfish, and skates all have very high abundance relative to the level of estimated pot bycatch. Gastropods and echinoderms comprise a major portion of the total biomass of the eastern Bering Sea and small losses due to pot bycatch would have little significance. In some cases crab pot bycatch have become part of small dedicated fisheries as for snails, octopus, and Korean hair crab. Minor losses of other invertebrates are not estimable but assumed to be relatively insignificant. In addition, the minor amount of these species caught as bycatch does not result in declines in species diversity because it does not cause a decline in any species abundance. From this information, NOAA Fisheries concludes that status quo has an insignificant effect on the population levels of benthic species caught as bycatch.

Seabirds

Fishery interactions with seabirds that are listed under the Endangered Species Act (ESA) are considered under Supporting Clause 12.2.4. With respect to non-ESA listed seabirds, NOAA's NMFS annually updates estimate of seabirds caught as bycatch in commercial groundfish fisheries operating in Federal waters off Alaska (Eich *et al*., 2016; Krieger *et al*., 2019). The most recent catch accounting data from 2007 through 2015 attribute 88% of seabird bycatch in the groundfish and halibut fisheries (hook-and-line, trawl, and pot gear, combined) to hook-and-line fisheries, 10% to trawl fisheries, and < 2.5% to pot fisheries. The combined bycatch of non-ESA listed seabirds in groundfish and crab pot fisheries is approximately 100 birds per year consisting of primarily northern fulmars (NMFS, 2004). NMFS concluded that fisheries on crab FMP species have very limited interactions with seabirds and that the interactions that do occur do not impact any species of seabird on a population level (NMFS, 2004).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible). Examples may include fishery management reports, and stock or ecosystems assessment reports.*	☑

EVIDENCE:
See referenced cited above.

References:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

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Krieger, J.R., Eich, A.M., and Fitzgerald, S.M. 2019. Seabird Bycatch Estimates for Alaska Groundfish Fisheries: 2018. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/AKR-20, 41

12.2.3.	There shall be outcome indicator(s) consistent with achieving management objectives for non-target species (i.e., avoiding overfishing and other impacts that are likely to be irreversible or very slowly reversible).

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Zacher, L.S., Richar, J. I., and Foy, R. J. 2019. DRAFT: The 2019 Eastern Bering Sea Continental Shelf Trawl Survey: Results for Commercial Crab Species. NOAA Technical Memorandum NMFS-AFSC. https://www.fisheries.noaa.gov/resource/document/draft-technical-memorandum-2019-eastern-bering-sea-continental-shelf-trawl-survey

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.6 Supporting Clause 12.2.4.

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on ETP species. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*		☑
EVIDENCE: A well-defined process exists at State[156] and federal[157] levels for listing endangered, threatened or protected (ETP) species. At the state level, ADF&G is responsible for determining and maintaining a list of endangered species under AS 16.20.190. At the federal level, NMFS and USFWS are responsible for maintaining lists of species that meet the definition of threatened or endangered under the ESA. NMFS is responsible for maintaining the list for most marine species and managing those species once they are listed. The USFWS is responsible for maintaining the list for terrestrial and freshwater species, as well as three marine mammal species (polar bear, Pacific walrus, and sea otter[158]), and for managing those species once they are listed. The State of Alaska Endangered Species List currently includes five species having potential to interact with BSAI crab fisheries: short-tailed albatross, *Phoebastria albatrus*, Eskimo curlew, *Numenius borealis*, blue whale, *Balaenoptera musculus*, humpback whale, *Megaptera novaeangliae*, and North Pacific right whale, *Eubalaena japonica*. Federal listings expand upon the State of Alaska's ESA listings with inclusion of bowhead whale (*Balaena mysticetus*), beluga whale Cook Inlet distinct population segment (*Delphinapterus leucas*), fin whale (*Balaenoptera physalus*), leatherback turtle (*Dermochelys coriacea)*, Northern sea otter southwest distinct population segment (*Enhydra lutris kenyoni)*, Polar bear (*Ursus maritimus)*, sei whale distinct population segment (*Balaenoptera borealis),* sperm whale (*Physeter macrocephalus*), Steller's eider (*Polysticta stelleri*), spectacled eider (*Somateria fischeri*), Steller sea lion west of 144 degrees W (*Eumetopias jubatus)*, Arctic ringed seal (*Phoca hispida hispida*), and bearded seal Beringia distinct population segment (*Erignathus barbatus nauticus*)[159]. The USFWS determined that the Pacific walrus (*Odobenus rosmarus divergens*) does not warrant listing as threatened or endangered under the ESA on October 4, 2017[160].		
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species (e.g. negatively impacting rebuilding efforts), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local*		☑

[156] http://www.adfg.alaska.gov/index.cfm%3Fadfg=specialstatus.akendangered
[157] https://www.fws.gov/alaska/pages/endangered-species-program/listing-endangered-species
[158] NOAA does not identify BSAI crab fisheries having any interactions sea otters (see Appendix 5 in Muto et al., 2020).
[159] On 28 December 2012, NMFS listed the Beringia DPS bearded seal (*E. b. nauticus*) and, thus, the Alaska stock of bearded seals, as threatened under the ESA (77 FR 76740; see Muto *et al*., (2020).
[160] https://www.fws.gov/alaska/pages/marine-mammals/pacific-walrus/current-research-pacific-walrus

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

knowledge. Accordingly, these impacts are monitored and do not impede, slow, or reduce likelihood of recovery of the species to target levels (or other planned outcomes). If such impacts arise, effective remedial actions are taken.

EVIDENCE:

Management objectives exist which seek to ensure that endangered species are protected from adverse impacts resulting from interactions with BSAI crab fisheries. All U.S. fisheries management, including that of BSAI crab fisheries, must be consistent with the Magnuson-Stevens Act (MSA), the Marine Mammal Protection Act (MMPA)[161], and the U.S. Endangered Species Act (ESA)[162]. Each of these acts establishes management guidelines, objectives and legal protections for threatened and endangered species.

The purpose of the ESA is to conserve threatened and endangered species and their ecosystems. There are more than 1,900 species listed under the ESA. A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become endangered in the future. USFWS and NMFS share responsibility for implementing the ESA. Within NOAA Fisheries, the Office of Protected Resources (OPR)[163] has jurisdiction over more than 150 endangered and threatened marine species, from whales to sea turtles and salmon to Johnson's Sea grass.

The listing of a species as endangered makes it illegal to "take" (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to do these things) that species. Similar prohibitions usually extend to threatened species. Federal agencies may be allowed limited take of species through interagency consultations with NMFS or USFWS. Non-federal individuals, agencies, or organizations may have limited take through special permits with conservation plans. Effects to the listed species must be minimized and in some cases conservation efforts are required to offset the take. NMFSs Office of Law Enforcement (OLE) works with the U.S. Coast Guard and other partners to enforce and prosecute ESA violations.

BSAI crab fisheries have only limited potential for interaction with endangered species of birds and marine mammals, and as such are generally not considered to have adverse impacts on endangered species.

With respect to addressing the potential for cumulative impacts of all fisheries on ETP species, stock assessments of marine mammals include, among other things, a description of estimates of annual human-caused mortality and serious injury through interactions with commercial, recreational, and subsistence fisheries, takes by subsistence hunters, and other human-caused events (e.g., entanglement in marine debris, ship strikes). The commercial fishery interaction data will be used to evaluate the progress of each fishery towards achieving the MMPA's goal of zero fishery-related mortality and serious injury of marine mammals (Muto *et al*., 2021).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on ETP species, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action are taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

<u>Marine Mammals</u>

As identified in annual marine mammal stock assessment reports, there is ongoing monitoring of human-caused mortality, serious injury, and non-serious injury of marine mammals. According to Muto *et al.* (2021) for example, the minimum

161 http://www.nmfs.noaa.gov/pr/laws/mmpa/
162 https://www.fws.gov/endangered/laws-policies/
163 https://www.fisheries.noaa.gov/about/office-protected-resources

12.2.4.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

estimated mean annual level of human-caused mortality and serious injury for Alaska bearded seals between 2013 and 2017 was 551 seals: 549 in the Alaska Native subsistence harvest, 0.4 due to Marine Mammal Protection Act (MMPA) research-related permanent removals from the population, and 1.6 in U.S. commercial fisheries (0.4 in BSAI pollock trawl, 1 in BSAI flatfish trawl, 0.2 in BSAI, Pacific cod trawl, and none reported in BSAI crab pot). The minimum estimated mean annual rate of U.S. commercial fishery-related mortality and serious injury (1.6 seals) is less than 10% of the PBR (10% of PBR = 821) calculated for U.S. waters and, therefore, can be considered insignificant and approaching a zero mortality and serious injury rate. BSAI crab pot fisheries are listed in the Federal Register[164] as Category III: Annual mortality and serious injury of a stock in a given fishery is less than or equal to 1 percent of the Potential Biological Removal (PBR) level (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

Seabirds

NOAA's NMFS annually updates its estimates of seabirds caught as bycatch in commercial groundfish fisheries operating in Federal waters off Alaska (Eich *et al*., 2016; Krieger *et al*., 2019). There is no indication of adverse interactions between BSAI crab fisheries and ESA-listed birds. USFWS does not identify BSAI crab fishery interactions as a threat to short-tailed albatross[165], Stellar's eider[166], spectacled eider[167], or Eskimo curlew[168]. No fishery interactions with Eskimo curlew have been reported in the literature and would seem unlikely given that BSAI crab fisheries are prosecuted well offshore.

Onboard Observer Program

In addition to the foregoing, the mandatory State of Alaska Shellfish Onboard Observer Program provides further evidence that there is adequate assessment of the most probable adverse impact of the BSAI crab fisheries on ETP species. Crab observers conduct species composition sampling of retained catch and bycatch, and record data on retained catch, fishing effort, and location, and observers also document specific seabird and mammal observations (Schwenzfeier *et al.*, 2008).

References:

Eich, A.M., Mabry, K.R., Wright, S.K., and Fitzgerald, S.M. 2016. Seabird Bycatch and Mitigation Efforts in Alaska Fisheries Summary Report: 2007 through 2015. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-F/AKR-12, 47p. https://alaskafisheries.noaa.gov/pr/seabird-bycatch-reports

Krieger, J.R., Eich, A.M., and Fitzgerald, S.M. 2019. Seabird Bycatch Estimates for Alaska Groundfish Fisheries: 2018. U.S. Department of Commerce, NOAA Technical Memorandum NMFS-F/AKR-20, 41 p. doi:10.25923/hqft-we56. https://www.fisheries.noaa.gov/resource/document/seabird-bycatch-estimates-alaska-groundfish-fisheries-2018

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NMFS, 2004. Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement. NOAA NMFS, NPFMC. August 2004. 1003 p. https://alaskafisheries.noaa.gov/sites/default/files/analyses/crabeis0804-chapters.pdf

Schwenzfeier, M., S. Coleman, and M. Salmon. 2008. Annual report of the onboard observer program for the Westward Region crab fisheries, 2006/2007. Pp. 195-230 In: Bowers, F.R., M. Schwenzfeier, S. Coleman, B.J. Failor-Rounds, K. Milani, K. Herring, M. Salmon, and M. Albert. 2008. Annual

[164] https://www.federalregister.gov/documents/2019/10/10/2019-22007/list-of-fisheries-for-2020
[165] https://www.fws.gov/alaska/pages/endangered-species/short-tailed-albatross
[166] https://www.fws.gov/alaska/pages/endangered-species/stellers-eider
[167] https://www.fws.gov/alaska/pages/endangered-species/spectacled-eider
[168] https://www.fws.gov/alaska/pages/endangered-species/eskimo-curlew

12.2.4.	The fishery management organization shall consider the most probable adverse impacts of the unit of certification on ETP species (Appendix 1, Part 4 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.
	management report for the commercial and subsistence shellfish fisheries of the Aleutian Islands, Bering Sea and the Westward Region's Shellfish Observer Program, 2006. Alaska Department of Fish and Game, Fishery Management Report No. 08-02, Anchorage. http://www.adfg.alaska.gov/FedAidpdfs/Fmr08-02.pdf

Numerical score:	Starting score	–	(	Number of EPs NOT met	x	3	)	=	Overall score
	10			0					10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.7 Supporting Clause 12.2.5.

12.2.5.	There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *There is a process in place that allowing creation of effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.*	☑

EVIDENCE:

There are well-established processes for setting limits on the take of ETP species to ensure that those species are protected from adverse impacts from commercial fisheries in Alaska including the BSAI crab fisheries under assessment here. Such limits are *de facto* outcome indicators for ETP species. However, the details of setting limits will vary according to the species involved and the federal agency charged with implementing legislation protecting ETPs.

NMFS

NMFS publishes a List of Fisheries, as required by the MMPA, which reflects current/updated information on interactions between U.S. commercial fisheries and marine mammals. Each commercial fishery on the list is classified into one of three categories based upon the level of mortality and serious injury of marine mammals that occurs incidental to each fishery:

- Category I: Annual mortality and serious injury of a stock in a given fishery is greater than or equal to 50 percent of the PBR level (i.e., frequent incidental mortality and serious injury of marine mammals).
- Category II: Annual mortality and serious injury of a stock in a given fishery is greater than 1 percent and less than 50 percent of the PBR level (i.e., occasional incidental mortality and serious injury of marine mammals).
- Category III: Annual mortality and serious injury of a stock in a given fishery is less than or equal to 1 percent of the PBR level (i.e., a remote likelihood of or no known incidental mortality and serious injury of marine mammals).

The classification of a fishery on the List of Fisheries determines whether participants in that fishery are subject to certain provisions of the MMPA, such as registration, observer coverage, and take reduction plan requirements. In general, the MMPA prohibits killing or injuring marine mammals. However, fisheries in Category I and II must meet additional requirements such as adherence to strict take limits and reporting requirements. Marine mammal stocks that are also listed under the ESA may be identified by NMFS as a "strategic marine mammal stock." For each strategic marine mammal stock, NMFS develops a Take Reduction Plan to help recover and prevent further depletion of the stock[169].

USFWS

The USFWS is responsible for maintaining the federal list of terrestrial and freshwater ETP species, as well as three marine mammal species (polar bear, Pacific walrus, and sea otter). In exceptional circumstances, USFWS may authorize incidental take of these three species in accordance with provisions of the MMPA (however no such authorizations have ever been required of BSAI crab fisheries). USFWS also develops conservation plans for ETP bird species (including short-tailed albatross, Stellar's eider, spectacled eider) and may authorize the use of incidental take permits in accordance with Section 10 of the ESA[170]. Such incidental take permits are published and the public is allowed to provide feedback[171]. However, given the rarity/absence of encounters between BSAI crab fisheries and the aforementioned ETP seabirds, USFWS does not require incidental take permits in these fisheries.

[169] https://www.fisheries.noaa.gov/national/marine-mammal-protection/marine-mammal-take-reduction-plans-and-teams
[170] https://www.fws.gov/endangered/permits/index.html
[171] https://www.fws.gov/policy/frsystem/default.cfm

12.2.5.	There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.

Current status/Appropriateness/Effectiveness:
There is evidence for established outcome indicators (e.g., in a fishery management plan or other regulation) seeking to ensure that ETP species are protected (through States or international regulations) from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. Overall, fishing activity does not impede, slow, or reduce likelihood of recovery of the species to target levels or other planned outcomes. Management objectives shall be achieved accordingly. ☑

EVIDENCE:
There are established outcome indicators consistent with ensuring that ETP species are protected from adverse impacts resulting from interactions with BSAI crab fisheries (including recruitment overfishing or other impacts) that are likely to be irreversible or very slowly reversible. Ongoing programs that monitor outcome indicators, including the State of Alaska Shellfish Onboard Observer Program (Schwenzfeier *et al*., 2008), help to ensure that adverse impacts to ETP species do not arise.

The Marine Mammal Protection Act (MMPA) requires stock assessment reports to be reviewed annually for stocks designated as strategic, annually for stocks where there is significant new information available, and at least once every three years for all other stocks. Each stock assessment includes, when available, a description of the stock's geographic range, a minimum population estimate, current population trends, current and maximum net productivity rates, optimum sustainable population levels and allowable removal levels, and estimates of annual human-caused mortality and serious injury through interactions with commercial fisheries and subsistence hunters (see Muto *et al*., 2021 for the most recent Marine Mammal stock assessment for the Alaska region).

The annual Ecosystems Status Reports for the Aleutian Islands (Ortiz and Zador, 2020) and Eastern Bering Sea (Siddon, 2020) elaborate on additional outcome indicators which are consistent with monitoring for adverse impacts on endangered species. For marine mammals, ecosystem indicators include estimations of stock abundance and/or related parameters for Stellar sea lions, northern fur seals, harbor seals, arctic ice seals (bearded seal, ribbon seal, ringed seal, spotted seal) and bowhead whales. For seabirds, the EBS Ecosystem Status Report includes an Integrated Seabird Information section which synthesizes seabird information to provide an overview of environmental impacts to seabirds and what that may indicate for ecosystem productivity as it pertains to fisheries management. Seabird information comes a wide variety of sources including long-term monitoring programs such as the Alaska Maritime National Wildlife Refuge (e.g., 2019 Seabird Report Card) as well as agency/university researchers, citizen science organizations, and coastal community members.

As noted in the Crab Ecosystem Considerations Report (Chilton *et al*., 2011), there is very limited potential for BSAI crab fisheries to have adverse impacts on endangered species or marine mammals. As noted previously, USFWS identifies three ESA-listed seabird species in Alaska: Steller's eider, *Polysticta stelleri* (threatened); Spectacled eider, *Somateria fischeri* (threatened); and Short-tailed albatross, *Phoebastria albatrus* (endangered). In the Final EIS for BSAI crab (NMFS, 2004), NOAA Fisheries concluded that the actions considered in the Biological Assessment are not likely to (1) adversely affect the listed seabirds, or (2) destroy or adversely modify designated critical habitat. Results from ongoing monitoring of seabirds (Eich *et al*., 2016) continue to support the conclusion that there is little if any bycatch of these species in BSAI crab fisheries.

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicators seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible. Examples may include fishery management plans, or stock and ecosystems assessment reports. ☑

12.2.5.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to ensure that ETP species are protected from adverse impacts resulting from interactions with the unit of certification and any associated enhanced fishery activity, including recruitment overfishing or other impacts that are likely to be irreversible or very slowly reversible.**

EVIDENCE:
References cited above.

References:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and R.J. Foy (2011) Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

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Ortiz, I., and Zador, S. (Eds.) 2020. Ecosystem Status Report 2020 Aleutian Islands. Nov 17, 2020. https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

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Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.8 Supporting Clause 12.2.6.

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on habitats. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on such impacts of fishing for the unit of certification, generic evidence based on similar fishery situations can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.*		☑
EVIDENCE: Well-established processes exist at Federal[172,173], State[174] and Council[175] levels to account for the most probable adverse impacts of the BSAI King and Tanner crab fisheries on habitats. Management response is typically proportional to severity of the identified risk. The BSAI crab fisheries under assessment here do not trigger risk factors/elements that are typically associated with a fishery at risk of adversely impacting habitats: the BSAI crabs under assessment are not keystone species (see Supporting Clauses 12.3 and 12.4) nor are they considered low-growth/high catchability species; BSAI crab fisheries have no significant interactions with ETP species (see Supporting Clause 12.2.4); bycatch of non-target resources is negligible in BSAI crab fisheries (see Supporting Clauses 12.2.1 and 12.2.2); and BSAI crab fisheries utilize pots which are generally considered to be of lesser concern among fishing gear types with respect to adverse gear-habitat interactions (NMFS, 2004).		
Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, if these impacts are likely to be irreversible or very slowly reversible, effective remedial action is taken (please see Appendix 1 part 5, noting specifically the 3 habitat assessment elements, and part 7 for cumulative effects evaluation). Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*		☐
EVIDENCE: As discussed more fully under Supporting Clause 12.2.7, the Council implements all provisions of the MSA including those provisions relating directly to EFH and HAPCs. EFH and HAPC implementation provides strong evidence that the fishery management organization considers the most probable adverse impacts of the BSAI crab fisheries under assessment on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. <u>Habitat Assessment Elements</u> In accordance with guidance to version 2.1 of the RFM Standard, the assessment team evaluated three habitat assessment elements (Appendix 1, part 5) associated with Supporting Clause 12.2.7. Evidence for fulfilment of these elements came in		

[172] https://www.fisheries.noaa.gov/about/office-habitat-conservation
[173] https://www.fws.gov/alaska/pages/fish-habitats
[174] http://www.adfg.alaska.gov/index.cfm?adfg=specialstatus.fedhabitat&species=stellersealion
[175] https://www.npfmc.org/habitat-protections/

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

large part from the Fishing Effects (FE) model of Simpson *et al*. (2017), the results of which were incorporated into Section 4.1.3 – Fishing Effects Vulnerability Assessment of Appendix F – Essential Fish Habitat (EFH and Habitat Areas of Particular Concern (HAPC) (Amendment 49 of the BSAI Crab FMP; NOAA Fisheries, 2018). The FE model expressly addresses reversibility by incorporating inputs that include, among other things, the distribution and intensity of high-resolution fishing data, and habitat susceptibility and recovery rates.

Results from the FE Model, presented in Appendix F of the BSAI Crab FMP, address the amount of habitat disturbed by commercial fishing within the stock's 50 percent quantile Core Essential Area.

- Red King Crab (Section 4.1.5.1): habitat reduction within core essential area has always been less than 10 percent. The authors noted that additional analysis may be needed to understand fishery impacts on BBRKC habitat because the most critical area for spawning is southern Bristol Bay, where habitat reduction is over ten percent.
- Blue King Crab – St Matthew Island Stock (Section 4.1.5.2.2): 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.
- Golden King Crab (Section 4.1.5.3): 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.
- Tanner Crab (Section 4.1.5.4): 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.
- Snow Crab (Section 4.1.5.5): 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.

A summary of how this information was used to score RFM Habitat Assessment Elements is shown in the Table 17.

Table 17. Scoring summary: RFM Habitat Assessment Elements.

Habitat Assessment Element	BBRKC	SMBKC	AIGKC	EBS Snow	EBS Tanner
1. Effects on sensitive habitats shall be reduced to a minimum percentage of the total area	< 10 %	< 10 %	Evidence lacking	< 10 %	< 10 %
2. The level of fishery impact is assessed. Physical structure & biological communities are not affected at significant scale	Not adversely affected	Not adversely affected	Not adversely affected	Not adversely affected	Not adversely affected
3. Management actions shall mitigate potential negative effects of gear on sensitive habitats.	Council actions	Council actions	Council actions, HAPC protection	Council actions	Council actions
Qualitative Score	Full Conformance	Full Conformance	Minor Non-Conformance	Full Conformance	Full Conformance

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**

There is strong evidence that four of the five BSAI crab stocks under assessment (BBRKC, SMBKC, EBS Snow, EBS Tanner) meet Habitat Assessment Elements 1-3. However, for the AIGKC unit of assessment, FE model results does not provide sufficient evidence to meet Habitat Assessment Element 1. Specifically, available information does not enable the assessment team to:

- Identify the spatial footprint (i.e., total area in Km2 or nm2) of the fishery on marine habitats (e.g., based on maps of fishing fleet distribution or other data).
- Identify the general range of habitat type/substrate (e.g., sand, muddy, gravel and pebble, rocky reefs, kelp, other biogenic habitats) affected and unaffected by the spatial footprint of the fishery.
- Assess the percentage area of overlap of the fishery with known sensitive habitats using available data. Sensitive habitats include HAPCs, other areas of known distribution rich in structural epifauna, areas of particular importance for ETP species, and closed areas which may be set up for habitat, species conservation, or both.

In connection with the above, Stevens (2021) notes that trap fishing impacts to benthic habitats may involve traps dragging along the seafloor during setting and retrieval which can damage sensitive habitat components such as corals, sponges, and other epifauna. Lines connecting multiple pots may increase the overall footprint and have the potential to cause additional damage depending on how and where the gear is fished (Stone, 2006; Stone and Shotwell, 2007). Stone and Rooper (2017) conclude that "…the major stressor on deep coral communities in Alaska was commercial fishing activities with bottom trawls exhibiting the highest threat based on severity of effects, extent of effects, geographic extent of use, and overlap with coral habitat. Demersal longlines and long-lined pots ranked intermediate in terms of potential threat to deep coral habitats while mid-water trawls, single pot sets, and scallop dredges were considered to pose minimal threat to those habitats."

<u>Cumulative effects of fisheries</u>

Guidance to version 2.1 of the RFM Standard also instructs the assessment team to evaluate cumulative effects of fisheries on habitats (Appendix 1, part 7). The cumulative effects of fishing and non-fishing activities on EFH were considered in the 2005 EFH EIS (NMFS, 2005), but available information was 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. As noted in the 2017 non-fishing effects report, 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. 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. Cumulative impacts were considered throughout the report (Simpson *et al*., 2017) and results have been incorporated into Appendix F of the BSAI Crab FMP (NOAA Fisheries, 2018).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on habitats, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target species with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:

There is sufficient evidence to substantiate that the fishery management organization considers the most probable adverse impacts to habitats by the BSAI fisheries under assessment here. Evidence includes:

- FE model results (Simpson *et al*., 2017)
- BSAI Crab FMP (NPFMC, 2011) and Amendment 49 (NOAA Fisheries, 2018)
- Council actions associated with HAPCs (see Supporting Clause 12.2.7)
- Monitoring bycatch including HAPC biota via the ADF&G Mandatory Crab Observer Program (*e.g.*, Gaeuman, 2014)

12.2.6.	The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.

- annual Alaska Ecosystem Status Reports (Siddon, 2020; Ortiz and Zador, 2020)

Also see references cited above.

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	Starting score		Number of EPs NOT met			Overall score
Numerical score:	10	– (	1 (AIGKC) 0 (BBRKC) 0 (SMBKC) 0 (EBS Snow)	x 3)	=	AIGKC: 7 BBRKC: 10 SMBKC: 10 EBS Snow: 10

12.2.6.	**The fishery management organization shall consider the most probable adverse impacts of the unit of certification on habitats (Appendix 1, Part 5 and 7), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge.**		
		0 (EBS Tanner)	**EBS Tanner: 10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)			Medium (AIGKC) High (all other UoCs)
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)			Minor NC (AIGKC) Full Conformance (all other UoCs)
Non-conformance Number (if applicable):			**3 (of 3)**

9.5.1.9 Supporting Clause 12.2.7.

12.2.7.	**There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place by which the potential impacts of the fishery upon habitats essential to the stock under consideration and on habitats that are highly vulnerable to damage are identified. This or a similar mechanism shall also be in place to identify habitats that are highly vulnerable to fishery activities by the unit of certification. The information provided by these mechanisms shall be used to produce specific management objectives related to avoiding significant adverse impacts on habitats. The knowledge of the habitats in question can therefore include relevant traditional, fisher, or community knowledge, provided its validity can be objectively verified (i.e., the knowledge has been collected and analysed though a systematic, objective, and well-designed process, and is not just hearsay). When identifying highly vulnerable habitats, their value to ETP species shall be considered, with habitats essential to ETP species being categorized accordingly.*	☑

EVIDENCE:

There is a mechanism in place to identify essential fish habitat (EFH) for the BSAI crab stocks under consideration and address potential impact of the fishery upon EFH. The MSA includes provisions concerning the identification and conservation of Essential Fish Habitat (EFH). The MSA defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” NMFS and NPFMC must describe and identify EFH in fishery management plans (FMPs), minimize to the extent practicable the adverse effects of fishing on EFH, and identify other actions to encourage the conservation and enhancement of EFH. Federal agencies that authorize, fund, or undertake actions that may adversely affect EFH must consult with NMFS, and NMFS must provide conservation recommendations to federal and state agencies regarding actions that would adversely affect EFH[176].

A mechanism exists to identify habitats that are highly vulnerable to damage, here referred to as Habitat Areas of Particular Concern (HAPCs). EFH provisions of the MSA provide a means for the Council to identify HAPCs [50 CFR 600.815(a)(8)] within Fishery Management Plans (FMP). Specific to fishery actions, HAPCs are areas within EFH that are ecologically important, sensitive to disturbance, or rare (NPFMC, 2010).

There is an open and transparent mechanism to nominate HAPCs. The Council calls for HAPC proposals through a nomination process. Proposals must provide clear, specific, and adaptive management objectives (NPFMC, 2010). Proposals have been submitted by a variety of entities including government agencies, industry groups and environmental NGOs[177].

Relevant traditional, fisher and community knowledge is considered in Council processes. The Council strives to collect and analyze such information through a systematic, objective, and well-designed process. In 2018, the Council established the Local Knowledge, Traditional Knowledge, and Subsistence (LKTKS) Action Module[178]. The goal of this Action Module is to develop protocols for using LK and TK in management, and to understand the impacts of Council decisions on subsistence resources, users, and practices.

Additionally, there is a mechanism to consider the value of habits to ETP species, and where appropriate to recognize and protect habitats essential to ETP species. This is evidenced, for example, by habitat concerns for western Stellar sea lions. Following the steep decline in abundance of western Steller sea lions observed in the 1980s, a number of management

[176] https://www.npfmc.org/habitat-protections/essential-fish-habitat-efh/
[177] https://www.npfmc.org/habitat-protections/habitat-areas-of-particular-concern-hapc/hapc-proposals/
[178] https://www.npfmc.org/lktk_taskforce/

12.2.7.	**There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.**

actions were implemented to promote the recovery of the Western U.S. stock of Steller sea lions, including 3-nmi no-entry zones around rookeries, prohibition of shooting at or near sea lions, and regulation of fisheries for sea lion prey species (*e.g.*, walleye pollock, Pacific cod, and Atka mackerel; see Muto *et al*., 2020). Fishery closures established in nearshore areas to reduce interactions with Steller sea lions have ancillary benefits of reducing habitat impacts as well[179].

Current status/Appropriateness/Effectiveness: *Successful management measures have been developed and are in place to achieve the objectives described in the process parameter.*	☑

EVIDENCE:

In accordance with requirements of the MSA, management agencies have knowledge of essential fish habitat (EFH) for the BSAI crab stocks under consideration. Crab EFH was described in Appendix F of the Crab FMP (NPFMC, 2011). FMP amendment 49, approved on May 31, 2018 (Final Rule: 83 FR 31340), updates the description and identification of EFH, and updates information on adverse impacts to EFH based on the best scientific information available (NOAA Fisheries, 2018).

There is evidence that effective management measures have been put in place by NPFMC and NMFS to avoid, minimize or mitigate impacts to EFH and HAPCs in the Bering Sea and Aleutian Islands. 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. Descriptions of these areas, as well at the coordinates, are provided in the Crab FMP (NPFMC 2011).

- **Aleutian Islands Habitat Conservation Area**
  The use of non-pelagic trawl gear, as described in 50 CFR part 679, is prohibited year-round in the Aleutian Islands Habitat Conservation Area, except for the designated areas open to non-pelagic trawl gear fishing.
- **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 Aleutian Islands Coral Habitat Protection Areas.
- **Alaska Seamount Habitat Protection Area**
  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.
- **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.

Additional HAPC closures, conservation areas, protection zones and other spatially regulated areas are shown in Figure 33

179 https://www.npfmc.org/habitat-protections/

12.2.7.	**There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.**

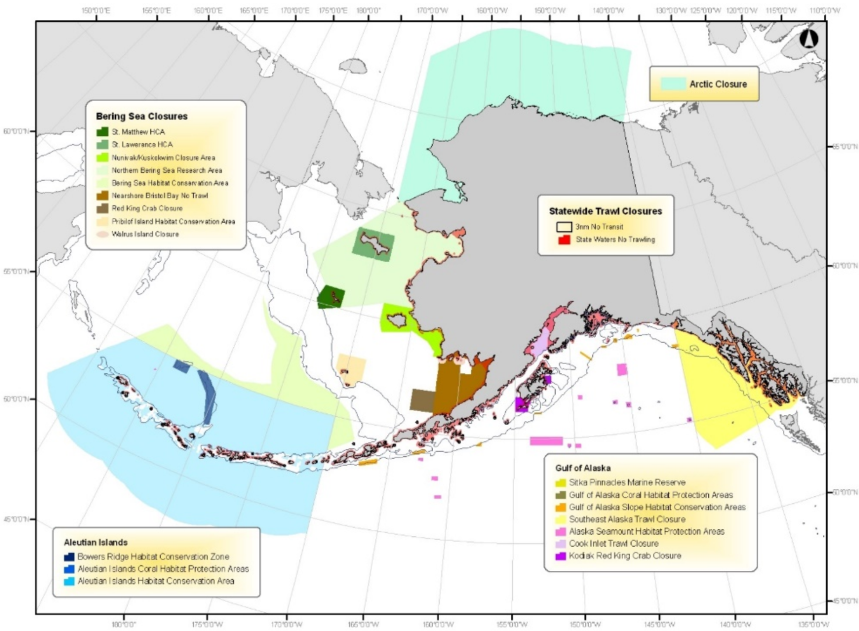

Figure 33. Map of area closures and reserves in the Bering Sea, Aleutian Islands and Gulf of Alaska (source: NPFMC).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there is knowledge of the essential habitats for the stock under consideration and potential fishery impacts on them. Impacts on essential habitats and on habitats that are highly vulnerable to damage by the fishing gear involved are avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat is considered, not just the part of the spatial range that is potentially affected by fishing. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:

There is sufficient evidence to substantiate that there is knowledge of EFH for BSAI King and Tanner crab stocks and that potential fishery impacts on crab EFH as well as impacts on HAPCs are avoided, minimized, or mitigated. Evidence includes:

- EFH for BSAI crab is described in Appendix F of the Crab FMP[180].
- Amendment 49[181] to the Crab FMP updates EFH descriptions.
- EFH has been mapped (Alaska EFH Mapper[182])
- Regulations/closures are in place to protect HAPCs[183]
- The next 5-year EFH review has been initiated[184]

Also see references cited above.

[180] https://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMP.pdf
[181] https://meetings.npfmc.org/CommentReview/DownloadFile?p=c6c652e5-6e47-4758-9db6 7a1107391b32.pdf&fileName=Crab_FMP_Appendix%20F_EFH%20(current).pdf
[182] https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html?id=e94af1927a0d43b983a47fd394718fc5
[183] https://www.npfmc.org/habitat-protections/
[184] https://meetings.npfmc.org/CommentReview/DownloadFile?p=973994fe-bc34-478c-acf5-b021d20f79a9.pdf&fileName=C3%20Crab%20Plan%20Team%20Report%202021-05.pdf

12.2.7.	**There shall be knowledge of the essential habitats for the *stock under consideration* and potential fishery impacts on them. Impacts on essential habitats, and on habitats that are highly vulnerable to damage by the fishing gear involved, shall be avoided, minimized, or mitigated. In assessing fishery impacts, the full spatial range of the relevant habitat shall be considered, not just the part of the spatial range that is potentially affected by fishing.**

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Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.10 Supporting Clause 12.2.8.

12.2.8.	**There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.*	☑

EVIDENCE:
The Council and NMFS have mechanisms to establish outcome indicators for EFH and sensitive/vulnerable habitats including HAPCs. Outcome indicators are consistent with achieving management objectives for avoiding, minimizing, or mitigating habitat impacts of BSAI crab fisheries to EFH and HAPCs.

Current status/Appropriateness/Effectiveness: *Successful outcome indicators and management measures have been developed and are in place to achieve the objectives described in the process parameter.*	☑

EVIDENCE:
The management system has established outcome indicators based on management objectives that seek to avoid, minimize or mitigate impacts on EFH and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. A wide array of ecosystem indicators is used to annually assess and monitor the ecosystems of the Bering Sea, Aleutian Islands, and Gulf of Alaska (Zador 2015; 2016; Siddon and Zador, 2019; Ortiz and Zador, 2020; Siddon,2020; see Supporting Clause 12.2.10) and a number of these indicators relate directly or indirectly to habitat outcomes. Outcome indicator(s) adequately reflect those management objectives for the BSAI fisheries under assessment.

Council Actions
The Council has taken numerous actions to conserve essential Bering Sea habitats (Table 18); also see map in Supporting Clause 12.2.7). Notably, in June 2007, the Council adopted precautionary measures to conserve benthic fish habitat in the Bering Sea by "freezing the footprint" of bottom trawling by limiting trawl effort only to those areas more recently trawled. Implemented in 2008, the new measures prohibit bottom trawling in a deep slope and basin area (47,000 nm2), and three habitat conservation areas around St Matthew Island, St Lawrence Island, and an area encompassing Nunivak Island-Etolin Strait-Kuskokwim Bay. The Council also established the Northern Bering Sea Research Area that includes the shelf waters to the north of St. Matthew Island (85,000 nm2). The northern Bering Sea was set aside for research on impacts of bottom trawling on benthic habitat. Bottom trawling is prohibited in the Northern Bering Sea Research Area. The Council sought to develop a research plan that would provide data to allow better understanding of the potential impacts of trawling on the benthic and epibenthic fauna of the northern Bering Sea before any commercial trawling was authorized.

Table 18. Amendments to the BSAI Groundfish FMP that addressed habitat protection (Source: BS FEP; NPFMC, 2018).

Amendment number	Year	Action
9	1985	Incorporate Habitat Protection Policy
21a	1992	Establish the Pribilof Island Habitat Conservation Area (HCA)
37	1996	Establish Bristol Bay Red King Crab Savings Area
55	1998	Define EFH
57	1998	Pollock Bottom Trawl Prohibition
78	2005	EFH EIS, which redefined EFH, and established the Aleutian Islands (AI) HCA, the AI Coral Habitat Protection Areas, Alaska Seamount Halibut Protection Areas, and the Bowers Ridge HCA
89	2007	Bering Sea Habitat Conservation Area
94	2009	Required bottom trawl sweep modification to revise boundaries of the Northern Bering Sea Research Area and the Saint Matthew Island HCA
98	2011	Essential Fish Habitat Omnibus Amendments
104	2013	Develop Skate HAPCs
115*	2017	Essential Fish Habitat Omnibus Amendments

12.2.8.	**There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.**

More recently, the Council designated as HAPCs six areas in the eastern Bering Sea where relatively high concentrations of skate eggs occur for several skate species (family Rajidae). Fishing activities are not restricted within these skate egg HAPCs. The Council has also taken actions/enacted protective measures as follows: Large areas around Pribilof Islands, Bristol Bay and the Bering Sea Red King Crab Closure Area closed to scallop fishing and bottom trawling to protect crab and other sensitive habitat; and ten miles around St. Lawrence, King and Little Diomede Islands closed to king and Tanner crab fishing to protect subsistence fisheries for crab (NPFMC, 2019).

<u>Federal Monitoring Indicators</u>
NOAA Fisheries compiles annual Ecosystem Status Reports for the Gulf of Alaska, Bering Sea and Aleutian Islands. At least four of these outcome indicators are useful for monitoring of adverse impacts to habitats.

1) Habitat – Structural Epifauna, Aleutian Islands (from Rooper, 2016). Groups considered to be structural epifauna, formerly known as HAPC biota, include seapens/seawhips, corals, anemones, and sponges. The biennial survey in the Aleutian Islands does not sample estimate the density of HAPC fauna well, but does seem to capture spatial trends in presence or absence. However, survey effort in rough or rocky areas where these groups are likely to be more abundant and survey effort is quite limited. The two major threats to populations of benthic invertebrates in the Aleutian Islands have been identified as fishing impacts and impacts of climate change. Both of these processes are occurring in the Aleutian Islands. Much of the benthic habitat in the Aleutians (~50% of the shelf and slope to depths of 500 m) has been protected from mobile fishing gear since 2006, however, no studies have been conducted to determine potential recovery or expansion of populations due to the closures.

2) Area Disturbed by Trawl Fishing Gear in the Eastern Bering Sea (Grieg and Zador, 2015). Fishing gear can affect habitat used by a fish species for the processes of spawning, breeding, feeding, or growth to maturity. An estimate of the area of sea floor disturbed by trawl gear may provide an index of habitat disturbance. The area disturbed in the Eastern Bering Sea floor was calculated from observer trawl data each year from 1990-2014.

3) Time Trends in Non-Target Species Catch (Whitehouse *et al*., 2015). We monitor the catch of non-target species in groundfish fisheries in the Eastern Bering Sea (EBS), Gulf of Alaska (GOA) and Aleutian Islands (AI) ecosystems. The three categories of non-target species tracked are: 1. Scyphozoan jellyfish; 2. species associated with Habitat Areas of Particular Concern-HAPC species (seapens/whips, sponges, anemones, corals, tunicates); and 3. Assorted invertebrates (bivalves, brittle stars, hermit crabs, miscellaneous crabs, sea stars, marine worms, snails, sea urchins, sand dollars, sea cucumbers, and other miscellaneous invertebrates). Data derive from groundfish fisheries. As such, this indicator may have limited utility in relating habitat trends to crab pot fisheries.

4) Maintaining and Restoring Fish Habitats (Olson, 2015). This indicator looks at areas closed to bottom trawling in the EBS/ AI and GOA. Many trawl closures have been implemented to protect benthic habitat or reduce bycatch of prohibited species (i.e., salmon, crab, herring, and halibut). Some of the trawl closures are year-round while others are seasonal. In general, year-round trawl closures have been implemented to protect vulnerable benthic habitat. Seasonal closures are used to reduce bycatch by closing areas where and when bycatch rates had historically been high. This indicator does not distinguish trawl closures from closures to other gear types (fixed gears, bottom contact gears) making it difficult to relate observed trends to crab pot fishing.

<u>BSCCG Actions</u>
Since the previous full assessment (Global Trust, 2017), the Bering Sea Crab Client Group (BSCCG) has implemented two corrective actions that serve as outcome indicators for avoiding or minimizing adverse impacts by the AIGKC fishery to sensitive/HAPC habitats: monitoring of fishery compliance with HAPC closure areas; and reviewing trends in coral bycatch rates.

12.2.8.	**There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.**

1. Monitoring of fishing effort in proximity to closure areas

BSCCG completed a review of the updated charting through the most recent season available (2017/18) of AIGKC pot fishing effort overlain with the closure areas (6 polygonal no-fishing areas). Figure 34 from ADFG staff continues to reflect a high degree of compliance of no fishing activity within the closed areas. There are approximately 18,300 GKC pots observed over the period after the closures went into effect through the most recently available data (2007-2018). For this update there are no new instances of pot effort reported inside the closure areas. As noted for the previous season, there were two (2) observed pots reported inside the southern-most closure area that reflected 99.88% of pots were observed and reported outside the closures in 2013. Review of the information with Dr. Siddon and ADFG staff indicates that observations for the 2 pots of interest may contain positional errors. Further, part of required compliance during AIGKC fishing operations is an active vessel monitoring system (VMS) which documents each boat's activity with a high degree of positional precision, especially adjacent to closed or sensitive areas. BSCCG consulted with all fishermen in the stakeholder group and further with ADFG Westward Region staff (Kodiak and Dutch Harbor) and NMFS (Dutch Harbor) and have found no evidence of a VMS report of activity inside the closed area of interest.

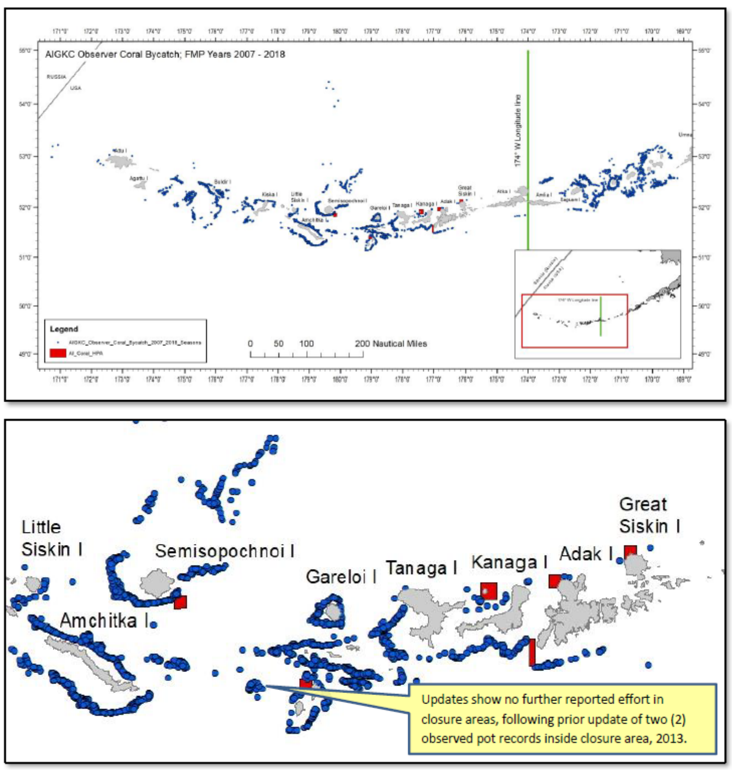

Figure 34. Updated spatial plot of AIGKC pot effort in proximity to AI Coral Closure Areas, 2007-2018 (top panel total area, bottom panel zoomed into red closure areas reflecting no further reported effort inside closure areas). Source: ADF&G, C. Siddon, L. Hulbert (Spatial data may be confidential).

2. Review of AIGKC observer pot bycatch data for coral species to evaluate trends in bycatch CPUE

In collaboration with ADFG staff in Juneau, BSCCG completed an update of the bycatch database from the AIGKC observer data over the period of interest (2007-2018). Coral bycatch rates are variable, but are consistently declining over the last 5 reported years (2014-2018). On average, the summary suggests that about 28% of observed pots have coral bycatch. Coral bycatch, as defined in the observer records, has not been further reviewed at this time to ascertain relative differences between pots with single or many pieces of coral, or any other qualitative factors that may help with further understanding of documented bycatch.

12.2.8.	**There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.**

Table 19. Tabular summary of AIGKC pot coral bycatch as recorded in the ADFG observer bycatch database, 2007-2018. Source: ADF&G, C. Siddon, L. Hulbert [04/06/20 email] (summarized data may be confidential).

FMP Year	Observer Pot Count - ALL	Pots with Coral Count - ALL	Percent of Pots with Coral
2007	2080	467	22.45%
2008	1592	364	22.86%
2009	1301	452	34.74%
2010	1303	450	34.54%
2011	1198	304	25.38%
2012	1547	462	29.86%
2013	1720	574	33.37%
2014	1513	517	34.17%
2015	1774	464	26.16%
2016	1675	430	25.67%
2017	1393	346	24.84%
2018	1233	296	24.01%

Evidence Basis:
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating impacts on essential habitats for the stock under consideration and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification. Examples may include various regulations, data, and reports. ☑

EVIDENCE:
There is evidence that outcome indicators help to achieve management objectives of avoiding, minimizing, or mitigating impacts on EFH for BSAI crab stocks under assessment and on habitats that are highly vulnerable to damage by the fishing gear. Evidence includes:

- EFH for BSAI crab is described in Appendix F of the Crab FMP[185].
- Fishing Effects (FE) model results in updated EFH descriptions (Amendment 49[186]).
- EFH has been mapped (Alaska EFH Mapper[187])
- Regulations/closures are in place to protect HAPCs[188]
- Ecosystem Status reports[189] utilize outcome indicators of direct relevance to monitoring habitats
- Ongoing monitoring of crab bycatch including HAPC biota (e.g., Gaeuman, 2014)
- Ongoing work by BSCCG to review coral bycatch rates and fishing effort in proximity to closure areas

Also see references cited above.

References:

Gaeuman, W. B. 2014. Summary of the 2013/2014 mandatory crab observer program database for the Bering Sea/Aleutian Islands commercial crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 14-49, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/fds14-49.pdf

Global Trust, 2017. Alaska Responsible Fisheries Management Certification: Full Assessment and Certification Report for the U.S. Alaska Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries, December 7, 2017, 376 p. https://www.alaskaseafood.org/rfm-certification/certified-fisheries/alaska-crab/

185 https://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMP.pdf
186 https://meetings.npfmc.org/CommentReview/DownloadFile?p=c6c652e5-6e47-4758-9db6 7a1107391b32.pdf&fileName=Crab_FMP_Appendix%20F_EFH%20(current).pdf
187 https://alaskafisheries.noaa.gov/portal/apps/webappviewer/index.html?id=e94af1927a0d43b983a47fd394718fc5
188 https://www.npfmc.org/habitat-protections/
189 https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

12.2.8.	There shall be outcome indicator(s) consistent with achieving management objectives for avoiding, minimizing, or mitigating the impacts of the unit of certification on essential habitats for the *stock under consideration* and on habitats that are highly vulnerable to damage by the fishing gear of the unit of certification.

Grieg, A. and Zador, S. 2015. Area Disturbed by Trawl Fishing Gear in the Eastern Bering Sea. In: Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

NPFMC, 2019. Bering Sea Fishery Ecosystem Plan. North Pacific Fishery Management Council. January 2019. 133 p. https://meetings.npfmc.org/CommentReview/DownloadFile?p=c334ad33-4139-4b5a-b205-a8b7c5028562.pdf&fileName=D6%20Final%20BS%20FEP%20Jan%202019.pdf

Olson, J. 2015. Maintaining and Restoring Fish Habitats: Areas Closed to Bottom Trawling in the EBS/ AI and GOA. Last updated: August 2015. In: Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

Ortiz, I., and Zador, S. (Eds.) 2020. Ecosystem Status Report 2020 Aleutian Islands. Nov 17, 2020. https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

Rooper, C. 2016. Habitat. Structural Epifauna - Aleutian Islands. Pp.58-61 In: Zador, S., (Ed.) (2016) Ecosystem Considerations 2016: Status of the Aleutian Islands Marine Ecosystem. NPFMC November 14, 2016, 110 p. https://access.afsc.noaa.gov/reem/ecoweb/index.php?ID=31

Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

Siddon, E. and Zador, S. (Eds.) 2019. Ecosystem Status Report 2019: Eastern Bering Sea. EBS Ecosystem Status. 223 p. https://apps-afsc.fisheries.noaa.gov/refm/reem/ecoweb/index.php

Whitehouse, A., Gaichas, S. and Zador, S. 2015. Time Trends in Non-Target Species Catch. In: Zador, S., (Ed.) (2015) Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

Zador, S., (Ed.) 2015. Ecosystem Considerations 2015: Status of Alaska's Marine Ecosystems. NPFMC November 16, 2015, 297 p. https://www.afsc.noaa.gov/REFM/Docs/2015/ecosystem.pdf

Zador, S., (Ed.). 2016. Ecosystem Considerations 2016. Status of the Aleutian Islands Marine Ecosystem. NPFMC November 14, 2016, 110 p. https://www.afsc.noaa.gov/REFM/Docs/2016/ecosysAI.pdf

Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3) =	**Overall score**
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.11 Supporting Clause 12.2.9.

<table>
<tr><td>12.2.9.</td><td colspan="2">The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.</td></tr>
<tr><td>Relevance:</td><td colspan="2">Relevant.</td></tr>
<tr><td colspan="2">Evaluation Parameters</td><td>Met?</td></tr>
<tr><td colspan="2">Process:
There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures. If information has been utilized from generic evidence based on similar fishery situations, then, based on the risk of severe adverse impact, the information shall be of higher precision for higher risk. For example, any of the following elements can be considered high risk for a fishery: keystone species, species with relative low growth rates or high catchability, fisheries with significant ETP species or bycatch of non-target fishery resources (or non-target stocks, species, harvests, or discards), or fisheries with important concerns for gear–habitat interactions. If information specific to the unit of certification area is available, generic evidence based on similar fishery situations may not be necessary.</td><td>☑</td></tr>
<tr><td colspan="3">EVIDENCE:
At the highest level, the BS FEP (NPFMC, 2020) addresses ecosystem-based fishery management across all Bering Sea commercial fisheries. The BS FEP incorporates explicit principles, policies, and guidelines for ecosystem-based management to be implemented in Fishery Management Plans, including measures designed to meet the mandates of the MSA, other applicable law, and six established ‘Ecosystem Goals’:
1. Maintain, rebuild, and restore fish stocks at levels sufficient to protect, maintain, and restore food web structure and function;
2. Protect, restore, and maintain the ecological processes, trophic levels, diversity, and overall productive capacity of the system;
3. Conserve habitats for fish and other wildlife;
4. Provide for subsistence, commercial, recreational, and non-consumptive uses of the marine environment;
5. Avoid irreversible or long-term adverse effects on fishery resources and the marine environment;
6. Provide a legacy of healthy ecosystems for future generations.

Section 7 of the BS FEP provides a detailed account of how the Council’s existing procedures and policies for managing fisheries in the Bering Sea EEZ account for interactions among Bering Sea fisheries, ecosystems, and human activities to optimize food production and protect the marine ecosystem. Section 7 details the involvement of state and federal agencies, universities and the public in Council processes, as well as outlining the legal framework for Council action.

With respect to the unit of assessment under consideration here, processes are well established at Council, Federal and State levels to ensure that the most probable impacts from BSAI crab fisheries are assessed, considered, and where necessary impacts are remediated. See evidence under “Current Status” below which describes agency roles in identifying ecosystem risks, assessing risk severity, and actioning management response.</td></tr>
<tr><td colspan="2">Current status/Appropriateness/Effectiveness:
There is evidence that the fishery management organization considers the most probable adverse impacts of the fishery under assessment on the ecosystem (e.g., food-webs effects), by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these impacts are likely to be irreversible or very slowly reversible; or effective remedial action shall be taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored. There are policies in place (e.g., harvest control rules) that are effective at protecting ecosystem</td><td>☑</td></tr>
</table>

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

functioning and accounting for species' ecological role, and precautionary and effective spatial management is used (e.g., to protect spawning areas, prevent localized depletion, and protect important foraging areas for predators of fished species) if applicable.	

EVIDENCE:
Fishery management organizations have a strong record of assessing the potentially adverse impacts of the BSAI Crab fisheries upon the ecosystem. In 2004, NMFS released the Final Environmental Impact Statement (FEIS) for the BSAI Crab Fisheries, in accordance with provisions of the National Environmental Policy Act of 1969 (NEPA). The Crab FEIS also served as the primary environmental review document supporting the Fishery Management Plan for BSAI king and Tanner Crabs. It summarized and analysed the best available scientific information about crab resources and the benthic environment in the BSAI and assessed the environmental impacts resulting from fishery management actions.

More recently, ecosystem information specific to BSAI crab stocks was updated and consolidated into a Crab Ecosystem Considerations and Indicators report (Chilton *et al.*, 2011) for the NPFMC. This report provided a detailed review of fishery-specific impacts on the physical environment, fishery-specific impacts on the biological environment, and fishery-specific impacts on crab biology.

The Council has taken ecosystem considerations into account during the annual TAC setting process and when recommending conservation and management measures to NMFS. Recent examples of ecosystem considerations in Bering Sea fisheries include: protecting marine food webs; monitoring ecosystem health; evaluating ecological, social, and economic trade-offs of different management actions; reducing bycatch; conserving important habitat; avoiding impacts to seabirds and marine mammals; adapting management to maintain resilient fisheries and ecosystems in a changing climate; providing for sustained participation of fishing communities; and fostering meaningful and diverse stakeholder participation in the Council process.

Ongoing programs to assess and monitor for potential ecosystem impacts of fisheries is described in the BS FEP (NPFMC, 2020). Programs include: Stock Assessments and Annual Catch Limits; AFSC Bottom Trawl Survey; AFSC Midwater/Acoustic Trawl Survey; AFSC Longline Surveys; IPHC Fishery-Independent Setline Survey; Bering Sea Integrated Ecosystem Research Program; Alaska Integrated Ecosystem Assessment; Marine Mammal Assessment; and Ecosystem Component Species.

Current status/Appropriateness/Effectiveness: *The bait used to capture the stock under consideration shall not be formally classified as ETP species (by Alaska or other international designations), and the fishery under consideration does not hinder recovery or rebuilding of overfished species that are not formally classified as ETP species and used as bait.*	☑

EVIDENCE:
Crab pots are baited with herring (e.g., *Clupea pallasi*) or other fresh bait such as Pacific cod (*Gadus macrocephalus*) or both. Herring is usually placed within a "bait bag" which is then secured to the trap so that it does not float away. Pacific cod is often attached to the inside of the trap as "hanging bait" (S. Goodman, pers. comm.). Pacific cod stocks are managed in accordance with the BSAI Groundfish Fishery Management Plan (NPFMC, 2020). Alaska's Pacific herring stocks are managed according to state harvest policies (Woodby *et al*., 2005). Neither Pacific herring nor Pacific cod are considered ETP species and the stocks in question are not currently overfished.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

EVIDENCE:

There is clear evidence that the NPFMC, NMFS and ADF&G consider the most probable impacts of the UoC on the ecosystem, assess and monitor those impacts, and where necessary take remedial actions to address adverse impacts if and when they should arise. Examples include:

- Crab FMP (NPFMC 2011)
- Crab EIS (NMFS, 2004)
- annual Crab SAFE Reports (NPFMC, 2020a)
- Crab CECIs (Chilton *et al.*, 2011)
- BS and AI FEPs (NPFMC, 2007; 2018)
- ADF&G Mandatory Crab Observer Program (e.g., Gaeuman, 2014)
- annual Alaska Ecosystem Status Reports (Siddon, 2020; Ortiz and Zador, 2020)

References:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

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Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

Woodby, D., Carlile, D., Siddeek, S., Funk, F., Clark, J. H., and Hulbert, L. 2005. Commercial Fisheries of Alaska. Alaska Department of Fish and Game, Special Publication No. 05-09, Anchorage. 74 p. https://www.adfg.alaska.gov/fedaidpdfs/sp05-09.pdf

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3)	=	Overall score
	10		0			10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High

12.2.9.	**The fishery management organization shall consider the most probable adverse impacts of the fishery under assessment on the ecosystem (Appendix 1, Part 6), by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**	
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)		Full Conformance
Non-conformance Number (if applicable):		**-**

9.5.1.12 Supporting Clause 12.2.10.

12.2.10.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhanced activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.**
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *There is a process to allow for drafting effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. There is also a process that states modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.*	☑

EVIDENCE:
The Council has established a process for developing outcome indicators that are consistent with minimizing adverse impacts of fisheries to the structure, processes and function of the Bering Sea and Aleutian Islands ecosystems. As summarized in the Bering Sea Fishery Ecosystem Plan (FEP) (NPFMC 2019) and Aleutian Islands FEP (NPFMC, 2007), ecosystem considerations are taken into account during the annual TAC setting process and conservation and management measures align with the overarching policies, objectives, and applicable law for ecosystem-based management. The Bering Sea FEP specifies the following topics:

- Protecting marine food webs
- Monitoring ecosystem health
- Evaluating ecological, social, and economic tradeoffs of different management actions
- Reducing bycatch
- Conserving important habitat
- Avoiding impacts to seabirds and marine mammals
- Adapting management to maintain resilient fisheries and ecosystems in a changing climate
- Providing for sustained participation of fishing communities
- Fostering meaningful and diverse stakeholder participation in the Council process

No enhancement activities are associated with the BSAI crab stocks under assessment. Therefore, outcome indicators for habitat modification are not applicable.

Current status/Appropriateness/Effectiveness: *There is evidence for outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:
There are outcome indicators specific to the BSAI king and Tanner crab fisheries. A set of 'Crab Ecosystem Considerations Indicators' or CECIs (Chilton *et al.*, 2011) are used to assess impacts of crab fisheries on aquatic ecosystems. These CECIs are consistent with achieving management objectives of identifying and minimizing adverse impacts of BSAI crab fisheries on aquatic ecosystems. Annual Stock Assessment and Fishery Evaluation (SAFE) reports have a chapter dedicated to ecosystem considerations (e.g., NPFMC, 2020) or, more recently for SMBKC and BBRKC stocks, an Ecosystem and Socioeconomic Profile (ESP) (Fedewa *et al.*, 2020a, b).

12.2.10.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhanced activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.**

In addition to crab-specific indicators, managers utilize outcome indicators which are more broadly applicable to the monitoring of the Alaska's fisheries and marine ecosystems, as described in Alaska Marine Ecosystem Status Reports[190]. The goals of the Ecosystem Status Reports are to (1) provide stronger links between ecosystem research and fishery management and (2) spur new understanding of the connections between ecosystem components by bringing together the results of diverse research reports into one document. A wide array of indicators is utilized to assess physical and environmental trends, ecosystem trends, and fishing and fisheries trends. Ecosystem Status Reports are updated regularly and are accessible online: see Siddon (2020) and Ortiz and Zador (2020) for recent reports for Eastern Bering Sea and Aleutian Islands, respectively. Taken together, there is strong evidence that management utilizes outcome indicators consistent with achieving management objectives that seek to minimize adverse impacts of BSAI crab fisheries on the structure, processes and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible.

No enhancement activities are associated with the BSAI crab stocks under assessment. Therefore, outcome indicators for habitat modification are not applicable.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhancement activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration are reversible and do not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function. Examples may include various regulations, data, and reports.*	☑

EVIDENCE:
See referenced cited above.

References:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Fedewa, E., Garber-Yonts, B., and Shotwell, K. 2020a. Appendix D. Ecosystem and Socioeconomic Profile of the Saint Matthew Blue King Crab Stock. September 2020. In: Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC. October 2020. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

Fedewa, E., Garber-Yonts, B., and Shotwell, K. 2020b. Appendix E. Ecosystem and Socioeconomic Profile of the Bristol Bay Red King Crab Stock. September 2020. NPFMC. October 2020. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

NPFMC, 2007. Aleutian Islands Fishery Ecosystem Plan. December, 2007. 198 p. https://www.npfmc.org/aleutian-islands-fishery-ecosystem-plan/

NPFMC, 2019. Bering Sea Fishery Ecosystem Plan. North Pacific Fishery Management Council. January 2019. 133 p. https://meetings.npfmc.org/CommentReview/DownloadFile?p=c334ad33-4139-4b5a-b205-a8b7c5028562.pdf&fileName=D6%20Final%20BS%20FEP%20Jan%202019.pdf

Ortiz, I., and Zador, S. (Eds.) 2020. Ecosystem Status Report 2020 Aleutian Islands. Nov 17, 2020. https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

[190] https://www.fisheries.noaa.gov/alaska/ecosystems/ecosystem-status-reports-gulf-alaska-bering-sea-and-aleutian-islands

12.2.10.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to minimize adverse impacts of the unit of certification (including any fishery enhanced activities) on the structure, processes, and function of aquatic ecosystems that are likely to be irreversible or very slowly reversible. Any modifications to the habitat for enhancing the stock under consideration must be reversible and not cause serious or irreversible harm to the natural ecosystem's structure, processes, and function.**
	Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

Numerical score:	**Starting score**	–	**(**	**Number of EPs NOT met**	x	3	**)**	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.13 Supporting Clause 12.2.11.

12.2.11.	**The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process that accounts for the most probable adverse impacts of the unit of certification on the ecosystem. This may take the form of an immediate management response or a further analysis of the identified risk. In the absence of specific information on the ecosystem impacts of fishing for the unit of certification, generic evidence based on similar fishery situations (proxies) can be used for fisheries with low risk of severe adverse impact. However, the greater the risk the more specific evidence shall be necessary to ascertain the adequacy of mitigation measures.*		☑

EVIDENCE:

Fishery management organizations have established processes to address the most probable adverse impacts of BSAI crab fisheries on the ecosystem. Council processes for the assessment of ecosystem impacts, analysis of severity of those impacts to the ecosystem, and formulation of conservation and management measures needed to address those ecosystem impacts are described in Section 7 of the BS FEP (NPFMC, 2020). Also see evidence for NPFMC processes presented in Supporting Clause 12.2.9.

More broadly, NEPA processes ensure that human activities with potential to impact BSAI crab resources are assessed and, where appropriate, corrected. The Council's analytical review documents that evaluate proposed changes to the conservation and management of groundfish and shellfish stocks for which they are responsible, are NEPA compliant documents. These documents are widely distributed and made available so that the public at large and other natural resource, management or development agencies will have an opportunity to testify or comment on possible impacts to their sphere of influence. In like manner, when other resource, development or management agencies that receive federal funds wish to implement new activities or develop new regulations that may impact fisheries under the auspicious of the Council, they must also develop NEPA documents which show their project's plan conform to existing Council FMPs and seek comments from the Council on ways that their proposed activities may impact the resources under Council jurisdiction.

NEPA requires federal agencies to prepare Environmental Assessments or Environmental Impact Statements prior to making decisions. The President's Council on Environmental Quality, referred to as CEQ, which was established along with NEPA, has adopted regulations and other guidance that provide general procedures for federal agencies to follow when preparing these documents. Moreover, each federal agency has adopted its own detailed NEPA procedures, and the federal courts, after more than 30 years of litigation, have played a major role in shaping NEPA's interpretation and implementation. Further details of the process can be found in The NEPA Book (Bass *et al*., 2001) and A Citizen's Guide to NEPA (CEQ, 2007).

Current status/Appropriateness/Effectiveness: *There is evidence that the fishery management organization considers the most probable adverse human impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge. Accordingly, these impacts are unlikely to be irreversible or very slowly reversible; if so, effective remedial action shall be taken. Reversibility refers to the effects of a process or condition capable of being reversed so that the previous state is restored.*	☑

EVIDENCE:

Fishery Management organizations have considered the most probable adverse impacts of BSAI crab fisheries on the ecosystem (Crab Final EIS, NMFS 2004; also see Supporting Clause 12.2.9). The consensus view is that impacts to ecosystems from crab fisheries are unlikely to be irreversible or very slowly reversible.

The potential for adverse environmental impacts on BSAI crab resources from human activities are also assessed. NPFMC and NMFS conduct regular assessments of crab ecosystems and habitats and investigate how environmental factors affect

12.2.11.	**The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

crab resources (e.g., Chilton *et al.*, 2011). Findings and conclusions are published in the Ecosystem Considerations chapter of the annual SAFE document (e.g., NPFMC, 2020), ESPs (Fedewa *et al.*, 2020a, b), and the various other research reports (e.g., Aydin *et al.*, 2007, Marcello *et al.*, 2012).

Currently, the best available science indicates that the largest impact resulting from human activities on BSAI crab resources, and more specifically, on the five stocks under consideration here, is fishing (an example from EBS Tanner crab is given in the table below). Directed crab fishing as well as crab bycatch in other fisheries such as the groundfish fisheries is assessed yearly and corrected appropriately through yearly stock assessment activities, and through the formulation of overfishing levels (OFLs), acceptable biological catches (ABCs), annual catch limits (ACLs), and total allowable catches (TACs). These determinations and actions are all documented in the yearly crab SAFE report compiled by ADF&G, NMFS and NPFMC scientists (e.g., Crab 2020 SAFE; NPFMC, 2020).

Table 20. Effects of Tanner crab fishery on Ecosystem (Stockhausen, 2020).

Effects of Tanner crab fishery on ecosystem			
Indicator	Observation	Interpretation	Evaluation
Fishery contribution to bycatch			
Prohibited species	salmon are unlikely to be trapped inside a pot when it is pulled, although halibut can be	unlikely to have substantial effects at the stock level	minimal to none
Forage (including herring, Atka mackerel, cod and pollock)	Forage fish are unlikely to be trapped inside a pot when it is pulled	unlikely to have substantial effects	minimal to none
HAPC biota	crab pots have a very small footprint on the bottom	unlikely to be having substantial effects post rationalization	minimal to none
Marine mammals and birds	crab pots are unlikely to attract birds given the depths at which they are fished	unlikely to have substantial effects	minimal to none
Sensitive non-target species	Non-targets are unlikely to be trapped in crab pot gear in substantial numbers	unlikely to have substantial effects	minimal to none
Fishery concentration in space and time	substantially reduced in time following rationalization of the fishery	unlikely to have substantial effects	probably of little concern
Fishery effects on amount of large size target fish	fishery selectively removes large males	may impact stock reproductive potential as large males can mate with a wider range of females	possible concern
Fishery contribution to discards and offal production	discarded crab suffer some mortality	may impact female spawning biomass and numbers recruiting to the fishery	possible concern
Fishery effects on age-at maturity and fecundity	none	unknown	possible concern

12.2.11.	**The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.**

Where the potential for adverse environmental impacts of human activities on ecosystems or on crab resources does arise, there is evidence that the Council considers and NMFS undertakes appropriate corrective actions. For example, the Council and NMFS have taken measures to protect and conserve EFH and HAPCs through establishment of habitat protection areas and habitat conservation areas (NPFMC 2020; see summary in Supporting Clause 12.7 regarding MPAs).

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization considers the most probable adverse impacts of the unit of certification on the ecosystem, by assessing and, where appropriate, addressing and or/correcting them, taking into account the best scientific evidence available and local knowledge. Accordingly, these catches (including discards) are monitored and do not threaten these non-target stocks with serious risk of extinction, recruitment overfishing, or other impacts that are likely to be irreversible or very slowly reversible; if such impacts arise, effective remedial action is taken. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
References cited above and in the evidence sections of Supporting Clause 12.9.

References:

Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. NOAA Tech. Memo. NMFS-AFSC-178. 298 p. https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-178.pdf

Bass, R.E., A. I. Herson, and K. M. Bogdan. 2001. The NEPA BOOK: A step-by-step guide on how to comply with the National Environmental Policy Act. 2001 (Second) Edition. Solano Press Books. ISBN 0-923956-67-0 http://www.solano.com/old_site_02/oldsite/bookinfo_nepa.htm

CEQ. 2007. A Citizen's Guide to the NEPA. Having Your Voice Heard. Council on Environmental Quality, Executive Office of the President. December 2007. 45 p. https://ceq.doe.gov/get-involved/citizens_guide_to_nepa.html

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

Fedewa, E., Garber-Yonts, B., and Shotwell, K. 2020a. Appendix D. Ecosystem and Socioeconomic Profile of the Saint Matthew Blue King Crab Stock. September 2020. In: Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC. October 2020. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

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NMFS, 2004. Bering Sea Aleutian Islands Crab Fisheries Final Environmental Impact Statement. NOAA NMFS, NPFMC. August 2004. 1003 p. https://alaskafisheries.noaa.gov/sites/default/files/analyses/crabeis0804-chapters.pdf

NPFMC, 2020a. Stock Assessment and Fishery Evaluation Report for the King and Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC, Anchorage, AK. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

Stockhausen, W.T. 2020. 2020 Stock Assessment and Fishery Evaluation Report for the Tanner Crab Fisheries of the Bering Sea and Aleutian Islands Regions. NPFMC, Anchorage, AK. https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/

12.2.11.	The fishery management organization shall consider the most probable adverse human impacts on the stock/ecosystem under consideration, by assessing and, where appropriate, addressing and or/correcting them, taking into account available scientific information and local knowledge.

Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		**0**		**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.14 Supporting Clause 12.3.

12.3.	**The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species[191] in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism in place by which the role of the stock under consideration in the food web is assessed and monitored, and its relative importance as a prey species is determined. If the species is considered by the fisheries management organization to be an important prey species, there shall be specific management objectives relating to minimizing the impacts of the fishery on dependent predators. The FAO Guidelines require that all sources of fishing mortality on the stock under consideration are taken into account (whether or not it is a prey species) in assessing the state of the stock under consideration, including discards, unobserved mortality, incidental mortality, unreported catches, and catches in other fisheries.*		☑

EVIDENCE:

The role of BSAI crab stocks in the food web has been adequately considered. The King and Tanner crab stocks under assessment are not considered key prey species in BSAI ecosystems (Chilton *et al.*, 2011). Relatively few species have been identified as predators of legal-sized male crab although specific information is limited due to the difficulty of identifying prey items to the species level with only partial carapace or dactyl pieces. As discussed below, for those predators that are known to prey upon the crab species under consideration here, there is no indication of dependency in this trophic relation.

<u>Fish Predation</u>

Based on food habits data collected in the summer months during the annual EBS bottom trawl survey, Pacific cod (not overfished), Pacific halibut (not overfished) and skates (not considered overfished or suffering overfishing) are the primary predators of large or legal-size crab although legal sized crab are a minimal component of these predators' diets. Pacific cod and large sculpins prey on adult king, Tanner and snow crab (NPFMC 2003; Aydin *et al.*, 2007) but adult crabs are relatively invulnerable to predation except after molting when they are in a soft-shell state (Blau 1986, Livingston 1989, Loher *et al.*, 1998).

Records of predation on golden and blue king crab are rare (Chilton *et al.*, 2011). The Resource Ecology and Ecosystem Modeling Program at AFSC collected stomachs on the EBS bottom trawl survey from over 100 species, yet BKC were found only in Pacific cod, walleye pollock and yellowfin sole stomachs. From 1981 to 2005, five Pacific cod, 27 walleye pollock and eight yellowfin sole contained BKC prey from a total of 13,831 stomach samples with Pacific cod having the largest amount of BKC by weight (AFSC, REEM food habits database). One golden king crab was found in a white-blotched skate (*Bathyraja maculata*) stomach from the 612 samples collected from along the Kuril Islands and southeast Kamchatka during 1996 (Orlov, 1998). Simenstad *et al.* (1977) assessed the AI marine food web in the vicinity of Amchitka Island and reported six instances of GKC and RKC in 69 halibut stomachs examined from inshore areas.

<u>Marine Mammals and Seabirds</u>

Ecosystem indicators for marine mammals and seabirds have been developed and implemented (Siddon, 2020; Ortiz and Zador, 2020). The Crab Ecosystem SAFE (Chilton *et al.*, 2011) also presents crab-specific outcome indicators which are consistent with achieving avoidance of severe adverse impacts to dependent predators by BSAI crab fisheries.

According to Chilton *et al.* (2011), NMFS conducted Endangered Species Act (ESA) Section 7 Consultations-Biological Assessments on the impact of the Bering Sea and Aleutian Island FMP crab fisheries on marine mammals (NMFS 2000) and on seabirds (NMFS 2002). As noted in the Endangered Species Act EIS report, crab fisheries do not adversely affect ESA listed species, destroy or modify their habitat, or comprise a measurable portion of their diet (NMFS 2004). Although the possibility

[191] See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.

12.3.	The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species[191] in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.

of strikes of listed seabirds with crab fishing vessels does exist (NMFS 2000), NMFS concluded that available evidence is not sufficient to suggest that these interactions occur in today's fisheries or limit the recovery of seabirds. Of non-listed marine mammals, bearded seals (*Erignathus barbatus*) are the only marine mammal potentially impacted by crab fisheries insofar as crab are a measurable portion of their diet (NMFS, 2004). For non-listed seabirds, the Alaska Groundfish Fisheries Final Programmatic SEIS (NMFS 2004) provides life history, population biology and foraging ecology for marine birds. The SEIS concluded that crab stocks under the NPFMC fishery management plan have very limited interaction with non-listed seabirds.

Additionally, it should be noted that there is ongoing assessment and monitoring of the roles of BSAI crab stocks in the food web. As described in the evidence for Supporting Clause 5.1.2, annual stock assessment and fishery evaluation (SAFE) reports take into account all sources of fishing mortality on BSAI crab stocks, including discards, unobserved mortality, incidental mortality, unreported catches, and catches in other fisheries.

Current status/Appropriateness/Effectiveness: *Management measures have been developed and are in place to achieve the management objectives described in the process parameter, and there is evidence to demonstrate that they are successful to this end. If the species under assessment is not considered to be a key prey species, then this parameter shall be considered fulfilled.*	☑

EVIDENCE:
BSAI crab stocks are not considered key prey species.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the role of the stock under consideration in the food web is considered, and if it is a key prey species in the ecosystem, objectives and management measures are in place to avoid severe adverse impacts on dependent predators. Examples may include various stock and ecosystem assessment reports.*	☑

EVIDENCE:
High quality evidence is available and sufficient to demonstrate that the food web roles of the BSAI crab stocks under assessment have been adequately considered by management and these crab stocks are not key prey species. Evidence includes:

- Annual Crab SAFE (NPFMC, 2020)
- Alaska Marine Mammal stock assessments (Muto *et al.*, 2021)
- Annual Ecosystem Status Reports for EBS and AI (Siddon, 2020; Ortiz and Zador, 2020)

References:

Aydin, K., S. Gaichas, I. Ortiz, D. Kinzey, and N. Friday. 2007. A comparison of the Bering Sea, Gulf of Alaska, and Aleutian Islands large marine ecosystems through food web modeling. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-178, 298p. https://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-178.pdf

Blau, S.F. 1986. Recent declines of red king crab (*Paralithodes camtschatica*) populations and reproductive conditions around the Kodiak Archipelago, Alaska, pp 360-369. In G. S. Jamieson and N. Bourne (eds.), North Pacific Workshop on stock assessment and management of invertebrates. Canadian Special Publication of Fisheries and Aquatic Sciences 92.

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and R.J. Foy (2011) Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

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12.3.	The role of the *stock under consideration* in the food web shall be considered, and if it is a key prey species[191] in the ecosystem, management objectives and measures shall be in place to avoid severe adverse impacts on dependent predators.

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Orlov, 1998. The diets and feeding habits of some deep-water skates (Rajidae) in the Pacific waters off the Northern Kuril Islands and Southeastern Kamchatka. Alaska Fishery Research Bulletin. 5(1): 1-17. https://www.adfg.state.ak.us/static/home/library/PDFs/afrb/orlov5n1.pdf

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Numerical score:	Starting score	– (	Number of EPs NOT met	x 3) =	Overall score
	10		0		10

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.15 Supporting Clause 12.4.

12.4.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a *stock under consideration* that is a key prey species[192].**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a mechanism in place that allows the establishment of outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species[193]. Mortality in Alaska is usually accounted for all removals of given species. The state and federal fish accounting systems operate in depth and make an explicit effort to document all removals to confirm with regulations in force. The assessors shall ensure that all removals are accounted for in the system (fish ticket, eLandings) for stock assessment and management purposes.*		☑
EVIDENCE: The food web roles of the five BSAI crab stocks under consideration here are reasonably well understood and none are considered key prey species (also see evidence in Supporting Clause 12.3). The Council does not identify BSAI crab stocks as forage species for groundfish (e.g., see BSAI Groundfish FMP; NPFMC, 2020), and no predators are known to have an obligate or dependent relationship (*sensu* Pikitch *et al.*, 2012) with BSAI crab stocks. Thus, available evidence indicates that the BSAI crab stocks under consideration here are not key prey species whose removal could adversely impact dependent predators (Chilton *et al.*, 2011). Nonetheless, mechanisms do exist within the Council process to establish outcome indicators consistent with achieving avoidance of severe adverse impacts on dependent predators. For example, the BSAI Groundfish FMP and Salmon FMP both address potential impacts to dependent predators through the use of outcome indicators. Thus, there are ongoing programs for monitoring of outcome indicators to ensure that adverse impacts to dependent predators do not arise. Recognized crab predators include various finfish species, especially Pacific cod, and a limited number of marine mammal species such as bearded seal (*Erignathus barbatus*). Pacific cod is a commercially important stock and therefore subject to annual stock assessment. Systems are in place to ensure that all removals of Pacific cod are accounted. Marine mammals are protected under the Marine Mammal Protection Act (MMPA) and mortalities are accounted for in annual stock assessment activities. The Alaska stock of bearded seals, a distinct population segment of the subspecies *Erignathus barbatus nauticus*, is listed as a threatened species under the ESA. NMFS' environmental impact statement for BSAI crab fisheries (NMFS, 2004) included bearded seal because crab form a measurable portion of the diet of this species. Information from recent stock assessments indicates that the main concern about the conservation status of bearded seals stems from the likelihood that a warming climate is reducing their preferred sea-ice habitats, (Muto *et al.* 2021).		
Current status/Appropriateness/Effectiveness: *There is evidence that outcome indicators and management measures have been developed, are in place, and have succeeded in achieving the objectives described in the process parameter.*		☑

[192] See Appendix 1 of Guidance to Performance Evaluation for the Certification of Wild Capture and Enhanced Fisheries in Alaska Version 2.0 May 2018.
[193] General harvest guidelines based on Lenfest report: "in fisheries with an intermediate level of information (which will include most well managed forage fisheries), there must be at least 40% of virgin or unfished biomass (B_0) left in the water, and fishing mortality should be no higher than 50% of F_{MSY}. Low information fisheries should leave at least 80% of B_0 in the water. High information fisheries (which have a high information not just on the fished stock, but the full ecosystem), may exceed these reference points if justified by the science, but in no case should fishing mortality exceed 75% of F_{MSY} or biomass fall below 30% of B_0. Link: http://www.lenfestocean.org/~/media/legacy/lenfest/pdfs/littlefishbigimpact_revised_12june12.pdf?la=en.

12.4.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a *stock under consideration* that is a key prey species[192].**

EVIDENCE:
Outcome indicators for crab predators are in place and used for ongoing monitoring programs as evidenced by the annual publication of stock assessment and fishery evaluation (SAFE) reports, marine mammal stock assessment reports, and ecosystem status reports.

Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that there are effective outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a stock under consideration that is a key prey species. Examples may include various stock and ecosystems assessment reports.*	☑

EVIDENCE:
Examples of reports that are relevant to outcome indicators for avoiding adverse impacts to dependent predators include:

- EBS Pacific Cod SAFE (Thompson *et al.*, 2020)
- 2020 Alaska marine mammal stock assessment report (Muto *et al.*, 2021)
- Ecosystem Status Report 2020 Eastern Bering Sea (Siddon, 2020)

References:

Chilton, E.A., K.M. Swiney, J.D. Urban, J.E. Munk, and Foy, R.J. 2011. Ecosystem consideration indicators for Bering Sea and Aleutian Islands Kind and Tanner Crab Species NOAA NMFS AFSC, 2011. http://www.npfmc.org/wp-content/PDFdocuments/resources/SAFE/CrabSAFE/511Chpaters/Ecosystem_CrabSAFE.pdf

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Numerical score:	**Starting score**	**–**	**(**	**Number of EPs NOT met**	**x**	**3**	**)**	**=**	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High

12.4.	**There shall be outcome indicator(s) consistent with achieving management objectives seeking to avoid severe adverse impacts on dependent predators resulting from the unit of certification fishing on a *stock under consideration* that is a key prey species[192].**

Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	**-**

9.5.1.16 Supporting Clause 12.5.

12.5.	States shall introduce and enforce laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).
Relevance:	Relevant.

Evaluation Parameters	Met?
Process: *The appropriate regulations have been implemented.*	☑
EVIDENCE: Laws and regulations based on the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) are in place and enforced. The US Senate ratified MARPOL and Congress implemented it by the Act to Prevent Pollution from Ships (APPS; 33 U.S.C. §§1905-1915) on October 21, 1980.	
Current status/Appropriateness/Effectiveness: *These regulations and their enforcement are effective and in line with the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78).*	☑
EVIDENCE: The US EPA and USCG have established protocols for managing enforcement of the Act to Prevent Pollution from Ships[194]. To further facilitate enforcement, APPS contains a "whistle blower provision" - those who come forward with violations of APPS or MARPOL may be compensated with up to 50% of the monetary penalties that the U.S. Government receives from the guilty parties[195].	
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the State has introduced and enforces laws and regulations based on the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (MARPOL 73/78). Examples may include various regulations, data, and reports.*	☑
EVIDENCE: The U.S. has introduced and enforces laws and regulations based on MARPOL as evidenced by: - U.S. federal law (Act to Prevent Pollution from Ships, APPS; 33 U.S.C. §§1905-1915) - Established protocols between US EPA and USCG for managing enforcement of Annex VI of MARPOL - A public record of criminal prosecutions of vessel pollution cases by the U.S. Department of Justice (penalties exceeded $200 million over a recent 10-year period[196].	

References:	See links provided below.					
Numerical score:	**Starting score**	– (	**Number of EPs NOT met**	x 3)	=	**Overall score**
	10		**0**			**10**
Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)						High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)						Full Conformance
Non-conformance Number (if applicable):						-

194 https://www.epa.gov/enforcement/marpol-annex-vi-and-act-prevent-pollution-ships-apps
195 https://www.whistleblowers.org/stop-shipping-pollution/
196 https://www.justice.gov/enrd/vessel-pollution-enforcement

9.5.1.17 Supporting Clause 12.6.

12.6.	Research shall be promoted on the environmental and social impacts of fishing gear especially on the impact of such gear on biodiversity and coastal fishing communities.
Relevance:	Relevant.

Evaluation Parameters	**Met?**
Process: *Research is promoted on the environmental and social impacts of fishing gear and its impacts on biodiversity and coastal fishing communities, as applicable to the fishery.*	☑
EVIDENCE: In Alaska there is a great deal of research into the social and environmental impact of fishing gear and its impacts on biodiversity and coastal fishing communities. This research is performed, promoted or supported by a number of public entities including NFMS, NPFMC and NPRB, academic institutions such as the Institute of Social and Economic Research, University of Alaska[197], as well as private groups such as the Alaska Fisheries Development Foundation (AFDF)[198], Alaska Bering Sea Crabbers (ABSC)[199], and Bering Sea Fisheries Research Foundation (BSFRF) [200].	
Current status/Appropriateness/Effectiveness: *There is evidence for this research, and is it considered appropriate for overall fisheries management purposes.*	☑
EVIDENCE: Fishery management agencies actively promote research on the environmental and social impacts of fishing gear and, in particular, on the impact of such gear on biodiversity and coastal fishing communities. The Council[201], AFSC[202] and the NPRB[203] all regularly produce or update lists of research priorities that focus on timely and important management concerns. Prioritization helps NMFS, NPRB and other research funding agencies focus their tight research funds to resolve topical fishery management issues (*e.g.*, NPRB, 2018; NOAA Fisheries, 2018; NPFMC, 2021). For BSAI crab fisheries, the Council has established an explicit “Research and Management Objective” in the crab FMP (NPFMC, 2011) to provide fisheries research, data collection, and analysis to ensure a sound information base for management decisions. The Crab Plan Team regularly updates research priorities which are made available online via the NPFMC Research Priority Database[204]. Other organizations, including university researchers and representatives from the private sector, are also actively involved in research on the environmental impacts of fishing gear on biodiversity, habitats, socioeconomics and ecosystems (Webb, 2014). For example, industry groups have engaged in research on gear impacts of direct relevance to BSAI crab fisheries. The BSFRF, ABSC, and Natural Resources Consultants, along with other partners from partners from the public and private sector, are testing gear modifications to see how well they reduce red king crab bycatch in the Bering Sea Aleutian Islands pot cod fishery and pot halibut fisheries[205]. In respect of understanding social impacts, UAF and AFDF (2019) have prepared a descriptive account of social responsibility in Alaska’s commercial fisheries that elaborates on labor and safety Laws, practices, and enforcement according to vessel size, gear type and target species. With respect to research on the social and economic impacts of the BSAI crab fisheries on coastal communities, please also see Supporting Clause 4.5 and references contained therein. A summary of research related to social and economic impacts of the crab rationalization program is given in the Final Draft BSAI Crab 10-Year Review (NPFMC, 2017).	
Evidence Basis:	☑

[197] https://www.uaa.alaska.edu/research/institute-social-economic-research/
[198] https://www.afdf.org/
[199] https://www.alaskaberingseacrabbers.org/about
[200] https://bsfrf.org/
[201] https://www.npfmc.org/research-priorities/
[202] https://www.fisheries.noaa.gov/resource/document/2018-alaska-fisheries-science-center-priorities-and-annual-guidance
[203] https://www.nprb.org/nprb/about-the-science/
[204] https://research.psmfc.org/
[205] https://bsfrf.org/project/gear-design-to-reduce-crab-bycatch/

12.6.	Research shall be promoted on the environmental and social impacts of fishing gear especially on the impact of such gear on biodiversity and coastal fishing communities.
The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that research is promoted on the environmental and social impacts of fishing gear especially the impact of such gear on biodiversity and coastal fishing communities. Examples may include various regulations, data, and reports.	
EVIDENCE: The body of published research on social and environmental impacts of fishing gear in Alaska is sufficient to substantiate that research, appropriate for overall fisheries management purposes, has been and continues to be actively promoted. See examples referenced above and in the literature cited therein.	

References:	NOAA Fisheries, 2018. AFSC Priorities and Annual Guidance for FY2018. 6 p. https://www.fisheries.noaa.gov/resource/document/2018-alaska-fisheries-science-center-priorities-and-annual-guidance NPFMC, 2011. Fishery Management Plan for Bering Sea and Aleutian Islands King and Tanner Crabs. North Pacific Fishery Management Council. October 2011. 229 p. https://www.npfmc.org/wp-content/PDFdocuments/fmp/CrabFMPOct11.pdf NPFMC, 2017. Ten-Year Program Review for the Crab Rationalization Management Program in the Bering Sea/ Aleutian Islands. North Pacific Fishery Management Council, Final Draft: January 2017. 259 p.https://www.npfmc.org/wp-content/PDFdocuments/catch_shares/Crab/Crab10yrReview_Final2017.pdf NPFMC, 2021. NPFMC Research Priorities for 2022 - 2024. 19 p. https://www.npfmc.org/research-priorities/ NPRB, 2018. North Pacific Research Board Science Plan. North Pacific Research Board. 132 p. https://www.nprb.org/nprb/about-the-science/ UAF and AFDF, 2019. Social Responsibility Onboard Commercial Fishing Vessels in Alaska: Labor and Safety Laws, Practices, and Enforcement By Vessel and Target Species. A collaboration of United Fishermen of Alaska (UAF) and Alaska Fisheries Development Foundation (AFDF), March 8, 2019. https://www.afdf.org/projects/current-projects/social-responsibility/ Webb, J. 2015. Summary of the interagency crab research meeting held December 11-12, 2013. Alaska Department of Fish and Game, Special Publication No. 15-14, Anchorage. 19 p. http://www.adfg.alaska.gov/FedAidPDFs/SP15-14.pdf

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

9.5.1.18 Supporting Clause 12.7.

12.7.	**The fishery management organization shall make use, where appropriate, of Marine Protected Areas (MPAs). The general objectives for establishing MPAs shall include ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.**	
Relevance:	Relevant.	
Evaluation Parameters		**Met?**
Process: *There is a process available for the consideration of MPAs as appropriate, as a tool for management.*		☑
EVIDENCE: The process for consideration of MPAs as a management tool is established at State[206], Federal[207] and Council[208] levels.		
Current status/Appropriateness/Effectiveness: *There shall be evidence for the use of MPAs, if appropriate (e.g. if they are employed MPAs as part of suite of management tools), as a tool for effective management with the general objectives of ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.*		☑
EVIDENCE: State and Federal management agencies and NPFMC have frequently used MPAs as management tools in Alaska. According to Brock (2015), 95 MPAs have been established in Alaska, covering a total area of 2,737,588 km^2 in four major ecoregions. Given the large number of MPAs, it is not surprising that specific conservation objectives vary from one MPA to another. However, most of Alaska's MPAs have been established with an aim to ensure the sustainability of fish stocks and fisheries, and/or to protect marine biodiversity and critical or sensitive habitats. For example, the NPFMC notes that vast areas of the North Pacific have been permanently closed to groundfish trawling and scallop dredging to reduce potential adverse impacts on sensitive habitat and to protect benthic invertebrates. These marine protected areas comprise a relatively large portion of the continental shelf, and in many respects, serve as marine reserves. In addition, fishery closures established in nearshore areas to reduce interactions with Steller sea lions have ancillary benefits of reducing habitat impacts as well[209].		
Evidence Basis: *The availability, quality, and/or adequacy of the evidence is sufficient to substantiate that the fishery management organization has made use, where appropriate, of MPAs. The objectives of establishing MPAs are ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats. Examples may include various regulations, data, and reports.*		☑
EVIDENCE: The National Marine Protected Areas Center[210] is a partnership between NOAA and the Department of the Interior. The Center hosts an interactive MPA Inventory on its website which describes all MPAs in US waters, where they are and what they do[211]. This comprehensive geospatial database combines publicly available data with information from state and federal MPA programs. A map of MPAs in Alaska[212] is shown in Figure 35**Error! Reference source not found.**.		

[206] https://www.adfg.alaska.gov/index.cfm?adfg=conservationareas.marineprotected
[207] https://marineprotectedareas.noaa.gov/aboutmpas/mpacenter/
[208] https://www.npfmc.org/habitat-protections/
[209] https://www.npfmc.org/habitat-protections/
[210] https://marineprotectedareas.noaa.gov/aboutmpas/mpacenter/
[211] https://marineprotectedareas.noaa.gov/dataanalysis/mpainventory/mpaviewer/
[212] http://seabank.org/unplug-and-connect-with-your-soul/

12.7.	**The fishery management organization shall make use, where appropriate, of Marine Protected Areas (MPAs). The general objectives for establishing MPAs shall include ensuring sustainability of fish stocks and fisheries, and protecting marine biodiversity and critical habitats.**

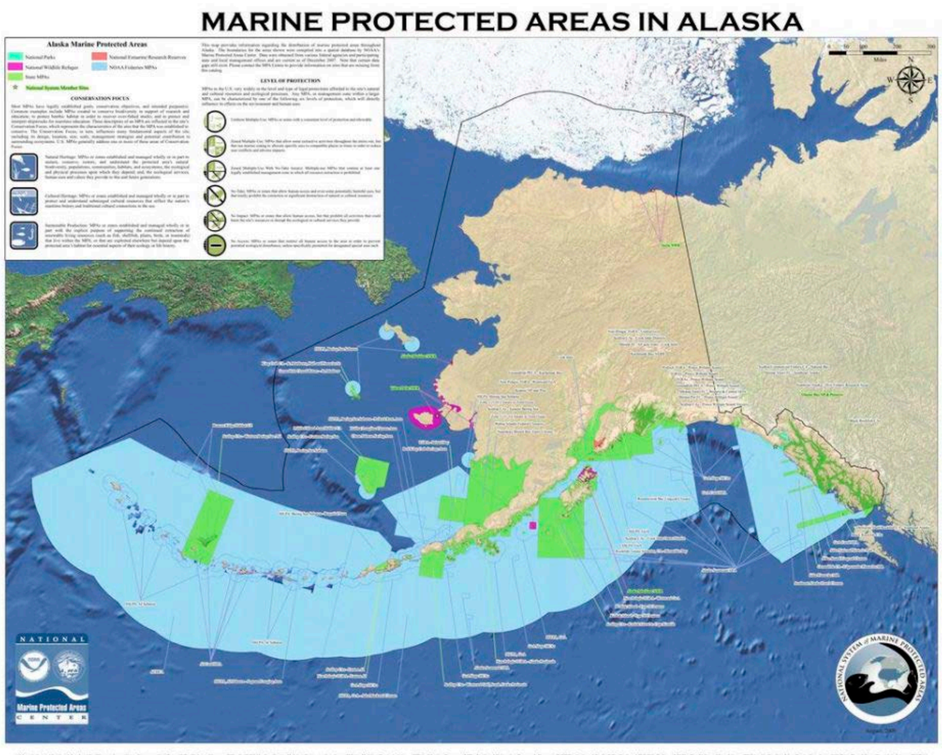

Figure 35. Map of Marine Protected Areas (MPAs) in Alaska (source: National MPA Center).

References:	Brock, R. 2015. Representativeness of Marine Protected Areas of the United States. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Protected Areas Center, Silver Spring, MD. 31 p. https://www.coris.noaa.gov/activities/mpa_us/

Numerical score:	**Starting score**	–	(	**Number of EPs NOT met**	x	3	)	=	**Overall score**
	10			**0**					**10**

Corresponding Confidence Rating: (10 = High; 4 or 7 = Medium; 1 = Low)	High
Corresponding Conformance Level: (10 = Full Conformance; 7 = Minor NC; 4 = Major NC; 1 = Critical NC)	Full Conformance
Non-conformance Number (if applicable):	-

10 Non-conformances and Corrective Actions

10.1 Non-conformances and associated Corrective Actions

The Assessment Team has identified three (3) non-conformances; 0 CRITICAL, 0 MAJOR and 3 MINOR.

In accordance with AK RFM requirements, the Client is required to submit a Corrective Action Plan (CAP) to address each non-conforming area. CAPs may consist of information that directly closes out the area of non-conformity with no further action required or a plan of activities to be implemented within a specific timeframe in order for the non-conformity to be closed out. Where CAPs require the cooperation and support of fishery management organisations, these must be identified with specific tasks and activities that are to be undertaken. Please note that, while the implementation of CAPs may be on-going for an extended period, in general non-conformances should be closed out within the lifetime of any resulting certificate.

Following receipt of a CAP, the Assessment Team are required to review the CAP and determine its likely adequacy at meeting the requirements of the particular clause and the appropriateness of the timeframe to achieve close out. Consideration of the CAP will also be part of the formal certification review by Global Trust's Certification Committee prior to awarding certification/continued certification.

10.1.1 Non-conformance 1 (of 3)

Non-conformance 1 (of 3)	
Clause:	6.3
Non-conformance level:	Minor
Non-conformance:	The SMBKC stock was declared overfished on October 22, 2018. In order to comply with provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), a rebuilding plan must be implemented prior to the start of the 2020/2021 fishing season. The fishery was closed for the 2016/17 season and has remained closed each year since. In recent assessments, MSST has been steadily dropping from 1.9 kt in 2016/17 to 1.67 kt in 2019/20. MMB was 1.12 kt in 2020/21 – a very small increase from 1.06 kt in 2019/20 – but the stock remains below the MSST estimated for 2019/20.
Rationale:	Based on the best available information on the biology of the SMBKC stock and environmental conditions, the time necessary to rebuild the stock will exceed 10 years. The SMBKC stock has been in a low productivity phase since 1996 and population recovery will be greatly influenced by 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 as a function of stock size in model-recruit parameters. The estimated time for rebuilding under the Council's preliminary preferred alternative, taking into account the biology of the species and current environmental conditions, is 25.5 years. 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. The directed fishery for SMBKC is managed under the State of Alaska harvest strategy and has been closed from the 2016/2017 season, prior to the stock being declared overfished. Measures to protect habitat and reduce bycatch potential include prohibitions on nonpelagic trawl gear in the St. Matthew Island Habitat Conservation Area (SMIHCA). Additionally, a 20 nm Steller sea lion closure area around the southern tip of Hall Island prohibits trawling, hook-and-line, and pot fisheries for pollock, Pacific cod, and Atka mackerel may help reduce SMBKC bycatch in those fisheries. Finally, State jurisdictional waters (0 to 3 nm from shore) surrounding St. Matthew, Hall, and Pinnacle Islands are closed to the taking of king and Tanner crab and to commercial groundfish

Non-conformance 1 (of 3)	
	fishing, further reducing the potential for SMBKC bycatch. See evidence for SC 6.3 (Section 9.3.3.3) for details of analyses related to the rebuilding plan. The “Extraordinary circumstances” provision of AK RFM Procedures 2 § 3.17 is used here as a basis for recommending carry over of the NC against SMBKC into this reassessment. The extraordinary circumstances being: (1) The NC was raised in the 2nd surveillance of the previous reassessment and 2 years is a very short time in which to observe a significant improvement in stock status; (2) Fishing pressure is not the sole contributor to the decline of this stock in recent years. Environmental/ecosystem changes associated with ocean warming appear to be impeding recruitment and stock recovery; (3) The fishery has been closed and will remain closed until there is improved recruitment.
Corrective Action Plan (CAP):	Date: December 5, 2021 From: Bering Sea Crab Client Group (BSCCG) *[BSCCG is wholly owned subsidiary of BSFRF]* Mr. Scott Goodman (Executive Director) Bering Sea Fisheries Research Foundation (BSFRF) 4039 21st Avenue W, Suite 404 Seattle, WA 98199 To: Dr. Ivan Mateo, Ph.D Fisheries Assessment Officer 3rd Floor, Block 3 Quayside Business Park Mill Street, Dundalk Co. Louth, Ireland RE: Preliminary **Corrective Action Plan** – for minor non-conformances in the St. Matthew Blue King Crab Unit of Assessment. Ref: AK/CRA/003/2021 (Conducted as part of U.S. Alaska Bering Sea and Aleutian Islands King, Tanner, and Snow Crab Commercial Fisheries – Re and Full Assessments, 2021/22 Dear Dr. Mateo, Please find this summary below to be our response to the renewed corrective action plan which we are submitting as part of ongoing certification and surveillance work in response to your draft Full Assessment Report and issuance of non-conformance items from earlier this fall. The St. Matthew Blue King Crab (SMTBKC) continues in its official “overfished” status, and our plan for the three action items are below for your review. The proposed actions are consistent with our action plan from prior assessment work and include tracking of: rebuilding plan progress, stock assessment refinement, and incidental bycatch monitoring and reporting. Importantly and worth noting again, all three of these items are built into parts of MSA requirements for monitoring of a stock in an overfished status and are part of the normal NPFMC-CPT-SSC process. In response to the recommentation for carry over and rationale which the assessment team has identified to support non-conformance issues, we agree on 2 of the 3 “extraordinary circumstances” points raised as written for the SMBKC stock. The first point notes that prior reporting for the NC did not occur over a long enough time span (2-3 years) to better evaluate status of the stock and we agree. For the second point we suggest a change to accurately reflect recruitment uncertainty. Impacts of ocean acidification on this stock are too uncertain to infer a direct impact on recruitment (pers. comm. C. Long, E. Fedewa, NOAA-Kodiak). A revision to this NC rationale could more accurately state “Fishing pressure is not the sole contributor to the decline of this stock in recent years and there is continuing uncertainty about what factors may be negatively impacting recruitment in the stock.” We also agree for the third point that the fishery on this stock has been closed and that is should remain closed until there is evidence of improved recruitment. **Action Plan Item 1: Support of and Attention to St. Matthew Blue King Crab Rebuilding Plan** Most recently at the September-October 2021 NPFMC-CPT-SSC process, the official rebuilding plan has been reviewed and adopted as an official amendment (Amendment 50) into the Bering Sea king and SMBKC Corrective Action Plan BSCCG 12/05/21 Page 1

Non-conformance 1 (of 3)

Tanner crab Fishery Management Plan (FMP) and is currently part of the normal status review activities. The primary objective of this plan is to rebuild the St. Matthew blue king crab stock, and currently the projected time for rebuilding is 25.5 years which takes into account the biology of the species and the current environmental conditions. This comports with MSA guidelines to rebuild within a time as short as possible. It is important to note that the rebuilding plan will allow directed fishing pursuant to the State of Alaska harvest strategy. However, the State's harvest strategy is more conservative than the FMP's control rule parameters for the stock because, under the harvest strategy, directed fishing is prohibited at or below a larger biomass level than under the F_{OFL} control rule (Crab SAFE Intro, Figure 1). Throughout the rebuilding plan for SMBKC, several sources of information will be maintained to facilitate the determination of adequate progress. The primary survey providing information on abundance and biomass densities comes from the National Ocean and Atmospheric Administration (NOAA) Bering Sea summer shelf surveys. The 2020 survey was cancelled due to COVID-19 pandemic logistical difficulties. The 2021 NMFS survey was completed as normal and survey estimates reflect a legal male biomass of 1,426 (t) which is below the long term average. Further 2021 survey results by size and sex categories show continuing downward trends. Fishing mortality is not considered to be the primary constraining factor for SMBKC. The groundfish fisheries incur low levels of bycatch of SMBKC (covered more below), but in analytical projections, average bycatch rates had no constraining effect on rebuilding. Instead, rebuilding will depend on successful recruitment of crab under ecosystem conditions that have recently been very unfavorable. Warm bottom temperatures, low pre-recruit biomass, and northward movement of predator species, primarily Pacific cod, have constrained stock growth. For this reason, the rebuilding plan aims to maintain existing low levels of fishing mortality with the hope that future ecosystem conditions will support SMBKC stock growth. We will report at the next update on the Council's official actions and subsequent steps, and further we will highlight results from the 2022 NMFS survey.

Action Plan Item 2: Support of and Participation in SMBKC Stock Assessment – GMACs Support

The Generalized Models for Alaskan Crab (GMACs) program was originally initiated by a collaboration of the stakeholder group BSFRF which has client ownership of BSCCG. The SMBKC stock was the first of the Alaskan stocks to utilize and rely on GMACs for approved management action. The SMBKC stock is assessed, as it has been since 2016, using the GMACSsmodel, which is now a standardized modeling framework that has been reviewed extensively by crustacean stock assessment authors in Alaska. We have been attentive to the utility provided by GMACs to SMBKC stock status evaluation and concur with the stock assessment scientist's current high level of concern. Moreover, we would note that our support and funding of portions of the GMAC project have led to the current level of review and precaution in managing this stock. The stock was last assessed by the CPT in September 2020 with the SSC and NPFMC recommending OFL and ABC specifications for the 2020/21 crab season, which were carried over from the prior cycle specifications and historically were low.

As part of 2021/22 crab season specification cycle, t he CPT recommended and the SSC approved that this stock be moved to a biennial cycle for assessment. Given the newly adopted official schedule, we agree with the action plan objective to continue to monitor and evaluate the status of the stock with a fully functional GMACs assessment over the next two cycles (3 years; 2022 and 2024). We will continue to report as part of action plan updates on the continued status of GMACs for STMTBKC management.

Non-conformance 1 (of 3)	
	Action Plan Item 3: Record Keeping & Reporting for SMBKC Stock – Bycatch Monitoring We are reporting no substantial SMBKC bycatch activity occurring in crab or non-crab fisheries in the SMBKC management area. Further, we would note again that no SMBKC directed fishery has occurred over the last several seasons. Consistent with our prior updates, we report again that management summaries indicate that the only SMBKC bycatch from directed crab pot fishing comes during snow crab fishing, has been negligible for the last several years, and is expected to be even lower given the very small recently announced opilio fishery. The CPT and SSC note that bycatch overall does not appear to be a significant driver in stock status review, but is importantly considered for its influence in rebuilding plan options. The continuing close review of SMBKC bycatch in other fisheries, at its current levels, is insignificant and does not influence the rebuilding time for this stock. Please let me know if there are further questions you may have at this time. Sincerely, BERING SEA CRAB CLIENT GROUP LLC
Assessment Team evaluation of CAP	The Assessment team confirms that further evidence submitted by Bering Sea Crab Client Group to address the non-conformance is sufficient to close non-conformance #1 with no further specific actions required by the Client. Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

10.1.2 Non-conformance 2 (of 3)

Non-conformance 2 (of 3)	
Clause:	6.3
Non-conformance level:	Minor
Non-conformance:	Guidance for current status states that “At a minimum, the stock is located above the midway point between the target (B_{MSY}) and the limit (MSST = .5 B_{MSY}) reference point. That means current biomass should be ~ 19.00 kt but it is well below that at ~ 15.00 kt. Therefore, a NC is raised against BBRKC.
Rationale:	Total catch (retained and bycatch mortality) increased from 7.6 kt in 2004/05 to 10.6 kt in 2007/08 but has decreased since then; total catch in 2019/20 was 2.22 kt. MMB for 2019/20 was estimated to be 14.24 kt and above MSST (10.62 kt); hence the stock was not overfished in 2019/20. The total catch mortality in 2019/20 (2.22 kt) was less than the 2019/20 OFL (3.40 kt); hence overfishing did not occur in 2019/20. However, several CPT members expressed concern that the stock will be overfished in a few years and that king crab stocks do not seem to rebuild easily, once an overfished condition is reached. It was suggested that it may be time to review the use of F35% as a proxy for F_{MSY} for this and other Alaskan crab stocks.

Non-conformance 2 (of 3)

Corrective Action Plan (CAP):

Date: December 5, 2021

From: Bering Sea Crab Client Group (BSCCG) *[BSCCG is wholly owned subsidiary of BSFRF]*
Mr. Scott Goodman (Executive Director)
Bering Sea Fisheries Research Foundation (BSFRF)
4039 21st Avenue W, Suite 404
Seattle, WA 98199

To: Dr. Ivan Mateo, Ph.D
Fisheries Assessment Officer
3rd Floor, Block 3
Quayside Business Park
Mill Street, Dundalk
Co. Louth, Ireland

RE: Preliminary **Corrective Action Plan** – for minor non-conformances in the Bristol Bay King Crab Unit of Assessment. Ref: AK/CRA/003/2021
(Conducted as part of U.S. Alaska Bering Sea and Aleutian Islands King, Tanner, and Snow Crab Commercial Fisheries – Re and Full Assessments, 2021/22

Dear Dr. Mateo,

Please find this summary below to be our response for a new corrective action plan which we are submitting as part of ongoing certification and surveillance work in response to your draft Full Assessment Report and issuance of non-conformance items from earlier this fall. The Bristol Bay red king crab stock (BBRKC) supports an important and iconic Alaskan crab fishery, and was closed this year for the first time since a two season period in 1994/1995. As a stakeholder group representing the Bering Sea crab industry through the BSCCG (RFM client) we have been concerned with the continuing, slow downward trajectory in this stock status. We generally agree with the basis for nonconformance noted in the updated assessment with some qualifying remarks in our proposed action steps below.

Action Plan Item 1: Focus on Continued Collection of Seasonal Movement Data for BBRKC

Movement information for the BBRKC stock is generally lacking specific information that could more fully inform the understanding of seasonal movement, molting, and mating of portions of the stock. The BSCCG is represented by BSFRF which supports ongoing collaborative research to improve understanding of BBRKC movement. Since 2019, BBRKC have been monitored through ongoing tagging and movement research with BSFRF, NOAA and ADF&G. Tagging efforts have included traditional (spaghetti tags) tags which require a recovery (during the fishery or bycatch event), new technology using acoustic tags and remote monitoring (2019-2021), and more recently with a larger scale deployment of satellite tags on mature male and female RKC. Recently, BSFRF, NOAA, and ADF&G scientists completed a collaborative effort during a 22-day charter (10/25/21-11/15/21) which placed approximately 320 tags on BBRKC in six (6) locations within Bristol Bay. The objectives of this work are to enhance understanding of both the male and female components of this stock. We propose for this action step to update the assessment team on the full objectives of this collaborative work, the continuing research plans which currently extend into 2022/2023, and for preliminary project summaries (as they become available) and for general summaries of tag recoveries and movement information that will inform continued project steps and considerations for management of BBRKC.

Non-conformance 2 (of 3)

Action Plan Item 2: Support of Refining Spatial Management of BBRKC

As part of the unique shared federal and state oversight of Bering Sea crab stocks, the BBRKC stock is managed by the ADF&G for execution of the fishery, and is part of a length based assessment (also ADF&G) that relies on primary data from the federal summer survey (NMFS). The fishery is conducted as a fixed gear (pot) fall fishery, and the survey is conducted as a bottom trawl summer survey. Further, there is a notable temporal and spatial difference between the fishery and the survey. The stock is known to occupy only a portion of the stations that are counted in the federal survey district that are used to estimate abundance and biomass. The stock also reflects variability in the fishing hot spots, which has been part of ongoing research reflecting how water temperatures influence stock densities. Several other Bering Sea fisheries target fish stocks on the BBRKC grounds. The stock is subject to some bycatch management measures that were implemented during a period that may not match with current status of the stock BBRKC. From the information available which reflects a number of spatial, temporal, and logistical gaps, there is renewed focus on updating measures to inform more refined spatial management (updating static areas, bycatch accounting, moving toward dynamic measures, etc.).

We propose for this action step to provide updates to the assessment team on how research efforts may inform potential management actions. Currently, the ongoing movement research is expected to update the spatial information available to evaluate existing measures and consider new ones. At its December 2021 meetings, the NPFMC will deliberate about a pending action to increase an existing spatial closure for BBRKC. The consideration of this action may prove to be noteworthy as further efforts are refined to update spatial management of the BBRCK stock. Additionally, the crab industry is working on other focused bycatch research (itself and with other sectors) that will likely lead to reduced impacts on the BBRKC stock. We plan to continue our collaborative work with the industry, researchers and managers to take steps that may improve the likelihood toward recovery and continued sustainability of this stock.

Action Plan and Non-conformance Status

As a final note about clarifying the current status and trend for this stock, we agree that the outlook for BBRKC is troubling. However, we would raise a note of caution for the assessment team, that basing a non-conformance for a stock in part on speculative outlook may not be appropriate. Current management has allowed for cautionary exploitation, continuing to allow for a reduced harvest as the stock has declined. The current quantitative status of the stock reflected a slight improvement from this year's review (MMB/MMB_{MSY} this year 0.62 v. last year 0.59 sourced from SAFE Introduction Tables 4-5) which is away from a likely overfished status. Paired with the cautionary step of closing the directed fishery (the largest documented source of removal of adults), and other measures that are raising the importance of reducing impacts, the updated trend may reflect marginal stability and remain above the overfished status.

Please let me know if there are further questions you may have at this time.

Sincerely,
BERING SEA CRAB CLIENT GROUP LLC

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Assessment Team evaluation of CAP	The Assessment team confirms that further evidence submitted by Bering Sea Crab Client Group to address the non-conformance is sufficient to close non-conformance #2 with no further specific actions required by the Client. Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

10.1.3 Non-conformance 3 (of 3)

Non-conformance 3 (of 3)	
Clause:	12.2.6, Habitat Scoring Element 1
Non-conformance level:	Minor
Non-conformance:	Information presented to the assessment team was not sufficient to confirm that the effects of the AIGKC fishery on sensitive habitats is reduced to a minimum percentage of the total area.
Rationale:	There was not enough evidence to substantiate that the AIGKC Unit of Certification fulfils Habitat Assessment Element 1 of Supporting Clause 12.2.6. More specifically, the assessment team was unable to substantiate: - the spatial footprint (i.e., total area in Km2 or nm2) of the AIGKC fishery on sensitive marine habitats (e.g., based on maps of fishing effort or other data); - the general range of sensitive habitat types (e.g., biogenic habitats) affected and unaffected by the spatial footprint of the AIGKC fishery; and - the percentage area of overlap of the AIGKC fishery with known sensitive habitats including areas known to be rich in structural epifauna/HAPC biota. Note: In the Aleutian Islands, groups considered to be HAPC biota include sea pens, sea whips, corals, anemones, and sponges (RFM Guidance, AK RFM Standard Version 2.1). Also see evidence considered in the scoring rationale for Supporting Clause 12.2.6.

Non-conformance 3 (of 3)	
Corrective Action Plan (CAP):	(see letter below)

Date: December 21, 2021

From: Bering Sea Crab Client Group (BSCCG) *[BSCCG is wholly owned subsidiary of BSFRF]*
Mr. Scott Goodman (Executive Director)
Bering Sea Fisheries Research Foundation (BSFRF)
4039 21st Avenue W, Suite 404
Seattle, WA 98199

To: Dr. Ivan Mateo, Ph.D
Fisheries Assessment Officer
3rd Floor, Block 3
Quayside Business Park
Mill Street, Dundalk
Co. Louth, Ireland

RE: Preliminary **Corrective Action Plan** – for minor non-conformances in the Aleutian Islands Golden King Crab Unit of Assessment. Ref: AK/CRA/003/2021
(Conducted as part of U.S. Alaska Bering Sea and Aleutian Islands King, Tanner, and Snow Crab Commercial Fisheries – Re and Full Assessments, 2021/22

Dear Dr. Mateo,

Please find this summary below to be our response for an revised corrective action plan which we are submitting as part of ongoing certification and surveillance work in response to your draft Full Assessment Report and issuance of non-conformance items from earlier this fall. The Aleutian Islands golden king crab stock (AIGKC) supports an important, generally healthy and stable stock of king crab with continued sustainable harvest in Alaska. The relatively small fleet that operates in this fishery and their processing partners continue to work together with state and federal managers in a productive manner that gives this stock a strong reputation of stability. Importantly, this stakeholder group continues to support its own non-profit research organization – the Aleutians King Crab Research Foundation (AKCRF) to assist with ongoing collaborative research efforts, including surveys and assessment improvements. The AKCRF also works in collaboration with BSFRF and has joint representation under BSCCG (the RFM client). Our action steps are similar to those we have taken before and we generally agree with the basis for non-conformance noted in the updated assessment, with some qualifying remarks in our proposed action steps below.

Action Plan Item 1: Historical spatial review of AIGKC pot fishing effort

We will continue with Dr. Chris Siddon and staff (ADF&G, Juneau) for progress of mapping and reviewing spatial effort. As we noted in our action plans under the last assessment, the detailed work steps involved in spatially reviewing the fishing activity require closely reconciling the positional information of fishing data which is confidential based on State of Alaska policies for data from 3 or fewer entities. The fishermen have agreed to sign waivers of confidentiality for other related spatial research in the area, which has allowed us to review and provide the updated mapping results. Generally, the current spatial review of annual effort conducted by ADF&G is completed as part of AIGKC pot survey research planning. The AIGKC eastern and western pot survey effort is currently in its seventh season, although there was some interruption to these efforts related to COVID-19 last year and into this year, currently. The cooperative survey information is considered during seasonal management with plans for implementation into the formal assessment as progress on this stock is completed to move to the

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Non-conformance 3 (of 3)

Generalized Model for Alaskan Crab Stocks (GMACS) in the coming seasons. We would propose that once the survey implementation has been completed and GMACS adopted for this assessment that this action step could be combined with others or closed out.

Action Plan Item 2: Update of recent fishing season effort in proximity to closure areas

We propose to complete a review of the updated charting through the most recent season available of AIGKC pot fishing effort overlain with the current closure areas (6 polygonal no-fishing areas). As we noted in prior updates, there have been very rare instances that suggested there was documented AIGKC pot fishing within one of the closed areas. We noted after review with fishery managers that observations for past seasons' records of interest (2 pots) may have contained positional errors. Further, part of required compliance during AIGKC fishing operations is to have onboard an active vessel monitoring system (VMS) which documents each boat's activity with a high degree of positional precision, especially adjacent to closed or sensitive areas. In the event that upcoming fishing activity records suggest presence in one of the closed areas we would again reconcile this with other currently enforced activity to verify if the AIGKC pot positions were accurately documented within a closed area or not. We would propose that once the AIGKC pot survey is considered seasonal (annual) and fully standardized, along with implemented as part of GMACs noted above, that this action step could be combined with others or closed out.

Action Plan Item 3: Continued review of AIGKC observer pot bycatch data paired with evaluation from NMFS EFH Fishing Effects (FE) modeling

In collaboration with ADF&G staff in Juneau, we propose to continue with a review of the bycatch database from the AIGKC observer data over the period of interest (2007-current). As we have conducted some of this work already, we have learned that coral bycatch, as defined in the observer records, is not precise enough to ascertain relative differences between pots with single or many pieces of coral, or any other qualitative factors that may help with further understanding of documented bycatch. Given that trends in compliance to avoid identified areas are high, trends of incidence with coral as observed are stable, and that absent new information used to more specifically inform sensitive habitat areas that this part of this action would be closed out after the next update.

The Essential Fish Habitat (EFH) program from NMFS includes periodic updates and more specific components to address key areas of habitat research. We are generally familiar with the Fishing Effects (FE) model and its objectives to better characterize and understand benthic impacts from fishing. For this action plan item we would seek to collaborate with the FE model team to explore options for evaluating areas that you have identified in the recent assessment update which updated FE model utilities may address. These areas include: identifying the spatial footprint of the fishery on habitat, identifying the general range of the habitat affected and unaffected, and assessment of the percentage of overlap of the fishery with known sensitive habitats based on available data. For this action we would propose two parts; 1) to generate an assumption-based footprint of sensitive habitat and the proportion of overlap of that habitat with AIGKC pot fishing using existing information on where the fishery occurs, the number of pot lifts per season, and existing bycatch information, to be completed prior to the first surveillance, and 2) collaborate with the Fishing Effects modelers and EFH team to produce EFH model-based footprint of sensitive habitat integrated with FE outcomes for reflecting the proportion of habitat impacted by AIGKC pot fishing, to be completed prior to the second surveillance. We are aware that the EFH review is upcoming (February 2022) and we would track the progress of that review and outcomes and then coordinate with them on an effort to evaluate some of our questions that are specific to AIGKC

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Non-conformance 3 (of 3)	
	fishing effects. We would report to the assessment team on this prior to the first surveillance if there are changes to this plan. Please let me know if there are further questions you may have at this time. Sincerely, BERING SEA CRAB CLIENT GROUP LLC
Assessment Team evaluation of CAP	The Assessment team confirms that further evidence submitted by Bering Sea Crab Client Group to address the non-conformance is sufficient to close non-conformance #3 with no further specific actions required by the Client. Annual surveillance audits will continue to review any up-dates, changes in circumstances and status as part of the normal audit procedure.
Status:	Open – Corrective Actions in place to be reviewed annually at surveillance audits.

10.2 Recommendations

Assessment Teams may also make Recommendations in areas where conformity to the AK RFM Standard could be improved. While Recommendations do not require Corrective Action Plans, the issues highlighted in these recommendations will be reviewed at subsequent assessment audits.

10.2.1 Recommendation 1 (of 1)

9.2.1. Recommendation 1 (of 1)	
Clause:	12.2.2 and 12.2.3
Recommendation:	It is recommended that the ADF&G observer database for BSAI crab fisheries should be summarized to provide a better picture of trends in non-target species interactions over time.
Rationale:	Bycatch of non-target finfish and invertebrates in the BSAI crab fishery is subject to ongoing monitoring through the ADF&G Mandatory Crab Observer Program (e.g., Gaeuman, 2014). Consequently, the abundance and species composition of bycatch is well established for the crab fisheries under assessment (see SC 12.2.2). However, a multi-year summary analysis of the observer database is unavailable. Therefore, recent trends are not well known. It is recommended that the ADF&G observer database for BSAI crab fisheries should be summarized to provide a better picture of trends in non-target species interactions over time. The format could be similar to that used for monitoring the catch of non-target species in groundfish fisheries (e.g., Whitehouse and Gaichas, 2020). Gaeuman, W. B. 2014. Summary of the 2013/2014 mandatory crab observer program database for the Bering Sea/Aleutian Islands commercial crab fisheries. Alaska Department of Fish and Game, Fishery Data Series No. 14-49, Anchorage. http://www.adfg.alaska.gov/fedaidpdfs/FDS14-49.pdf Whitehouse, G.A. and S. Gaichas. 2020. Time Trends in Non-Target Species Catch. Pp. 142-144 In: Siddon, E. (Ed.) 2020. Ecosystem Status Report 2020 Eastern Bering Sea. December 2020. https://www.fisheries.noaa.gov/resource/data/ecosystem-status-report-2020-eastern-bering-sea

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12 Appendices

12.1 Appendix 1 – External Peer Review

The RFM program requires that reports be subjected to review by reviewers external to the Certification Body. Based on the technical expertise required, a team of Peer Reviewers was selected. Peer Reviewers were asked to focus on specific parts of the assessment depending on their particular areas of expertise but were also asked to provide comments elsewhere where they saw fit to do so. The team of Peer Reviewers for this assessment was made up of:

- Dr. Romuald Lipcius
- Dr. Robert Leaf

Note. Peer reviewer information has been removed and peer reviews are unattributed in this report.

12.2 Peer Reviewer 1

12.2.1 General comments – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
General Comments	
Please provide a short summary of the key comments of the peer review and a statement on whether or not you are in broad agreement with the conclusions reached. Please refer to both positive and critical aspects discovered during the review (circa. 0.5 page). Overall, the assessment team was thorough and documented the evidence ratings and conformances of each supporting clause adequately for the second reassessment of the US Alaska Bering Sea and Aleutian Islands King and Snow crab following the reassessment procedures for the Alaska RFM Certification program. They provided comprehensive information that allowed me to evaluate the appropriateness of determining continuing and establishing certification. My responses below document my general and specific comments to each of the evaluation clauses. The assessment team provided a rigorous and sufficiently critical analysis of each of the sections of certification.	The team appreciates the peer review comments. No further response required

12.2.2 Non-conformances raised (if applicable) – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
Background Section	
See comments below regarding the non-conformances identified in the narrative.	No further response required

12.2.3 Scoring element review – Peer Reviewer 1

Please provide comment as required on each clause or leave blank as appropriate—again here, please refer to both positives and negatives.

12.2.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	The assessment team provided evidence and documentation of the structured and legally mandated management systems in place for the stock under consideration. These management systems have as a feature the interactions of regulatory and governance partnerships to perform effective assessment, management, and enforcement of fishery legislation. This level of management satisfies the criteria that the management system is effective. The fishery management system for the fishery under consideration is consistent with state and federal laws, specifically the dictates of the Alaska Department of Fish and Game and for stocks that are located within the EEZ, the regulatory structure is consistent with the Magnuson-Stevens Fishery Conservation and Management Act. The applicable supporting clauses document this compliance. There is justified "high" evidence rating. Given the constraints the biological spatial distribution of the stock, management measures are adequate for the stocks in the entirety of their ranges.	No further response required
1.2.	A primary output of statistical quantitative stock assessment approach for the stocks under consideration is a determination of stock and fishery status. Part of this evaluation is the determination of the geographic range of the stock under consideration and the biological characteristics of the stocks. For each of the five units, the stock biological unit is well characterized through their entire distribution.	No further response required
1.2.1.	I agree that management takes account of previously agreed management measures that were established and applied in the same region. This is done through the council (North Pacific FMC) and Alaska BOF which have processes to ensure continuity of governance and regulatory measures.	No further response required
1.3.	N/A	
1.3.1.	N/A	
1.4.	N/A	
1.4.1	N/A	
1.5.	N/A	
1.6.	The costs for management, research, and enforcement of the stocks under consideration are provided jointly through state and federal programs as well as from industry sponsored research (CAP for nonconformance #3). The funding from these sources includes university	No further response required

Clause	Peer Reviewer comment	Assessment team response
	sponsored research, management activity, enforcement, and observer monitoring.	
1.6.1.	N/A	
1.7.	The fishery management system for the fishery under consideration is overseen through state and federal governance bodies. These have adopted management and assessment processes that are under continuous external review from stakeholders, scientists, and policy makers. Adaptive management in this context is of primary consideration.	No further response required
1.8.	The management system for the fishery under consideration is performed at the federal level by the North Pacific FMC and at the state level by the Alaska BOF. Each enacts policy is a fully transparent and cooperative manner with stakeholders, scientists, and policy makers. Meetings are recorded, open to the public, allow public comments, and are interactive.	No further response required
1.9.	These fisheries do not occur on the high seas. As such this clause is not applicable.	No further response required
2. Coastal area management frameworks		
2.1.	The management system for the fishery under consideration is performed at the federal level by the North Pacific FMC and at the state level by the Alaska BOF. These governance bodies have adopted a sustainability policy, though the MSFMCA and other related polies that make ecosystem considerations a priority, as well as recognizing the needs of coastal communities. The governance system outlined in 1.7 and 1.8 have as a priority the goals of achieving sustainability for the stock while considering the impacts of legislation to achieve this on the ecosystem and coastal community members (stakeholders).	No further response required
2.1.1.	The assessment team has documented, thoroughly, the international coordination efforts to promote sustainability of living marine resources in coastal areas.	No further response required
2.1.2.	The fishery management system for the fishery under consideration is overseen through state and federal governance bodies that are advised by trained scientists, economists, and policy analysts that employ state of the art methods. I do take exception to the hyperbole and partial sentence that should be probably be redacted from the narrative "Internationally respected scientists, seasoned fisheries managers, and policymakers work for the NPFMC, NMFS, and ADF&G commit their whole lives to the agency they work for and the resource they are tasked with managing".	Thanks for your comments. The sentence was revised accordingly
2.2.	State and federal policy making have as a guiding principle, cooperation and engagement with stakeholders from the fisheries sector in the decision-making process.	No further response required

Clause	Peer Reviewer comment	Assessment team response
2.3.	It is not clear what conflicts with other user groups are present, however the assessment team does document the presence of state and federal policies to mitigate potential user conflicts including avenues for dispute resolution at the federal level.	No further response required
2.4.	Dissemination of information and promotion of transparency is a feature of the federal and state management systems. The assessment team has documented the relevant modes that NPFMC, NMFS, and ADF&G use to share information about the conservation and resource status.	No further response required
2.5.	The assessment team describes the efforts at the federal level to ensure that economic, social, and cultural values of the coastal living resources are described, primarily by the Economic and Social Sciences Research (ESSR) Program in Alaska.	No further response required
2.6.	In addition to comprehensive fishery-independent fishery monitoring the federal and state management bodies have external funding and internal capability to research and monitor the coastal environment using a range of oceanographic and biological observation systems. The assessment team documents these in detail, and they are extensive. Indeed, this region is well studied.	No further response required
2.7.	The assessment team documents the systems in place for communication of the presence of deleterious environmental impacts. Of primary concern, because of the history of impacts in the region is oil pollution the assessment team highlights the agreements in place to address this.	No further response required
3. Management objectives and plan		
3.1.	Management objectives are robust and are codified in the fishery management plan (FMP) for the stock under consideration. The fishery management plan is supported by the input and scientific evidence from various academic, federal, and state (of Alaska) agencies as well as the fishing and stakeholder community.	No further response required
3.1.1.	The assessment team documents two legal frameworks (Magnuson-Stevens Act and the Endangered Species Act) to ensure that ETP species are protected from adverse impacts of fishing activity.	No further response required
3.1.2.	The fishery management plan (FMP) for the stock under consideration includes the evaluation and consideration of essential habitats.	No further response required
3.1.3.	As above, the North Pacific FMC has started to formalize the EBFM approach.	No further response required
3.2.		
3.2.1.	The assessment team documents the presence of an IFQ to minimize excess fishing capacity.	No further response required

Clause	Peer Reviewer comment	Assessment team response
3.2.2.	Responsible fisheries are promoted though the evaluation of the economic conditions of the fishery under consideration.	No further response required
3.2.3.	The interests of all fishers, including artisanal and small-scale fishers are included in management although it is not clear how relevant this is to the fishery under consideration: There is no small-scale or artisanal fishing on the BSAI crab stocks because they operate under an IFQ system that is fully exploited.	The contents of the clause were changed to irrelevant because there is no small-scale or artisanal fishing on the BSAI crab stocks
3.2.4.	As above, the North Pacific FMC has started to formalize the EBFM approach. These efforts are consistent with federal legal frameworks (Magnuson-Stevens Act and the Endangered Species Act).	No further response required

12.2.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	The assessment team documents the monitoring program conducted by ADF&G to collect data on retained catch, bycatch/discards in all BSAI directed crab fisheries as well as crab bycatch/discards in all groundfish fisheries. This is a comprehensive monitoring program and the data collected are incorporated into the assessment that is used for stock and fishery status.	Thank you. No further response required.
4.1.1.	As above, a comprehensive monitoring program exists that data are collected are incorporated into the assessment that is used for stock and fishery status.	Ditto.
4.1.2.	N/A	
4.2.	Based on the reporting of the assessment team, the fishery has a full at-sea and dockside observer program to evaluate the composition of the retained catch.	Ditto.
4.2.1.	Based on the information available to the assessment team, the at-sea and dockside observer program is adequate for reconstruction of fishery-wide discard, total catch, and incidental catch estimates. Because observer coverage is not total, there will always be some uncertainty in these estimates, however these can be addressed in the formal, quantitative, statistical stock assessment.	Ditto.
4.3.	Data dissemination, that respects privacy and confidentiality, is a feature of the observer program. The data collected by this program is made available, sufficiently anonymised, to stock assessment scientists.	Ditto.
4.4.	The assessment team provided information and citations to document the policies in place, primarily state funded, that promote Alaska seafood as quality products of high value.	Ditto.
4.5.	In the narrative, the assessment team documents the extensive social and economic evaluation of the fishery	Ditto.

Clause	Peer Reviewer comment	Assessment team response
	under consideration including the value of the crab, its future value, and the economic impacts to local communities. Indeed, this is a feature of the MSFCA to promote the value of the nation's fishery resources.	
4.6.	Although the fishery under consideration is a fully industrialized, offshore fishery, the assessment team documents that a portion of the IFQ allocation is distributed to eligible western Alaskan communities in order to provide an opportunity for those communities to participate, to support sustainable and diversified economic development and provide social benefits to those communities. Like many councils in the US, the North Pacific FMC seek to incorporate traditional and local fishery knowledge into conservation, sustainable use, and management.	Ditto.
4.7.	N/A	
4.8.	N/A	
4.9.	N/A	
4.10.	N/A	
4.11.	N/A	
5. Stock assessment		
5.1.	Stock assessment for the fishery and stocks under consideration is performed by state and federal assessment entities, NOAA and ADF&G. The quality and complexity of the stock assessments employed by scientists working for these agencies is of the highest quality and all undergo extensive peer review, internal and external.	Ditto.
5.1.1.	The structure, data inputs, and complexity of each of the stock assessments for the fishery under consideration are tailored to the data availability. These are used to determine stock and fishery status.	Ditto.
5.1.2.	Like many fisheries and stock in the region, well established institutions (state, federal, and university scientists) employing qualified staff are in place that conduct research into all aspects of fisheries. A survey of Google Scholar and a review of the literature used to prepare the reassessment document confirms that many aspects of the biology of the stock have been well described as well as the environmental and ecological characteristics of the region.	Ditto.
5.2.	As above, research capacity is documented by the assessment team and it is extensive tin the region.	Ditto.
5.3.	Academic and agency scientists are engaged in international collaboration to discuss innovations in stock assessment methods of relevance to the sock under consideration.	Ditto.
5.4.	Agreed, and this is a feature of federal and state stock assessment reporting.	Ditto.

Clause	Peer Reviewer comment	Assessment team response
5.5.	Stock and fishery status determination are evaluated given the perceived uncertainty and with sufficient levels of precaution. The Council's and council staff are active in evaluation of appropriate and precaution reference points for management and this is an active area of policy discussion.	Ditto.
6. Biological reference points and harvest control rule		
6.1.	The establishment of robust, precautionary, and sustainable reference points is an area of active discussion. Based on the information provided by the assessment ream, these have been established for the stock under consideration.	Ditto.
6.2.	Limit reference points have been established for the stock under consideration and is well documented and described by the assessment team. These are in accordance with federal guidelines for fishery sustainability.	Ditto.
6.3.	The assessment team has provided extensive detail and summary of the procedure for status determination in relation to the established fishery reference point. Here MSST is between the OFL and ABC.	Ditto.
6.4.	Following MSFMCA, if the current level of the stock has exceeded target or limit reference points the rate of harvest is reduced and a rebuilding plan is implemented. As the assessment team documents, the harvest control rule is effective at keeping or bringing back the stock to sustainable levels. Note to assessment team, redact 'salmon' in this part of the narrative.	The team is unable to find reference to 'salmon' in the 6.4 narrative. Ditto.
6.5.	As above, rebuilding when levels of the stock have exceeded the limit reference point is exceeded.	Ditto.
7. Precautionary approach		
7.1.	The stocks under consideration are under the mandate of the MSFMCA which requires that conservation and fishery management measures prevent overfishing while achieving optimum yield. Under this management framework the NPFMC mandates harvest rules consistent and sufficiently precautionary based on the assigned tier which reflects the uncertainty and availability of information. The tier system specifies appropriate and cautionary fishery reference points and is variable for each stock and thus proxies (informed by the history of exploitation and the best available science) are used. The high confidence of the supporting clauses speaks to the application of the tier system to determine stock and fishery status.	Ditto.
7.1.1.	The precautionary approach considers uncertainties related to process (ecosystem and biology of the stock), models (the assessment model), and reference point formulation.	Ditto.

Clause	Peer Reviewer comment	Assessment team response
7.1.2.	Data used in stock assessment are collected and reported annually and uncertainties are evaluated prior to implementation into stock assessment and withing the stock assessment. All decision making is reviewed in formal peer review to ensure that data quality and adequacy are ensured. This is well documented in the report and in the cited assessment documents in the reassessment narrative.	Ditto.
7.2.	N/A	

12.2.3.3 Section C: Management Measures, Implementation, Monitoring, and Control

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.	There is an established and robust procedure to use statistical quantitative models, establishment of precautionary fishery reference points, and rebuilding, if necessary, ensure that long term sustainability of the fishery under consideration is achieved.	No further response required
8.1.1.	The assessment team documents that management measures are evaluated in the context of social impact. It is not clear how their cost effectiveness is evaluated.	New text was added to this clause
8.1.2.	The gear used for prosecution of the fishery is modified with escape rings and degradable material to mitigate bycatch and discards. The assessment team, in the introduction to the fishery, also describes the ramps for female crabs to be returned and not incidentally caught.	No further response required
8.2.	These destructive practices are not employed in the fishery.	No further response required
8.3.	The assessment team has identified that the rationalization program allocates the resource among groups. This is a limited access program where harvesters and processors share allocation.	No further response required
8.4.	The nature of the fishery (limited access) serves to limit excessive harvest capacity.	No further response required
8.4.1.	Limited access approaches are widely used in industrialized fisheries to mediate exploitation pressure and has been adopted in the BSAI crab fishery. The aim of these programs is to promote economic development through sustainable use and the assessment team has documented the economic analysis that is routinely undertaken to examine the economic conditions of the fishery.	No further response required
8.5.	The retention of crabs is a function of the characteristics of the trap characteristics and can change due to regulatory action. Because of the sexual dimorphism of the stock, size selectivity is a de facto sexual selective process. These technical considerations are taken into account. This sentence in the narrative should be modified: “Females are not only smaller than	Sentence was reworded accordingly

Clause	Peer Reviewer comment	Assessment team response
	men of the same age, but they also have a lower proportion of recoverable meat than males of the same size.”	
8.5.1.	This is the case for the fishery under consideration. The gear used for prosecution of the fishery is modified with escape rings and degradable material to mitigate bycatch and discards. The assessment team, in the introduction to the fishery, also describes the ramps for female crabs to be returned and not incidentally caught.	No further response required
8.6.	This is the case for the fishery, following Alaska state code.	No further response required
8.7.	The fishery participants and management entities implement selective and to the extent possible, environmentally friendly. This statement probably needs to be modified to be more specific and informative: “For a long time, the use of highly selective pots to reduce unwanted catch of target species as well as bycatch of non-target species, as well as the development of handling practices to reduce rejected catch mortality, have been significant parts of the management of BSAI crab fisheries.”	The statement was modified accordingly
8.8.	Gear with degradable panels is employed to minimize the impacts of “ghost” fishing. Additional, technical regulations and practices are documented by the assessment team.	No further response required
8.9.	Through enforcement, and market forces, the fishing selectivity of gear is maintained. The assessment team states that males are selected and that the meat mass is higher for this sex, and thus is preferred by the industry.	No further response required
8.10.	N/A	
8.11.	Academic and agency scientists are engaged in international collaboration to discuss innovations in fishing selectivity and fishing methods.	No further response required
8.12.	Academic and agency scientists are engaged in international collaboration to discuss innovations in fishing selectivity and fishing methods, and I agree that for the fishery under consideration the research is extensive. The SAFE report describes the experimental study of survey selectivity for some taxa.	No further response required
8.13.	Not relevant for this fishery.	No further response required
9. Appropriate standards of fishers’ competence		
9.1.	The state of Alaska has an extensive safety and training programs available to fishers and entry is monitored and controlled. Entry of participants is regulated.	No further response required
9.2.	The state of Alaska has an extensive safety and training programs available to fishers and entry is monitored and controlled. It is not clear if the statement by the assessment team that training is focused on FAO	Statement was modified for more clarity

Clause	Peer Reviewer comment	Assessment team response
	doctrine and that fishers "as a matter of course, become familiar with the code and other standards associated with responsible fishing operations"	
9.3.	Entry of participants is regulated and participation is monitored through the Restricted Access Management Program.	No further response required
10. Effective legal and administrative framework		
10.1.	Enforcement in the fishery is comprehensive and coordinated though the state of Alaska and federal enforcement agencies.	No further response required
10.2.	Fishing vessels must be licensed to participate in the fishery.	No further response required
10.3.	N/A	
10.3.1.	N/A	
10.4.	N/A	
10.4.1.	N/A	
11. Framework for sanctions		
11.1.	There exist procedures for sanctions that vary in intensity for violators of fishery policy.	No further response required
11.2.	There exist procedures for sanctions that vary in intensity for violators of fishery policy. These follow a tiered system that are different in severity.	No further response required
11.3.	Sanctions exist to punish illegal fishing activity.	No further response required
11.4.	N/A	

12.2.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	The impacts of environmental conditions are evaluated and provides context to the output of each single species stock assessment model. Additionally, ecosystem status reports produced by NOAA for the region help to provide information for understanding population dynamics.	Comment accepted. No revision requested.
12.2.	The Council, NMFS and ADF&G have established processes for the detection of potentially adverse impacts to nontarget catch/associated species taken in BSAI crab fisheries. Bycatch and species interactions are monitored through the observer program, and this is well described in the narrative document.	Comment accepted. No revision requested.
12.2.1.	Incidental removals of living marine resources are accounted for and the bycatch is generally small, this is well documented by the assessment team.	Comment accepted. No revision requested.
12.2.2.	As above, incidental removals of living marine resources are accounted for and the bycatch is generally small, this is well documented by the assessment team.	Comment accepted. No revision requested.
12.2.3.	Given the types of the bycatch that are incidentally captured at large frequencies, it is not perceived that	Comment accepted. No revision requested.

Clause	Peer Reviewer comment	Assessment team response
	benthic species are imperilled. The estimates of bycatch are well quantified, monitored, and reported.	
12.2.4.	Interactions with all ETP species are monitored through onboard and dockside observers.	Comment accepted. A paragraph was added to the evidence section of 12.2.4 to further highlight the role of the observer program in monitoring fishery interactions with ETP species.
12.2.5.	The primary vehicle for ensuring that ETP species are protected is the observer programs that report interactions to USFWS (birds) and NOAA (marine mammals).	Comment accepted. Text was added to 12.2.5 to further highlight the role of the observer program in monitoring fishery interactions with ETP species.
12.2.6.	BSAI crab fishing gear are at a low risk of having deleterious habitat interactions. The probability of deleterious interaction with habitats is evaluated for the fishery.	Comment accepted. No revision requested.
12.2.7.	The role of essential habitats is well documented and impacts of the fishery are monitored and evaluated. The EFH considerations for the fishery are outlined in the fishery management plan for the BSAI crab stocks. Some specific areas are known to be habitat areas of particular concern, and these are identified and listed in the fishery management plan.	Comment accepted. No revision requested.
12.2.8.	As above, the habitat areas of concern framework in the EFH are well understood and well monitored. Crab pot distributions are monitored as are distributions of coral species that occur in the fishery.	Comment accepted. No revision requested.
12.2.9.	Management and assessment implicitly consider the potential of the fishery to adversely harm the ecosystem. Several ecosystem-level investigations have been undertaken to understand the potential deleterious impacts of harvest of living marine resources from the ecosystem.	Comment accepted. No revision requested.
12.2.10.	This supporting clause is addressed above. The assessment team documents the adequate evidence for this point.	Comment accepted. No revision requested.
12.2.11.	This supporting clause is addressed above. The assessment team documents the adequate evidence for this point.	Comment accepted. No revision requested.
12.3.	This stock, like all living resources, play a role in the trophic dynamics of the system and are impacted by the ecosystem conditions. The assessment addresses these concerns, and the impacts are evaluated based on available science.	Comment accepted. No revision requested.
12.4.	This stock, like all living resources, play a role in the trophic dynamics of the system and are impacted by the ecosystem conditions. However they are not identified as key or critical forage for predators.	Comment accepted. No revision requested.
12.5.	These laws are enforced.	Comment accepted. No revision requested.
12.6.	This is a research area of interest to scientists in federal government service and academia. It is supported by state and federal funding vehicles.	Comment accepted. No revision requested.

Clause	Peer Reviewer comment	Assessment team response
12.7.	The MPA vehicle is a widely used management tool in Alaska. These are located in areas to promote stock sustainability.	Comment accepted. No revision requested.
13. Fisheries enhancement activities		
	N/A	

12.2.4 Conclusion – Peer Reviewer 1

Peer Reviewer Comments	Assessment Team Response
General Comments	
Given the information provided to me in the report the appropriate conclusion has been reached: these are responsibly managed fisheries and I agree with the assessment team that the fisheries under consideration (US Alaska Bering Sea and Aleutian Islands King Crab, Tanner Crab, and Snow Crab, St. Matthew Island Blue King Crab, Eastern Bering Sea Tanner Crab, Aleutian Islands Golden King Crab, and Eastern Bearing Sea Snow Crab should be awarded continuing certification against the "FAO-based responsible Fishery Management Certification Program". Of particular focus in this review of the recertification document is comments on the corrective action for the three minor non-conformances documented in the report. The first non-conformance is that the biomass of St. Matthew Blue King Crab continues to be below its B_{MSY} proxy and is in a rebuilding plan. The stock has been hampered by continued low recruitment that is likely not driven by fishing mortality but instead by a host of deleterious ecosystem conditions (changes to the predator field, changes to the temperature regime, possible ocean acidification). Such environmentally mediated population dynamics are a feature of invertebrate fisheries and are correctly considered an "extraordinary circumstance" that demands no corrective action. Instead, continued monitoring of the stock during its rebuilding is warranted and appropriate. The "extraordinary circumstance" consideration is appropriate because this non-conformance will likely not be closed within the lifetime of the certificate. The second minor non-conformance that was identified is for the stock status of Bristol Bay Red King Crab (it is considerably below B_{MSY}). Based on the letter provided by the certification holder, the corrective action of working to improve stock definition of BBRKC and working with the ADF&G assessment team to inform the length-structured quantitative assessment is warranted and appropriate. The final non-conformance, element 12.2.6, scoring element #1 identified insufficient information to determine the impacts of the AIGKC fishery on sensitive habitats. The FE (Fishing Effects) model is used to understand the impacts to habitat from fishing for the fishery under consideration and there is currently not enough information to understand the impacts to habitat for the Aleutian Islands Golden King Crab fishery. The CAP to address this is adequate and involves collaborative work with the ADF&G.	Thanks for the reviewer comments. No further response required

12.3 Peer Reviewer 2

12.3.1 General comments – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
General Comments	
Please provide a short summary of the key comments of the peer review and a statement on whether or not you are in broad agreement with the conclusions reached. Please refer to both positive and critical aspects discovered during the review (circa. 0.5 page). I am in general agreement with the evaluations by the Assessment Team (AT), and further, my opinion is that the AT did an excellent job on the assessment. I raised a few issues that need to be addressed by the AT, including (i) dead links, (ii) links that are too general and which I had to investigate to find specific evidence, (iii) evidence that is too general and not sufficiently detailed to serve as convincing evidence, (iv) irrelevant information not directed at a specific clause, and (v) absence of key information related to a clause. These issues, however, only relate to a few clauses, which can be easily corrected. Overall, I am impressed by the management of the Bering Sea and Aleutian Islands King, Tanner and Snow Crab Commercial Fisheries, and agree that the fishery deserves certification.	The minor issues that the peer reviewer was mentioning were corrected throughout the report.

12.3.2 Non-conformances raised (if applicable) – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
Background Section	
Please provide a short commentary on any non-conformances raised and the appropriateness or otherwise of proposed corrective actions. Please refer to both positive and critical aspects discovered during the review (circa. 0.5 page). I am in full agreement with the AT's evaluation of the 3 non-conformances and the proposed corrective actions. Non-conformance 1 on the SMBKC stock's lack of recovery is a situation where there may be other environmental processes, such as a regime shift, preventing stock recovery. I note that the actions taken by management, though they did not foster recovery, may actually have prevented collapse of a stock beyond the low-production/recruitment phase. Assessment of non-conformance 2 on the BBRKC stock is also justified, though the slow recovery by the stock warrants further evaluation of status in future surveillance audits, as concluded by the AT. Assessment of non-conformance 3 on AIGKC fishery effects on the ecosystem is also justified, and as the AT recommends, corrective Actions in place should be reviewed annually at surveillance audits.	Corrective action plan items will be reviewed annually

12.3.3 Scoring element review – Peer Reviewer 2

Please provide comment as required on each clause or leave blank as appropriate—again here, please refer to both positives and negatives.

12.3.3.1 Section A: The Fisheries Management System

Clause	Peer Reviewer comment	Assessment team response
1. Structured and legally mandated management system		
1.1.	Please comment or leave blank as appropriate.	No further response required
1.2.		No further response required
1.2.1.		No further response required
1.3.		No further response required
1.3.1.		No further response required
1.4.		No further response required
1.4.1		No further response required
1.5.		No further response required
1.6.		No further response required
1.6.1.		No further response required
1.7.		No further response required
1.8.		No further response required
1.9.		No further response required
2. Coastal area management frameworks		
2.1.		No further response required
2.1.1.		No further response required
2.1.2.		No further response required
2.2.		No further response required
2.3.		No further response required
2.4.		No further response required
2.5.		No further response required
2.6.		No further response required
2.7.		No further response required
3. Management objectives and plan		
3.1.		No further response required
3.1.1.		No further response required
3.1.2.		No further response required
3.1.3.		No further response required
3.2.		No further response required
3.2.1.		No further response required
3.2.2.		No further response required
3.2.3.		No further response required
3.2.4.		No further response required

12.3.3.2 Section B: Science & Stock Assessment Activities, and the Precautionary Approach

Clause	Peer Reviewer comment	Assessment team response
4. Fishery data		
4.1.	I agree with the Assessment team's evaluation.	Thank you. No response required.
4.1.1.	I agree with the Assessment team's evaluation.	Ditto.
4.1.2.	Not relevant.	
4.2.	I agree with the Assessment team's evaluation.	Ditto.
4.2.1.	I agree with the Assessment team's evaluation.	Ditto.
4.3.	I agree with the Assessment team's evaluation.	Ditto.

Clause	Peer Reviewer comment	Assessment team response
4.4.	Although I agree with the Assessment team's evaluation, I wish that specific examples had been provided, rather than just links. In fact, the first link (#90) went to UA's CFOS, not to the Kodiak site (https://alaskaseagrant.org/about/kodiak-seafood-and-marine-science-center/).	Thank you. Link #90 was removed. Link #89 (alaskaseagrant.org), which replaces #90, provides ready access to the Kodiak site. A few examples of projects have been added to the evidence.
4.5.	I agree with the Assessment team's evaluation, but there are issues. Links #93 and 94 are dead links. Link 93 should be https://apps-afsc.fisheries.noaa.gov/REFM/Socioeconomics/Projects/communities/default.php and 94 should be https://www.npfmc.org/safe-stock-assessment-and-fishery-evaluation-reports/.	Thank you. Links 92 and 93 (not 93 and 94) were changed as suggested.
4.6.	The evidence for active integration of LTK in management was not detailed, only that efforts are underway that allow for community involvement. The following are two sources that I found which provide direct evidence of LTK integration: https://alaskaseagrant.org/2019/07/01/local-and-traditional-knowledge-included-in-bering-sea-management-plan/ and https://repository.library.noaa.gov/view/noaa/13001.	Thank you. These links have been added as #97 and #98.
4.7.	Not relevant.	
4.8.	Not relevant.	
4.9.	Not relevant.	
4.10.	Not relevant.	
4.11.	Not relevant.	
5. Stock assessment		
5.1.	I agree with the Assessment team's evaluation.	Thank you. No response required. Ditto.
5.1.1.	I agree with the Assessment team's evaluation.	Ditto.
5.1.2.	I agree with the Assessment team's evaluation.	Ditto.
5.2.	I agree with the Assessment team's evaluation.	Ditto.
5.3.	I agree with the Assessment team's evaluation, but there are issues. Link #108 is a dead link. Link 108 should be https://www.fisheries.noaa.gov/resource/document/2020-international-fisheries-agreement-book and link 105 is too general, such that I had to search for the evidence. A better evaluation would have presented specific links within the general link including links such as https://www.uarctic.org/organization/thematic-networks/global-ecological-and-economic-connections-in-arctic-and-sub-arctic-crab-fisheries/.	Thank you. The suggested link has been added as # 106 and link #108 has been replaced as suggested.
5.4.	Not relevant.	
5.5.	I agree with the Assessment team's evaluation.	Thank you. No response required.
6. Biological reference points and harvest control rule		
6.1.	I agree with the Assessment team's evaluation.	Ditto.
6.2.	I agree with the Assessment team's evaluation.	Ditto.
6.3.	I agree with the Assessment team's evaluation.	Ditto.

Clause	Peer Reviewer comment	Assessment team response
6.4.	I agree with the Assessment team's evaluation.	Ditto.
6.5.	I agree with the Assessment team's evaluation.	Ditto.
7. Precautionary approach		
7.1.	I agree with the Assessment team's evaluation.	
7.1.1.	Although I agree with the Assessment team's evaluation, I would have appreciated listing specific examples followed by the references to earlier sections or the SAFE report demonstrating the inclusion of uncertainty. As written, the evaluation described the process of data collection rather than providing examples of "*evidence to demonstrate that in the fishery under assessment, uncertainties considered include those associated with the size and productivity of the stocks…*" The evaluation could have provided specific evidence such as by stating that an example of inclusion of uncertainty in OFL is by use of ABC, which is "a level of annual catch of a stock that accounts for the scientific uncertainty in the estimate of OFL and any other specified scientific uncertainty and is set to prevent, with a greater than 50 percent probability, the OFL from being exceeded" (SAFE report, 2020). Similarly, the ABC Control Rule provides evidence (SAFE report, 2020). A quick search for "uncertainty" in the SAFE report demonstrates extensive evidence for this clause.	Thank you. Some of the suggested text has been added to 7.1 evidence along with reference to 6.3 for examples of applying a buffer to the OFL to derive the ABC, thereby accounting for uncertainty.
7.1.2.	I agree with the Assessment team's evaluation.	Thank you. No response required.
7.2.	Not relevant.	

12.3.3.3 Section C: Management Measures, Implementation, Monitoring, and Control

Clause	Peer Reviewer comment	Assessment team response
8. Management measures		
8.1.		No further response required
8.1.1.		No further response required
8.1.2.		No further response required
8.2.		No further response required
8.3.		No further response required
8.4.		No further response required
8.4.1.		No further response required
8.5.		No further response required
8.5.1.		No further response required
8.6.		No further response required
8.7.		No further response required
8.8.		No further response required
8.9.		No further response required
8.10.		No further response required
8.11.		No further response required
8.12.		No further response required
8.13.		No further response required
9. Appropriate standards of fishers' competence		

Clause	Peer Reviewer comment	Assessment team response
9.1.		No further response required
9.2.		No further response required
9.3.		No further response required
10. Effective legal and administrative framework		
10.1.		No further response required
10.2.		No further response required
10.3.		No further response required
10.3.1.		No further response required
10.4.		No further response required
10.4.1.		No further response required
11. Framework for sanctions		
11.1.		No further response required
11.2.		No further response required
11.3.		No further response required
11.4.		No further response required

12.3.3.4 Section D: Serious Impacts of the Fishery on the Ecosystem

Clause	Peer Reviewer comment	Assessment team response
12. Impacts of the fishery on the ecosystem		
12.1.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.	Non-scoring clause.	
12.2.1.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.2.	I agree with the Assessment team's evaluation, but I am concerned with the reliance by fishery management on an EIS that was conducted almost 2 decades ago (NMFS, 2004). I suggest that a recommendation of the Assessment Team is to repeat the EIS in the near future.	Comment accepted. We agree that the 2004 EIS information needs updating. A paragraph was added to SC 12.2.2 and a recommendation was added to Section 11.2. We note that a Supplemental EIS is usually triggered only when there is a proposal for a substantial change in management or circumstances. Since an SEIS may not be warranted here, we instead focussed our recommendation on updating the summary analyses of relevant bycatch datasets.
12.2.3.	I agree with the Assessment team's evaluation, but again I suggest that a recommendation of the Assessment Team is to repeat the EIS in the near future.	See response to 12.2.2
12.2.4.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.5.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.6.	I agree with the Assessment team's evaluation, but there is one issue remaining to be addressed. Crab pots can not only "catch" corals when retrieved, but crab pots can also drag across the bottom along with their lines and destroy benthic habitat such as corals (Stevens, B.G. 2021. The ups and downs of traps: environmental impacts, entanglement, mitigation, and the future of trap fishing for crustaceans and fish. ICES Journal of Marine Science 78(2), 584-596, doi:10.1093/icesjms/fsaa135). This was dealt with for the Alaskan crab fisheries by R.P. Stone (Stone, R. P. 2006. Coral habitat in the Aleutian Islands of Alaska:	Comment accepted. A paragraph has been added to SC 12.2.6 which explicitly addresses concerns about the potential for benthic impacts caused by the dragging of pots during set and retrieval. References and links were included as well.

Clause	Peer Reviewer comment	Assessment team response
	depth distribution, fine-scale species associations, and fisheries interactions. Coral Reefs, 25: 229–238. Stone, R. P., and Shotwell, S. K. 2007. State of deep coral ecosystems in the Alaska Region: Gulf of Alaska, Bering Sea and the Aleutian Islands. In The State of Deep Coral Ecosystems of the United States, pp. 65–108. Ed. by S. E. Lumsden, T. F. Hourigan, A. W. Bruckner, and G. Dorr. NOAA Technical Memorandum CRCP-3, NOAA, Silver Spring, MD. 365 pp). Stevens (2021), Stone (2006) and Stone *et al.* (2007) all demonstrated that the estimated impact of crab pots was low. This information should be added.	
12.2.7.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.8.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.9.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.10.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.2.11.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.3.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.4.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.5.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.6.	I agree with the Assessment team's evaluation.	Thank you. No response required.
12.7.	I agree with the Assessment team's evaluation.	Thank you. No response required.
13. Fisheries enhancement activities (remove if not applicable)		
	N/A	

12.3.4 Conclusion – Peer Reviewer 2

Peer Reviewer Comments	Assessment Team Response
General Comments	
Please provide an overall conclusion including: ▪ An indication of whether or not you believe the conclusion of the Assessment Team is appropriate conclusion based on the evidence presented in the assessment report. Where non-conformances requiring corrective actions on behalf of the fishery have been raised, for each such non-conformance, please provide: ▪ An indication of whether or not you believe the non-conformances are appropriate. ▪ An indication of whether or not you believe the Corrective Action Plan is appropriate and likely to address the non-conformance within the specified timeframe.	No further response required

12.4 Appendix 2 – Stakeholder submissions and Assessment Team Responses

There were no stakeholder submissions.

12.5 Appendix 3 – Data Deficient Framework (if applicable)

12.6 Appendix 4 – Assessment Team and Peer Reviewer Bios

12.6.1 Assessment Team Bios

Based on the technical expertise required to carry out this assessment, an Assessment Team was selected as follows.

Dr. Ivan Mateo (Lead Assessor)

Dr. Ivan Mateo has over 20 years' experience working with natural resources population dynamic modeling. His specialization is in fish and crustacean population dynamics, stock assessment, evaluation of management strategies for exploited populations, bioenergetics, ecosystem-based assessment, and ecological statistical analysis. Dr. Mateo received a Ph.D. in Environmental Sciences with Fisheries specialization from the University of Rhode Island. He has studied population dynamics of economically important species as well as candidate species for endangered species listing from many different regions of the world such as the Caribbean, the Northeast US Coast, Gulf of California and Alaska. He has done research with NMFS Northeast Fisheries Science Center Ecosystem Based Fishery Management on bioenergetic modeling for Atlantic cod. He also has been working as environmental consultant in the Caribbean doing field work and looking at the effects of industrialization on essential fish habitats and for the Environmental Defense Fund developing population dynamics models for data poor stocks in the Gulf of California. Recently Dr. Mateo worked as National Research Council postdoc research associate at the NOAA National Marine Fisheries Services Ted Stevens Marine Research Institute on population dynamic modeling of Alaska sablefish.

Dr. Gerald P. Ennis (Assessor)

Following undergraduate and graduate degrees at Memorial University of Newfoundland in the 1960s, Dr. Ennis completed a Ph.D. in marine biology at University of Liverpool in the early 1970s. He retired in 2005 following a 37-year research career with the Science Branch of the Department of Fisheries and Oceans. His extensively published work has focused primarily on lobster fishery and population biology and on various aspects of larval, juvenile and adult lobster behavior and ecology in Newfoundland waters. Throughout his career, Dr. Ennis was heavily involved in the review and formulation of scientific advice for management of shellfish in Atlantic Canada as well as the advisory/consultative part of managing the Newfoundland lobster fishery

Dr. Wes Toller

Dr. Wes Toller has an extensive background in fisheries management and habitat conservation. As owner and operator of his own consulting business since 2010, Dr. Toller has worked closely with a number of leading certification schemes including the Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) to develop and improve processes for auditing and accreditation of sustainability standards. He previously worked as a program manager with Accreditation Services International (ASI) where he helped establish the company's nascent MSC Program. Dr. Toller has an in-depth knowledge of ISO requirements and international best practices that pertain to eco-labelling. He has a detail-oriented work style and wide-ranging interests. He has experience in many subject areas within the field of sustainability, and a specialist in sustainable use of fishery resources in the field of fisheries management and marine science. Dr. Toller received his doctorate in biological sciences from the University of Southern California. He currently resides in Seattle.

12.6.2 Peer Reviewer Bios

Based on the technical expertise required to carry out this assessment, a team of external Peer Reviewers was selected as follows.

Dr. Romuald Lipcius

Dr. Romuald Lipcius is a Professor of Marine Science at the Virginia Institute of Marine Science (VIMS), College of William & Mary (Virginia, USA), where he has been on the faculty in the Department of Fisheries Science since 1986. He received a Ph.D. (major: Biological Science; minor: Statistics) from Florida State University in 1984, and was awarded Postdoctoral Fellowships by the Smithsonian Institution (1984-85) and US National Research Council (1985-86) before joining the faculty. His main interest is in Marine Conservation Ecology and Fisheries Management, and has over 30 years of experience conducting basic and applied research on Blue crab, eastern oyster, Caribbean spiny lobster, queen conch, Nassau grouper and various marine bivalves. He has 28 years of experience as the state's expert on Blue crab ecology and management by providing formal management advice to the Virginia Marine Resources Commission, Chesapeake Bay Commission, Chesapeake Bay Stock Assessment Committee, and Chesapeake Bay Program Fisheries Goal Implementation Team, and 10 years of experience serving as scientific advisor on oyster restoration to US Army Corps of Engineers, NOAA Chesapeake Bay Office, and Chesapeake Bay Program Fisheries Goal Implementation Team. He has been Chief Scientist of the Blue Crab Winter Dredge Survey for 25 years, Co-Principal Investigator of the Blue Crab Stock Assessment in Chesapeake Bay, and served on the review panel of the 2013 Gulf of Mexico Blue Crab Stock Assessment. Dr. Lipcius has 97 publications in peer-reviewed scientific journals, as well as numerous technical reports. Besides his postdoctoral fellowships, he has been awarded two Outstanding Faculty Awards at VIMS (1993, 2002), and a Coastal America Award (2009) by the Executive Office of the President of the US. He has also been selected as a Senior Postdoctoral Fellow of the Smithsonian Institution (1997-99), Aldo Leopold Leadership Fellow (2006), and US National Academy of Sciences Kavli Fellow (2009).

Dr. Robert Leaf

Dr. Robert Leaf is an Assistant Professor at the Gulf Coast Research Lab, University of Southern Mississippi. His research interests include population dynamics of fishes and invertebrates with an emphasis on the environmental drivers influencing stock dynamics. Dr. Leaf has 20 years of experience working in the field of natural resource management of fin and shellfish. He specializes in the evaluation of management strategies of harvested species and the identification of environmental drivers that impact their population dynamics. Dr. Leaf received his Master's Degree in Marine Science at Moss Landing Marine Laboratories and his Ph.D. in Fisheries and Wildlife Sciences from Virginia Polytechnic and State Institute. His last professional post was as a post-doctorate under Dr. Kevin Friedland at the Northeast Fishery Science Center's Narragansett Laboratory. There, he worked on understanding the impact of environmental conditions on fish stock productivity and recruitment. He has worked in the Gulf of Mexico for the last three years working on fish stock assessment of commercially and recreationally important species in that area. Dr. Leaf is a member of the Gulf of Mexico Fishery Management Council's Red Drum working group and NOAA's Marine Fisheries and Climate Taskforce. He currently supervises four masters level students working on various state and federally managed fish stocks.