Monterey Bay Aquarium
Seafood Watch

Draft Assessment for Review
July 2025

Environmental sustainability assessment of wild-caught Golden king crab,Tanner crab, and Snow crab from the United States (Alaska) caught using pots.

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Species:	Golden king crab *(Lithodes aequispinus)*, Tanner crab *(Chionoecetes bairdi)*, Snow crab *(Chionoecetes opilio)*
Location:	United States: Alaska
Gear:	Pots
Type:	Wild Caught
Author:	Seafood Watch
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Assessed using Seafood Watch Fisheries Standard v4

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About the Monterey Bay Aquarium Seafood Watch Program

The mission of the Monterey Bay Aquarium is to inspire conservation of the ocean and enable a future where the ocean flourishes and people thrive in a just and equitable world. To do this, the Aquarium is focused on creating extraordinary experiences that inspire awe and wonder, championing science-based solutions, and connecting people across the planet to protect and restore the ocean. We know that healthy ocean ecosystems are critical to enabling life on Earth to exist, and that our very survival depends on them. As such, our conservation objectives are to mobilize climate action, improve the sustainability of global fisheries and aquaculture, reduce sources of plastic pollution, and restore and protect ocean wildlife and ecosystems.

The aquarium is focused on improving the sustainability of fisheries and aquaculture given the role seafood plays in providing essential nutrition for 3 billion people globally, and in supporting hundreds of millions of livelihoods. Approximately 180 million metric tons of wild and farmed seafood is harvested each year (excluding seaweeds). Unfortunately, not all current harvest practices are sustainable and poorly managed fisheries and aquaculture pose the greatest immediate threat to the health of the ocean and the economic survival and food security of billions of people.

The Seafood Watch program was started 25 years ago as a small exhibit in the Monterey Bay Aquarium highlighting better fishing practices and grew into one of the leading sources of information on seafood sustainability, harnessing the power of consumer choice to mobilize change. The program's comprehensive open-source information and public outreach raises awareness about global sustainability issues, identifies areas for improvement, recognizes and rewards best practices and empowers individuals and businesses to make informed decisions when purchasing seafood.

We define sustainable seafood as seafood from sources, whether fished or farmed, that can maintain or increase production without jeopardizing the structure and function of affected ecosystems, minimize harmful environmental impacts, assure good and fair working conditions, and support livelihoods and economic benefits throughout the entire supply chain. As one aspect of this vision, Seafood Watch has developed trusted, rigorous standards for assessing the environmental impacts of fishing and aquaculture practices worldwide. Built on a solid foundation of science and collaboration, our standards reflect our guiding principles for defining environmental sustainability in seafood.

Seafood Watch Ratings

The Seafood Watch Standard for Fisheries is used to produce assessments for wild-capture fisheries resulting in a Seafood Watch rating of green, yellow, or red. Seafood Watch uses the assessment criteria to determine a final numerical score as well as numerical subscores and colors for each criterion. These scores are translated to a final Seafood Watch color rating according to the methodology described in the table below. The table also describes how Seafood Watch defines each of these categories. The narrative descriptions of each Seafood Watch rating, and the guiding principles listed below, compose the framework on which the criteria are based.

Green	Final Score >3.2, and either criterion 1 or criterion 3 (or both) is green, and no red criteria, and no critical scores	Wild-caught and farm-raised seafood rated green are environmentally sustainable, well managed and caught or farmed in ways that cause little or no harm to habitats or other wildlife. These operations align with all of our guiding principles.
Yellow	Final score >2.2, and no more than one red criterion, and no critical scores, and does not meet the criteria for green (above)	Wild-caught and farm-raised seafood rated yellow cannot be considered fully environmentally sustainable at this time. They align with most of our guiding principles, but there is either one conservation concern needing substantial improvement, or there is significant uncertainty associated with the impacts of the fishery or aquaculture operations.
Red	Final Score ≤2.2, or two or more red criteria, or one or more critical scores.	Wild-caught and farm-raised seafood rated red are caught or farmed in ways that have a high risk of causing significant harm to the environment. They do not align with our guiding principles and are considered environmentally unsustainable due to either a critical conservation concern, or multiple areas where improvement is needed.

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Guiding Principles

Monterey Bay Aquarium defines sustainable seafood as seafood from sources, whether fished or farmed, that can maintain or increase production without jeopardizing the structure and function of affected ecosystems, minimize harmful environmental impacts, assure good and fair working conditions, and support livelihoods and economic benefits throughout the entire supply chain.

As one aspect of this vision, Seafood Watch has developed trusted, rigorous standards for assessing the environmental impacts of fishing and aquaculture practices worldwide. Environmentally sustainable wild capture fisheries:

1. **Follow the principles of ecosystem-based fisheries management**

   The fishery is managed to ensure the integrity of the entire ecosystem, rather than solely focusing on maintenance of single species stock productivity. To the extent allowed by the current state of the science, ecological interactions affected by the fishery are understood and protected, and the structure and function of the ecosystem is maintained.

2. **Ensure all affected stocks[1] are healthy and abundant**

   Abundance, size, sex, age and genetic structure of the main species affected by the fishery (not limited to target species) is maintained at levels that do not impair recruitment or long-term productivity of the stocks or fulfillment of their role in the ecosystem and food web.

   Abundance of the main species affected by the fishery should be at, above, or fluctuating around levels that allow for the long-term production of maximum sustainable yield. Higher abundances are necessary in the case of forage species, in order to allow the species to fulfill its ecological role.

3. **Fish all affected stocks at sustainable levels**

   Fishing mortality for the main species affected by the fishery should be appropriate given current abundance and inherent resilience to fishing while accounting for scientific uncertainty, management uncertainty, and non-fishery impacts such as habitat degradation.

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[1]"Affected" stocks include all stocks affected by the fishery, no matter whether target or bycatch, or whether they are ultimately retained or discarded.

The cumulative fishing mortality experienced by affected species must be at or below the level that produces maximum sustainable yield for single-species fisheries on typical species that are at target levels.

Fishing mortality may need to be lower than the level that produces maximum sustainable yield in certain cases such as forage species, multispecies fisheries, highly vulnerable species, or fisheries with high uncertainty.

For species that are depleted below target levels, fishing mortality must be at or below a level that allows the species to recover to its target abundance.

4. **Minimize bycatch**

   Seafood Watch defines bycatch as all fisheries-related mortality or injury other than the retained catch. Examples include discards, endangered or threatened species catch, pre-catch mortality and ghost fishing. All discards, including those released alive, are considered bycatch unless there is valid scientific evidence of high post-release survival and there is no documented evidence of negative impacts at the population level.

   The fishery optimizes the utilization of marine and freshwater resources by minimizing post-harvest loss and by efficiently using marine and freshwater resources as bait.

5. **Have no more than a negligible impact on any threatened, endangered or protected species**

   The fishery avoids catch of any threatened, endangered or protected (ETP) species. If any ETP species are inadvertently caught, the fishery ensures and can demonstrate that it has no more than a negligible impact on these populations.

6. **Are managed to sustain the long-term productivity of all affected species**

   Management should be appropriate for the inherent resilience of affected marine and freshwater life and should incorporate data sufficient to assess the affected species and manage fishing mortality to ensure little risk of depletion. Measures should be implemented and enforced to ensure that fishery mortality does not threaten the long term productivity or ecological role of any species in the future.

   The management strategy has a high chance of preventing declines in stock productivity by taking into account the level of uncertainty, other impacts on the stock, and the potential for increased pressure in the future.

   The management strategy effectively prevents negative population impacts on bycatch species, particularly species of concern.

7. **Avoid negative impacts on the structure, function or associated biota of aquatic habitats where fishing occurs**

The fishery does not adversely affect the physical structure of the seafloor or associated biological communities.

If high-impact gears (e.g. trawls, dredges) are used, vulnerable seafloor habitats (e.g. corals, seamounts) are not fished, and potential damage to the seafloor is mitigated through substantial spatial protection, gear modifications and/or other highly effective methods.

8. **Maintain the trophic role of all aquatic life**

   All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web, as informed by the best available science.

9. **Do not result in harmful ecological changes such as reduction of dependent predator populations, trophic cascades, or phase shifts**

   Fishing activities must not result in harmful changes such as depletion of dependent predators, trophic cascades, or phase shifts.

   This may require fishing certain species (e.g., forage species) well below maximum sustainable yield and maintaining populations of these species well above the biomass that produces maximum sustainable yield.

10. **Ensure that any enhancement activities and fishing activities on enhanced stocks do not negatively affect the diversity, abundance, productivity, or genetic integrity of wild stocks**

    Any enhancement activities are conducted at levels that do not negatively affect wild stocks by reducing diversity, abundance or genetic integrity.

    Management of fisheries targeting enhanced stocks ensures that there are no negative impacts on the wild stocks, in line with the guiding principles described above, as a result of the fisheries.

    Enhancement activities do not negatively affect the ecosystem through density dependent competition or any other means, as informed by the best available science.

Final Ratings

Ratings Details	C 1 Target Species	C 2 Other Species	C 3 Management	C 4 Habitat	Rating
Golden king crab Aleutian Islands Stock - United States - Alaska - Pots - 1,758 mt	5.000	1.732	4.000	2.828	Yellow (3.146)
Golden king crab Southeast Alaska Stock - United States - Alaska - Pots - 72 mt	2.644	2.236	3.000	3.240	Yellow (2.753)
Red king crab Norton Sound Stock - United States - Alaska - Pots - 192 mt	5.000	4.284	4.000	3.000	Green (4.004)
Red king crab United States - Alaska - Pots - 973 mt - FAO Major Area: Pacific, Northeast - Management Unit: Bristol Bay	4.284	4.284	4.000	3.000	Green (3.852)
Snow crab United States - Alaska - Pots - 0 mt	2.236	4.284	4.000	3.000	Green (3.274)
Southern Tanner crab United States - Alaska - Pots - 522 mt - FAO Major Area: Pacific, Northeast - Management Unit: South Peninsula	3.318	5.000	3.000	3.000	Green (3.496)
Southern Tanner crab United States - Alaska - Pots - 2,675 mt - FAO Major Area: Pacific, Northeast - Management Unit: Kodiak	2.644	5.000	3.000	3.000	Yellow (3.303)
Southern Tanner crab Eastern Bering Sea Stock - United States - Alaska - Pots - 910 mt	4.284	2.236	4.000	3.000	Green (3.274)
Southern Tanner crab Southeast Alaska Stock - United States - Alaska - Pots - 433 mt	2.644	2.236	3.000	3.240	Yellow (2.753)

Abbreviations

Table 1

Abbreviation	Description
ADF&G	Alaska Department of Fish & Game
AI	Aleutian Islands
AIGKC	Aleutian Island golden king crab
BB	Bristol Bay
BBRKC	Bristol Bay red king crab
BSAI	Bering Sea & Aleutian Islands
EBS	Eastern Bering Sea
EBSTC	Eastern Bering Sea Tanner crab
EBSSC	Eastern Bering Sea snow crab
KTC	Kodiak Tanner crab
NS	Norton Sound
NSRKC	Norton Sound red king crab
NOAA	National Oceanic and Atmospheric Administration
NPFMC	North Pacific Fishery Management Council
PI	Pribilof Islands
SEAK	Southeast Alaska
SEAKGKC	Southeast Alaska golden king crab
SEAKTC	Southeast Alaska Tanner crab
SP	South Peninsula
SPTC	South Peninsula Tanner crab

Summary

This Seafood Watch assessment evaluates the environmental sustainability of nine commercial wild crab fisheries for golden king crab, red king crab, Tanner crab, and snow crab by Alaska region, including the Bering Sea and Aleutian Islands, Southeast Alaska, and the Gulf of Alaska.

Seafood Watch assessments consider factors such as stock health, impacts on other species, management effectiveness and implementation, and environmental impacts on habitat.

Based on these factors, Seafood Watch rates red king crab harvested in Norton Sound and Bristol Bay, Tanner crab harvested in the Eastern Bering Sea and South Peninsula, and snow crab harvested in the Eastern Bering Sea as green. Golden king crab harvested in the Aleutian Islands and Southeast Alaska, and Tanner crab harvested in Southeast Alaska and the Kodiak region are rated yellow.

Alaska crab overview

Seafood Watch maintains rigorous, science-based standards for fisheries and aquaculture based on the U.N. Code of Conduct for Responsible Fisheries. Using those standards, Seafood Watch assesses fisheries or aquaculture products found in North American markets. Alaska's commercial king, Tanner, and snow crab fisheries were among the most valuable in the U.S. in recent years. In 2020, these fisheries were worth roughly $160 million, approximately 27% of the total U.S. crab fishery value. Two years later, stock declines, particularly with snow crab in the Eastern Bering Sea, spurred fishery closures and reductions, creating a drop in U.S. production.

Several Alaska crab species harvested in the past are currently closed to fishing, mainly due to stock declines. Seafood Watch does not provide ratings for closed fisheries. This assessment covers nine fisheries that were open for the 2024-2025 season, including Eastern Bering Sea snow crab, which reopened after a population crash in the early 2020s.

Assessment highlights

In general, the assessment found Alaska crab fisheries were at sustainable population levels for most of the fisheries, with the notable exception of snow crab in the Eastern Bering Sea. Impacts to the crab stocks were of moderate concern in the Southeast Alaska golden king crab and Tanner crab fisheries, Kodiak Tanner crab, and the Eastern Bering Sea snow crab fisheries. The latest information showed some uncertainties surrounding the stock status or the vulnerability of these species, or unknown fishing mortality. (See Criterion 1)

The assessment found that fishery impacts on other species were of low concern in the Norton Sound red king crab, Bristol Bay red king crab, Kodiak Tanner crab, South Peninsula Tanner crab, and Eastern Bering Sea snow crab fisheries. Fishery impacts on other species were of moderate concern for the Southeast Alaska golden king crab, Southeast Alaska Tanner crab, and the Eastern Bering Sea Tanner crab fisheries. Fishery impacts on other species were of high concern in the Aleutian Islands golden king crab fishery, due to the potential risk to highly

vulnerable corals.

Fisheries targeting Alaska crab use pot gear that makes contact with the seafloor, although most of the fisheries likely have minimal impacts on vulnerable habitats as they often occur in soft-sediment areas. Because of the highly vulnerable nature of corals and other deepwater habitats with significant presence in the Aleutian Islands, and that pots are attached to longlines in this region which could potentially lead to more impacts than a single trap if lost, dragged gear or abandoned (or "ghost") gear in the Aleutian Island golden king crab fishery has the potential to substantially impact these habitats. Also, the pot fisheries gear in several of these regions poses a potential for marine mammal entanglements, particularly with humpback and gray whales, but interactions are considered rare, and impacts are likely minimal. (Criterion 2)

These fisheries are managed by a combination of state and federal agencies. The Alaska Board of Fisheries and Department of Fish and Game manages the fisheries, along with federal oversight from the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the North Pacific Fishery Management Council for the Bering Sea and Aleutian Islands rationalized fisheries (Eastern Bering Sea snow crab, Bristol Bay red king crab, Norton Sound red king crab, Aleutian Islands golden king crab, Eastern Bering Sea Tanner crab). Management includes strategies such as stock surveys and assessment, harvest limits, and regulations on gear use, among other tools.

Management effectiveness is considered highly effective overall for most of the fisheries in this assessment. For the Southeast Alaska golden king crab and Tanner crab fisheries, and the Kodiak and South Peninsula Tanner crab fisheries, management and bycatch strategies were considered moderately effective. These scores were limited by some uncertainties surrounding the effectiveness of the management strategies in place and a need for stronger measures regarding ghost gear. (Criterion 3)

Impacts on surrounding habitat and ecosystems are considered minimal for all fisheries in this assessment, with the exception of the Aleutian Island golden king crab fishery. As mentioned above, there are some concerns about potential impacts by pot gear that makes contact with the seafloor on vulnerable dense coral "gardens" in this region. Conversely, Southeast Alaska fisheries have closed a substantial proportion of potentially vulnerable habitats to pot gear, earning a slight score increase for the mitigation of impacts. (Criterion 4)

More details about scoring for each of these criteria can be found in each section.

Introduction

Scope of the analysis and ensuing rating

This report considers U.S. wild-caught golden king crab (*Lithodes aequispinus*), red king crab (*Paralithodes camtschaticus*), Tanner crab (*Chionoecetes bairdi*), and snow crab (*Chionoecetes opilio*) caught in trap/pot fisheries in the Bering Sea and Aleutian Islands (BSAI), Gulf of Alaska (including the Kodiak and South Peninsula regions) and Southeast Alaska (SEAK). All the landed crabs of these species in Alaska are caught through directed crab trap/pot or ring net fisheries, as no other fisheries are permitted to land them; however, ring net fisheries (for SEAKTC) are not covered by this report because commercial landings are negligible. Several Alaska fisheries that in the past targeted crab are currently closed to fishing, mainly due to stock declines (see Appendix C for a list of all Alaska king, Tanner, and snow crab fisheries, closed and open). This report provides recommendations for nine Alaska crab fisheries that were opened for the 2024-2025 seasons, including: AIGKC, NSRKC, BBRKC, SEAKGKC, SEAKTC, EBSTC, KTC, SPTC, and EBSSC.

Species Overview

Golden king crab

Golden king crab occurs from the Sea of Japan to the northern Bering Sea, including the Aleutian Islands (AI), and as far south as northern British Columbia (Jewett et al. 1985). It is typically found at depths of 300–1,000 m in high-relief habitat, and frequently over coral substrate (NMFS 2004). Male size-at-maturity is about 130mm carapace length in the AI and 107 mm in the Pribilof Islands (PI), whereas females mature at a slightly smaller size (approximately 100–110mm) (Somerton and Otto 1986). SE AK GKC males become mature at approximately 118–158mm carapace length, depending on location (Olson et al. 2018). SEAKGKC enter the fishery at approximately 150mm carapace length and approximately 10.5 years of age (Stratman et al. 2017). Male golden king crab mature at approximately 8 years of age (Stratman et al. 2017). The maximum observed size in the SEAKGKC fishery is 215mm carapace length, at approximately 18.5 years of age (Stratman et al. 2017). Fecundity is approximately 30,000 eggs (Jewett et al. 1985).

Red king crab

There are several stocks of red king crab present in Alaska (St John et al. 2025), of which the Bristol Bay (BB) and Norton Sound (NS) stocks are being assessed here (NOAA 2024). The species range from the Bering Sea south to British Columbia, Canada in North American waters and are the largest of commercially harvested crabs with males growing up to 0.45 kg with a leg span of 1.5 m and females growing around half that size (NOAA 2024)(ADFG 2024). The largest crabs have been estimated to be between 20-30 years old (ADFG 2024). Female red king crab reproduce once a year and release up to 500,000 eggs, with juveniles less than 2 years old typically living in shallow, complex habitats and moving into deeper water once mature (NOAA 2024). Crabs from the different stocks may have unique life history traits, as the

NSRKC typically spends most of their life in more shallow water whereas BBRKC spend more time in deeper water, although they may complete annual migrations to shallow water for reproduction (Hamazaki 2024)(ADFG 2024).

Tanner crab

The range of Tanner crab in the eastern North Pacific Ocean extends as far south as Oregon and as far north as BB (Stockhausen 2021). In the western North Pacific, its range extends as far south as Hokkaido, Japan and as far north as the Kamchatka Peninsula (Stockhausen 2021). Size-at-maturity is about 69mm carapace width for females and 92mm carapace width for males (Rugolo and Turnock 2012). Age of maturity for females is about 5 years, whereas males mature at about 6 years (Donaldson et al. 1981; NPFMC 2021a). Maximum age is assumed to be 20 years, based on the snow crab lifespan (Rugolo and Turnock 2012). Mean fecundity for EBSTC was estimated at 138,127 eggs (Gravel and Pengilly 2007). Pacific cod is the main predator on Tanner crab in terms of biomass (Szuwalski 2021); however, flathead sole, rock sole, halibut, skates, and yellowfin sole also prey on small Tanner crab (NPFMC 2021a).

Snow crab

The range of snow crab in the eastern North Pacific extends from British Columbia to the coast of Alaska in the Bering, Beaufort, and Chukchi Seas (NOAA 2024d). It is typically found in soft sandy or muddy ocean bottoms less than approximately 198 m deep and may live for up to 20 years (ibid). Male snow crabs can reach approximately 150mm in carapace width with females growing up to around half that size (ibid). Female snow crabs can carry up to approximately 100,000 eggs, depending on their size (ibid).

Management Overview

Alaska king, Tanner, and snow crab fisheries are managed by a combination of state and federal agencies including the Alaska Department of Fish and Game (ADF&G), the Alaska Board of Fisheries, and NOAA Fisheries (NOAA). The North Pacific Fishery Management Council (NPFMC), is part of NOAA, and makes recommendations on regulations and programs, which NOAA then adopts. The AIGKC, BBRKC, EBSTC, and EBSSC fisheries are part of the Bering Sea and Aleutian Islands (BSAI) crab rationalization program and are managed by all three agencies under the Federal Fishery Management Plan for BSAI King and Tanner Crab (NPFMC 2021a). Although the NSRKC fishery is not managed under the crab rationalization program, it is an FMP species, and hence there is federal oversight in its management. The SEAKGKC and SEAKTC fisheries are managed by ADF&G under the Southeast Alaska Golden King Crab Management Plan and the Southeast Alaska Tanner Crab Management Plan, respectively (Stratman et al. 2021)(Palof et al. 2022). The SPTC fishery is managed by ADF&G under the Fishery Management Plan for the South Peninsula District Commercial Tanner Crab Fishery (Whiteside 2023). The KTC fishery is managed by ADF&G under the Fishery Management Plan for the Kodiak District Commercial Tanner Crab Fishery (Nichols 2022). Management agencies manage these crab stocks and fisheries through these management plans and the associated measures, including but not limited to, conducting stock surveys,

establishing harvest limits, and setting regulations for permitting and gear use.

Production Statistics

Golden king crab

The directed fishery for AIGKC began in 1981, with the retained catch dropping in the early 1990s and management changing specifications from guideline harvest levels (GHL) to total allowable catch (TAC) with the adoption of the Crab Rationalization Program in the mid-2000s (Siddeek et al. 2023). Landings (including both the western and eastern portions of the AI fishery) have averaged approximately 2800 MT annually since the 2013-2014 season (Figure 1) (ibid.). For the 2022-2023 season, the TAC was set at 2291 MT (785mt for the western AI and 1506mt for the eastern AI) (ibid.).

Although most GKC harvest in Alaska currently occurs in the AIGKC fishery, a smaller commercial GKC fishery is actively operating in SEAK. The SEAKGKC fishery started in 1972, with peak landings in 1986, followed by a decline in landings dramatically through the mid-1990s, an increase again until 2011, and further steady declines since (Stratman et al. 2021). Landings for the SEAKGKC fishery have averaged approximately 36mt annually since the 2013-2014 season (Figure 1) (ibid.). The GHL for the 2024 season was set at 123 MT (ADFG 2024g).

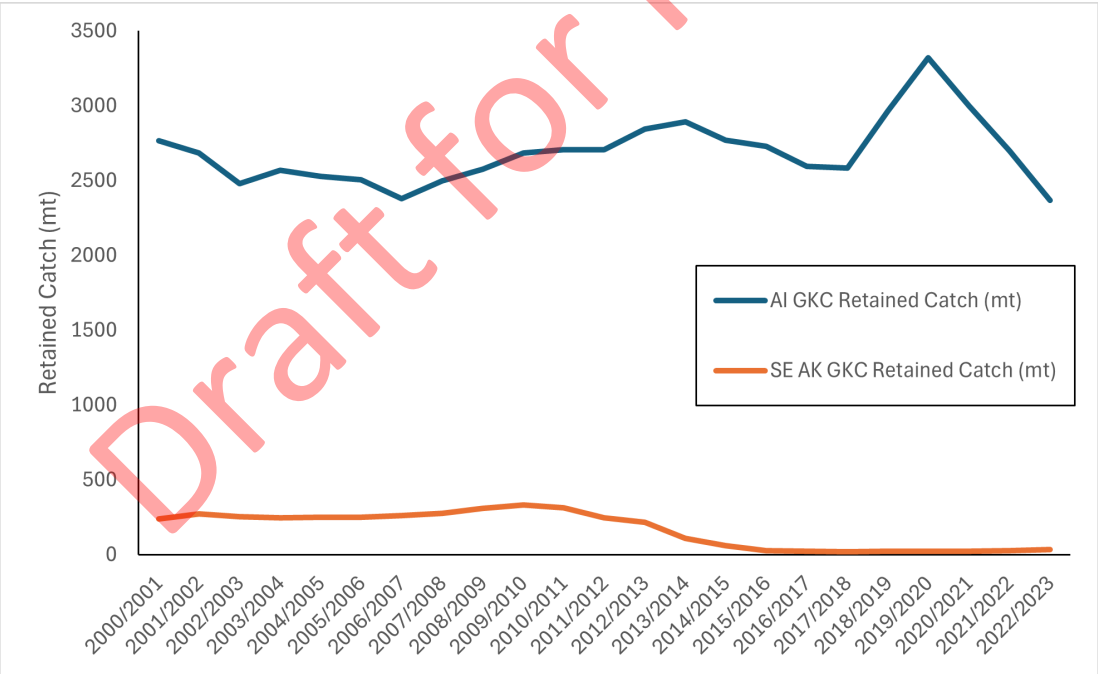

Figure 1: Retained catch of GKC in Southeast Alaska and the Aleutian Islands from 2000-2023 (Siddeek et al. 2023; Stratman et al. 2021; ADFG 2024g).

Red king crab

The Alaskan red king crab commercial fishery has historically been the state's top shellfish

fishery, harvesting about $2.5 billion of crab between 1975 and 2018 (ADFG 2024). However, red king crab experienced a crash in 1983 and many populations have remained depressed across most of the state since (Kruse et al. 2010), encouraging fishers to target other species such as golden king crab (ADFG 2024).

The NSRKC fishery consists of three sub-fisheries: summer commercial, winter commercial, and winter subsistence; the summer commercial fishery, which began in 1977 and peaked shortly after, accounts for 85% of total harvest (Hamazaki 2024). The fishery declined in the 1990s with harvest remaining lower throughout the 2000s (ibid.). The commercial fishery was closed in the 2020/2021 and 2021/2022 seasons due to poor stock performance (ibid.). Landings for the NSRKC fishery have averaged approximately 1,496 MT annually since the 2013/2014 season (excluding the 2020/2021 and 2021/2022 seasons as they were closed) (Figure 2) (ibid.). The GHL for the 2023-2024 season was set at 219 MT (ADFG 2024e).

The BBRKC fishery began to expand in the 1960s, peaking in 1980, followed by a dramatic decline and low harvest levels for the following three decades (Kruse et al. 2010)(Palof 2023). With an improved stock assessment, a management strategy evaluation and a revised harvest strategy, the stock was considered rebuilt in 2003 (Kruse et al. 2010). This was followed by the adoption of the Crab Rationalization Program in 2005, which resulted in a slight increase in catch around 2010 (Palof 2023). Nevertheless, catch has been declining since, and has resulted in a directed pot fishery closure in both the 2021/2022 and 2022/2023 seasons due to low mature female abundance and recruitment (ibid.). Landings for the BBRKC fishery have averaged approximately 3,083 MT annually since the 2013/2014 season (excluding the 2021/2022 and 2022/2023 seasons as they were closed) (Figure 2) (ibid.). The TAC for the 2023-2024 season was set at 975 MT (ADFG 2024e).

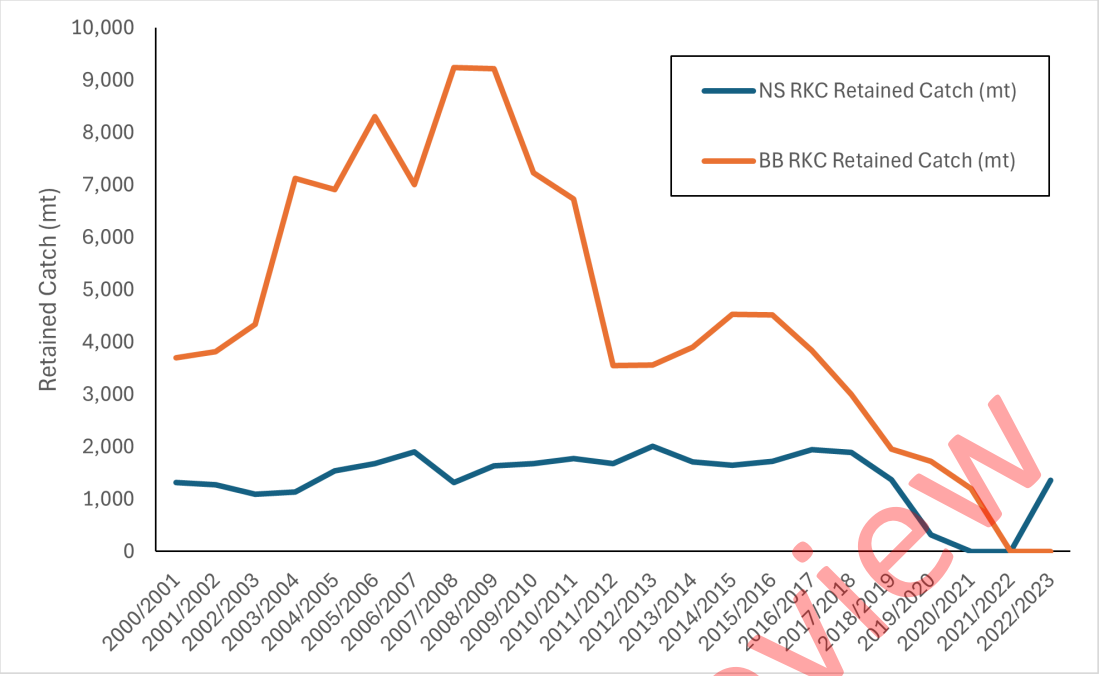

Figure 2: Retained catch of RKC in Norton Sound and Bristol Bay from 2000-2023 (Hamazaki 2024) (Palof 2023).

Tanner crab

The commercial EBSTC fishery began in the late 1960s, peaking in the late 1970s, grew in the 1980s after foreign fleets were prohibited from harvesting in the Bering Sea, then began experiencing dramatic fluctuations before closing for several years starting in the late 1990s due to an overfished status (Stockhausen 2023). The directed fishery was prosecuted following the rationalization of the BSAI crab fisheries in the 2005/2006 season and was closed again from 2010-2012 because stock biomass didn't meet the thresholds necessary to open (ibid.). Although the stock was declared rebuilt in 2012, fishery landings have remained at low levels since with occasional closures within the region (particularly 2016/2017 and 2019/2020) (ibid.). Landings for the EBSTC fishery have averaged approximately 2,576 MT annually since the 2013/2014 season (excluding the 2016/2017 and 2019/2020 seasons as they were closed) (Figure 3) (ibid.). The TAC for the 2023-2024 season was set at 943 MT.

Landings for the SEAKTC fishery peaked in the early 1980s, then fluctuated before declining to low levels in the early 2000s (Wood et al. 2017). Since 2003, SEAKTC fishery landings remained stable at low levels and increased slightly through 2020 (ADFG 2021a). Landings for the SEAKTC fishery have averaged approximately 558 MT annually since the 2013/2014 season (Figure 3) (ADFG 2024m). The fishery is managed without a GHL, but management continues to determine stock health and establish a mature male harvest rate so that regional exploitation should not exceed 20% of mature male or 38% of legal male biomass (Palof et al. 2022).

The SPTC fishery had significant expansion through the 1970s, but faced population

fluctuations and overfishing over the following decades resulting in periodic closures of the fishery (Whiteside and Looman 2023). Landings for the SPTC fishery have averaged approximately 193 MT annually since the 2013/2014 season, although the fishery was not open for eight of the ten seasons (Figure 3) (Whiteside and Looman 2023). The GHL for the 2024 season was set at 218 MT (ADFG 2024b).

The KTC fishery had significant expansion through the 1970s, but faced population fluctuations and overfishing over the following decades resulting in periodic closures of the fishery (Whiteside and Looman 2023). Landings for the KTC fishery have averaged approximately 305 MT annually since the 2013/2014 season, although the fishery was not open for five of the ten seasons (Figure 3) (Whiteside and Looman 2023). The GHL for the 2024 season was set at 1360 MT (ADFG 2024b).

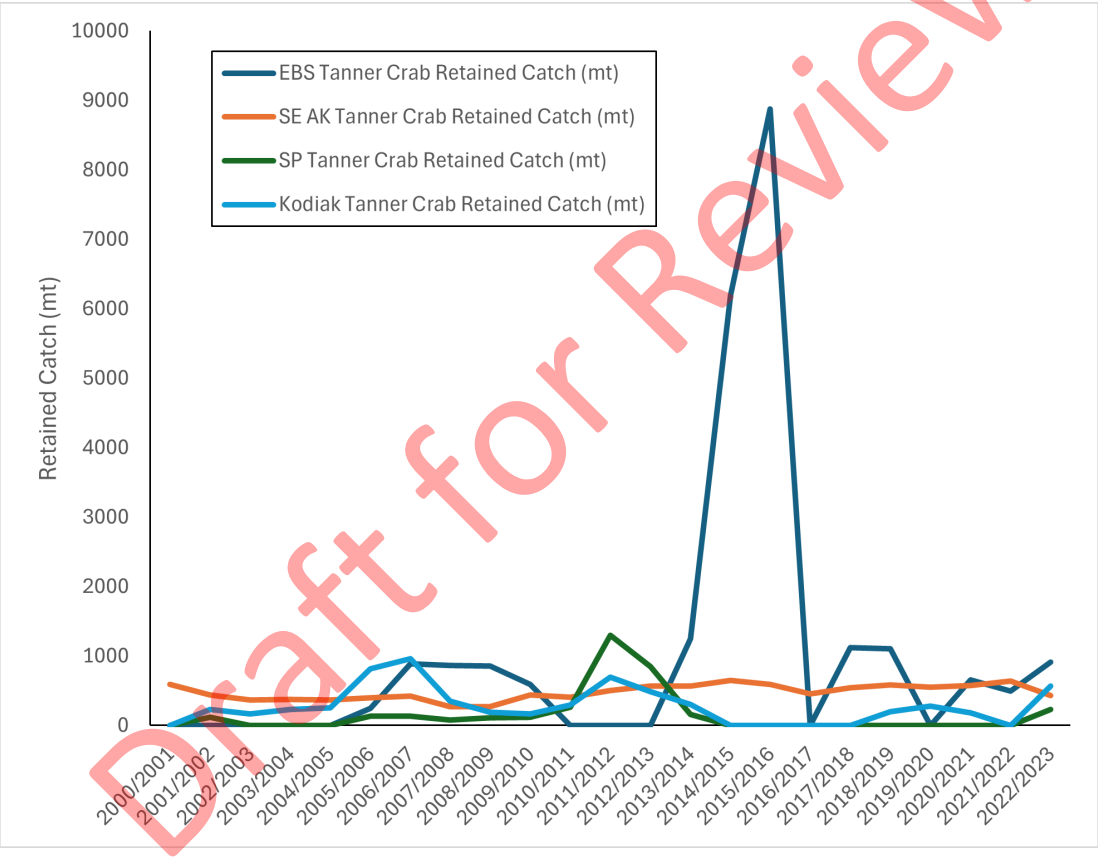

Figure 3: Retained catch of Tanner crab in the EBS, SE AK, SP, and Kodiak regions from 2000-2023 (Stockhausen 2023)(Palof et al. 2022; Whiteside and Looman 2023).

Snow crab

The commercial EBSSC fishery grew in the early 1980s after foreign fleets were prohibited from harvesting in the Bering Sea, and reached historical highs in the mid-1990s (Szuwalski 2024). The stock was declared overfished in 1999, dropping retained catches significantly before slowly increasing again over time as the stock rebuilt (ibid). However, a major stock collapse was observed between 2018 and 2021 due to series of a marine heatwaves (Szuwalski

et al. 2023b), which resulted in the closing the fishery for the first time for multiple seasons (Szuwalski et al. 2023b; Szuwalski 2024). Landings for the EBSSC fishery averaged approximately 14,793 MT annually since the 2013/2014 season, although the fishery was not open for the last two of the ten seasons due to the fishery's closure (Figure 4) (ibid). It was determined that the fishery would be reopened in 2024, and the TAC for the 2024/2025 season has been set at 2140 MT (ADFG 2024n).

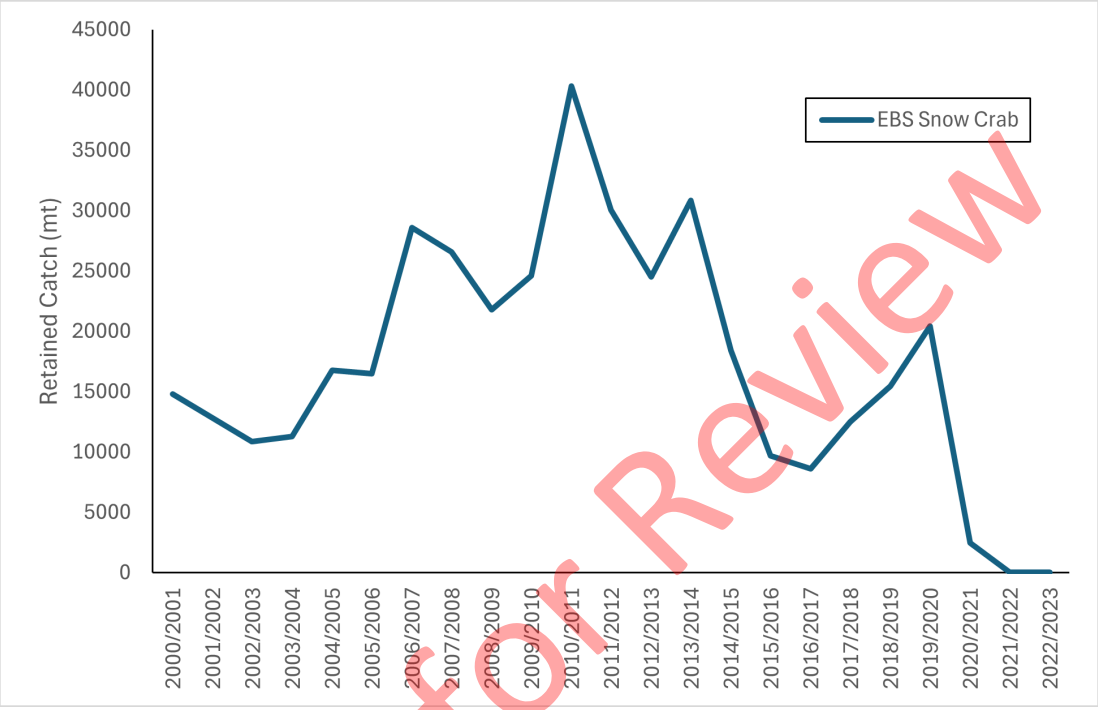

Figure 4: Retained catch of snow crab in the EBS from 2000-2023 (data from (Szuwalski 2024)).

Importance to the US/North American market

In 2022, U.S. production of king, Tanner, and snow crab was quite low due to fishery closures and reductions. In addition, in March 2022, the U.S. banned all seafood imports from the Russian Federation, including king, Tanner, and snow crab (SeafoodSource 2022). The commercial Alaska king, Tanner, and snow crab fisheries have been among the most valuable in the U.S. in recent years. In 2020, these fisheries were worth roughly $160 million, approximately 27% of the total U.S. crab fishery value (NOAA 2022b).

Trade and supply statistics in the U.S. often include both *C. opilio* and *C. bairdi* (Tanner crab) as snow crab, so the two species' data are reported together. The supply of snow and Tanner crab in the U.S. was approximately 217,920 mt (round weight) in 2020, with roughly 93% of this supply being imported (NOAA 2022c). The 2020 U.S. supply was considerably higher than in 2019, and was the highest since 2013. Approximately 61% of U.S. imports of snow and Tanner crab in 2020 were from the Atlantic coast of Canada, 33% from the Russian Federation, 2% from Norway, and the remainder from several other countries (NOAA 2022d). Approximately

30% of U.S. landings of snow and Tanner crab in 2019 were exported to China, 24% to Japan, 19% to Vietnam, and the remainder to several other countries (NOAA 2022c). Much of the snow crab exported to China is for meat extraction and subsequent export to Japan (DFO 2016).

Trade and supply statistics in the U.S. report all king crab species together (red, golden, blue). The supply of king crab in the U.S. was approximately 54,000 mt (round weight) in 2020, with roughly 92% of this supply being imported (NOAA 2022c). This supply was slightly above the average U.S. supply for 2016–2020. Approximately 90% of U.S. imports of king crab in 2020 were from the Russian Federation, 9% from Argentina (southern king crab, *Lithodes santolla*), and the remainder from several other countries (NOAA 2022d). Approximately 64% of U.S. landings of king crab in 2020 were exported to Japan, 26% to Canada, 2% to South Korea, and the remainder to several other countries (NOAA 2022c).

Common and market names

Golden king crab may also be referred to as brown king crab (FDA 2024). Red king crab may also be referred to as Kamchatka crab or Alaskan king crab (FDA 2024). Tanner crab may also be referred to as southern Tanner crab or snow crab (FDA 2024; ADFG 2024f). Snow crab may also be referred to as Tanner crab (FDA 2024)(ADFG 2024f).

Primary product forms

The most common product forms of Tanner and snow crab are frozen leg sections or clusters, mainly for export to China and Japan (ASMI 2018; AFSC 2019). The whole cooked crab (shelled and frozen) is another product form that makes up a small percentage of exports (ASMI 2018). Live Tanner and snow crab are also sold in some locations (AFSC 2019).

Golden and red king crab are sold as sections, claws, legs, and legs split down the middle. Most king crab is delivered live to shore-based processors, cooked, then brine-frozen (Blau 1997) (FishChoice 2020). Fresh king crab has also been sold for cooking at home in the past (Blau 1997).

Production volume notes

The AIGKC fishery had the highest levels of retained catch across Alaska king, Tanner, and snow crab fisheries in 2023, with 1,758 MT landed. The EBSSC fishery landed a volume of 0 MT in 2023, due to the fishery being closed at that time.

Summary

Red king crab harvested in Norton Sound and Bristol Bay are rated green due to minimal concerns surrounding abundance and fishing mortality of the target species and impacts on other species, effective management, and low concerns surrounding impacts on the habitat and ecosystem.

Tanner crab harvested in the Eastern Bering Sea are rated green due to minimal concerns surrounding abundance and fishing mortality of the target species, moderate concerns surrounding impacts on other species, effective management, and low concerns surrounding impacts on the habitat and ecosystem.

Tanner crab harvested in the Kodiak region are rated yellow due to moderate concerns surrounding abundance and fishing mortality of the target species, minimal concerns surrounding impacts on other species, moderately effective management, and low concerns surrounding impacts on the habitat and ecosystem.

Tanner crab harvested in the South Peninsula region are rated green due to low concerns surrounding abundance and fishing mortality of the target species, minimal concerns surrounding impacts on other species, moderately effective management, and low concerns regarding impacts on the habitat and ecosystem.

Snow crab harvested in the Eastern Bering Sea are rated green due to moderate concerns surrounding abundance and fishing mortality of the target species, minimal concerns surrounding impacts on other species, effective management, and low concerns regarding impacts on the habitat and ecosystem.

Golden king crab and Tanner crab harvested in Southeast Alaska are rated yellow due to moderate concerns surrounding the abundance and fishing mortality of the target species and impacts on other species, moderately effective management, and low concerns regarding impacts on the habitat and ecosystem.

Golden king crab harvested in the Aleutian Islands is rated yellow due to minimal concerns surrounding abundance and fishing mortality of the target species, significant concerns surrounding impacts on other species, effective management, and moderate concerns regarding impacts on the habitat and ecosystem.

Eco-Certification information

There are currently no Marine Stewardship Council (MSC) eco-certifications for the fisheries included in this report.

Assessments

This section assesses the sustainability of the fishery(s) relative to the Seafood Watch Standard for Fisheries, available at www.seafoodwatch.org. The specific standard used is referenced on the title page of all Seafood Watch assessments.

Criterion 1: Impacts on the Species Under Assessment

This criterion evaluates the impact of fishing mortality on the species, given its current abundance. When abundance is unknown, abundance is scored based on the species' inherent vulnerability, which is calculated using a Productivity-Susceptibility Analysis. The final Criterion 1 score is determined by taking the geometric mean of the abundance and fishing mortality scores. The Criterion 1 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Factor 1.3 (Fishing Mortality) is Critical.

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level*

Criterion 1 Summary

Golden king crab			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
Aleutian Islands Stock - United States - Alaska - Pots - 1,758 mt	5.000 Very Low Concern	5.000 Low Concern	**Green (5.000)**
Southeast Alaska Stock - United States - Alaska - Pots - 72 mt	2.330 Moderate Concern	3.000 Moderate Concern	**Yellow (2.644)**

Red king crab			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
Norton Sound Stock - United States - Alaska - Pots - 192 mt	5.000 Very Low Concern	5.000 Low Concern	**Green (5.000)**
United States - Alaska - Pots - 973 mt - FAO Major Area: Pacific, Northeast - Management Unit: Bristol Bay	3.670 Low Concern	5.000 Low Concern	**Green (4.284)**

Snow crab			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
United States - Alaska - Pots - 0 mt	1.000 High Concern	5.000 Low Concern	**Yellow (2.236)**

Southern Tanner crab			
Region / Method	**Abundance**	**Fishing Mortality**	**Score**
United States - Alaska - Pots - 522 mt - FAO Major Area: Pacific, Northeast - Management Unit: South Peninsula	3.670 Low Concern	3.000 Moderate Concern	**Green (3.318)**
United States - Alaska - Pots - 2,675 mt - FAO Major Area: Pacific, Northeast - Management Unit: Kodiak	2.330 Moderate Concern	3.000 Moderate Concern	**Yellow (2.644)**
Eastern Bering Sea Stock - United States - Alaska - Pots - 910 mt	3.670 Low Concern	5.000 Low Concern	**Green (4.284)**
Southeast Alaska Stock - United States - Alaska - Pots - 433 mt	2.330 Moderate Concern	3.000 Moderate Concern	**Yellow (2.644)**

Criterion 1 Assessment

Scoring Guidelines

Factor 1.1 - Abundance

Goal: Stock abundance and size structure of native species is maintained at a level that does not impair recruitment or productivity.

- *5 (Very Low Concern) – Strong evidence exists that the population is above an appropriate target abundance level (given the species' ecological role), or near virgin biomass.*
- *3.67 (Low Concern) – Population may be below target abundance level, but is at least 75% of the target level, OR data-limited assessments suggest population is healthy and species is not highly vulnerable.*
- *2.33 (Moderate Concern) – Population is not overfished but may be below 75% of the target abundance level, OR abundance is unknown and the species is not highly vulnerable.*
- *1 (High Concern) – Population is considered overfished/depleted, a species of concern, threatened or endangered, OR abundance is unknown and species is highly vulnerable.*

Factor 1.2 - Fishing Mortality

Goal: Fishing mortality is appropriate for current state of the stock.

- *5 (Low Concern) – Probable (>50%) that fishing mortality from all sources is at or below a sustainable level, given the species ecological role, OR fishery does not target species and fishing mortality is low enough to not adversely affect its population.*
- *3 (Moderate Concern) – Fishing mortality is fluctuating around sustainable levels, OR fishing mortality relative to a sustainable level is uncertain.*
- *1 (High Concern) – Probable that fishing mortality from all source is above a sustainable level.*

Golden king crab *(Lithodes aequispinus)*

1.1 Abundance

Aleutian Islands Stock | Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Very Low Concern

The most recent stock assessment of AIGKC was conducted in 2024 using data through the 2023/2024 season (Jackson 2024). The stock has a B_{MSY} proxy of $MMB_{35\%}$, where MMB is mature male biomass. The target reference point is $MMB_{35\%}$ and the overfishing threshold is $50\%B_{MSY}$ (i.e. half the target reference point). The 2024 stock assessment estimated current biomass to be above B_{MSY} ($MMB_{current}/MMB_{35\%}=1.09$, based on the author's preferred model(Jackson 2024). Therefore, as there is a recent stock assessment that estimates biomass to be above a target reference point appropriate for the species, abundance is considered a “very low concern” [per line 1.a. and 1.b. in table 1.1.1 of the Standard].

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Moderate Concern

ADF&G reviews commercial fishery logbook CPUE, fish tickets, and dockside sampling for each of the seven GKC management areas in SE Alaska to determine relative stock health {Stratman 2021}. The most recent ADF&G stock status update for GKC in SE Alaska included reference points based on commercial fishery catch per unit effort (CPUE), which currently cannot be used to assess whether the stock is overfished, so there is uncertainty surrounding the appropriateness of these reference points (Olson and Stratman 2022). Fishery CPUE in at least four management areas has declined since 2010, and a fifth area (Lower Chatham Strait) has not been fished in recent years (Olson and Stratman 2022). CPUE has been at levels similar to the 1990s, when a fishery collapse occurred (Stratman 2020; Olson and Palof 2020). Because of uncertainty regarding the Olson and Stratman (2022) data-limited assessment results and reference points, a productivity-sensitivity analysis (PSA) was conducted for this Seafood Watch report. As there is a data-limited assessment available with uncertainty surrounding the results such that a PSA was conducted determining the stock had low vulnerability (PSA score = 2.11), abundance is considered a “moderate concern” [per lines 2.c. and 2.e. in table 1.1.1 of the Standard].

Supplementary Information

Productivity-Susceptibility Analysis (PSA):

Table 3

Productivity			
Attribute	**Ranking**	**Score**	**Reference**
Average age at maturity	5-6 years	2	(ADFG 2024f)
Average maximum age	14 years	2	(ADFG 2024f)
Von Bertalanffy (Brody) growth coefficient (K)	Ranges from 0.2-0.4	1	
Fecundity	85,000-424,000 eggs per year	1	(ADFG 2024f)
Reproductive strategy	demersal egg layer or brooder	2	(ADFG 2024f)
Density dependence	No dynamics demonstrated or likely	2	(Zheng and Kruse 2003)
Productivity Score: (2+2+1+1+2+2)/6 = 1.67			

Table 4

Susceptibility		
Attribute	**Ranking**	**Score**
Areal overlap	Unknown	3
Vertical overlap	Target species/unknown	3
Seasonal availability	Fisheries overlap with species on average for >6 months per year	3
Selectivity of fishery	Target species, but "high risk" conditions do not apply	2
Post-capture mortality	Retained species	3
Susceptibility Score: (3+3+3+2+3)/5 = 2.8		

Table 5

Vulnerability Score
√(1.67+2.8) = 2.11

1.2 Fishing Mortality

Aleutian Islands Stock | Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Low Concern

According to the 2024 stock assessment for AIGKC, the 2023/2024 total mortality (2,755 MT) (including landings plus incidental mortality across all fisheries) was below the crab allowable biological catch level and allowable catch limit for the stock (3,137 MT) (Jackson 2024). The state establishes annual TACs at a level sufficiently below the Allowable Catch Level (ACL) considering a number of stock factors, including estimates of exploitable biomass, stock status, and recruitment, as well as scientific and management uncertainty and accountability measures so that the sum of the catch and the assumed uncertainty do not exceed the ACL (NPFMC 2021a). Therefore, as it is probable that fishing mortality from all sources is below a sustainable level that is appropriate for the species, fishing mortality is considered a “low concern” [per line 1. in table 1.2.1 in the Standard].

Supplementary Information

From 2019-2024, retained catch exceeded the annual TAC by a small amount; however, this overage was due to the ADFG cost-recovery program harvest, so it was not considered an overage for the commercial fishery (Jackson 2024). Total retained catch in 2023/2024 was 2,578 MT; 1,758 MT was from the Eastern AI fishery (which included cost-recovery catch) and 820 MT was from the Western AI fishery (Jackson 2024).

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Moderate Concern

The ADF&G evaluates SEAKGKC stock status and establishes a guideline harvest level (GHL) and guideline harvest range (GHR) annually, using fishery dependent data including CPUE, harvest, biological information (such as carapace length, weight, and maturity) collected from dockside sampling of landings (Olson and Stratman 2022). Decision support rules are in place, including the reduction of GHL the following season, when logbook CPUE is less than the previous season and is between the limit and trigger reference points (ibid). Nevertheless, fishing mortality is not estimated for SEAKGKC,

and harvest levels corresponding to MSY-based reference points have not been established (ibid). Harvest of SEAKGKC has been low in recent years relative to historical levels (see figure below); however, a sustainable level of harvest with respect to appropriate reference levels that will prevent continued declines has yet to be defined for this fishery. Therefore, as fishing mortality with respect to appropriate reference levels is unknown, this factor is considered a "moderate concern" [per line 3. in table 1.2.1 of the Standard].

Supplementary Information

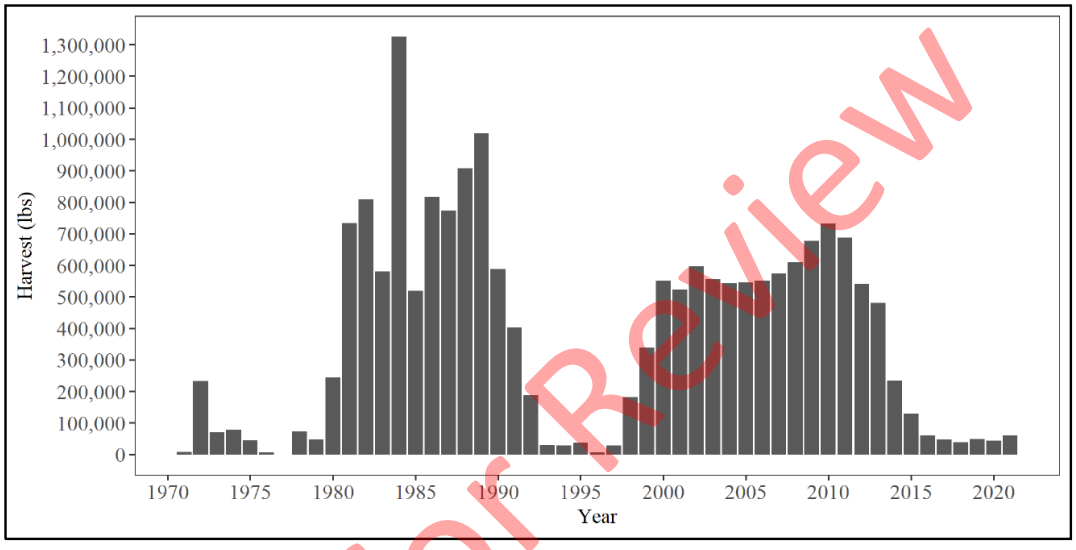

Figure 5: Harvests of golden king crab (lbs) in Southeast Alaska (Olson and Stratman 2022).

SEAKGKC is also caught by fishers targeting SEAKTC, based on ADF&G at-sea observer data and the fisheries often being open concurrently (Olson and Bishop 2012; ADFG 2023). GKC may be retained in the Tanner crab fishery, provided that the two fisheries occur concurrently and that fishers/permit holders are registered for the GKC fishery (ADFG 2023).

ADF&G evaluates stock status and establishes GHLs for seven GKC management areas in SEAK based on fishery-dependent data (ADFG 2023). Beginning with the 2020–21 season, reference points for commercial fishery CPUE began to be used to determine GHLs, but these were based on historical CPUE and not designed to measure harvest levels relative to MSY-based reference levels (Olson and Palof 2022). In recent years, commercial GKC fishery CPUE declined to historical lows for a longer duration than experienced during the 1990s fishery collapse, closing the fishery in several management areas for the entire 2019–20 season due to low fishery logbook CPUE and other poor indicators (Stratman 2020). All areas were reopened for the 2020–21 season despite quite low fishery CPUE in the most recent years for nearly all areas {Olson and Palof 2020}(ADFG 2021b). For the 2024 season, all management areas were open with GHLs similar to the previous season or higher (ADFG 2023).

Red king crab *(Paralithodes camtschaticus)*

1.1 Abundance

Norton Sound Stock | Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Very Low Concern

The most recent stock assessment of NSRKC was conducted in 2024 using data through the 2023 season (Hamazaki 2024). The 2024 stock assessment estimated biomass to have been fluctuating around B_{MSY} since around 2000, with a dip to the lowest point in the time series in 2019 (Hamazaki 2024). Since then, estimated biomass has increased again, and currently exceeds B_{MSY} ($B_{2024}/B_{MSY}=1.2$) (Hamazaki 2024). Therefore, as there is a recent stock assessment that has estimated biomass to be above a target reference point appropriate for the species with no scientific controversy, abundance is considered a "very low concern" [per lines 1.a. and 1.b. in table 1.1.1 of the Standard].

Supplementary Information

A direct estimation of B_{MSY} is not possible for this stock. The target reference point is the B_{MSY} proxy, which is calculated as mean model estimated mature male biomass from 1980 to present, and the overfishing threshold is half the target reference point (i..e $B_{MSY}/2$) (Hamazaki 2024).

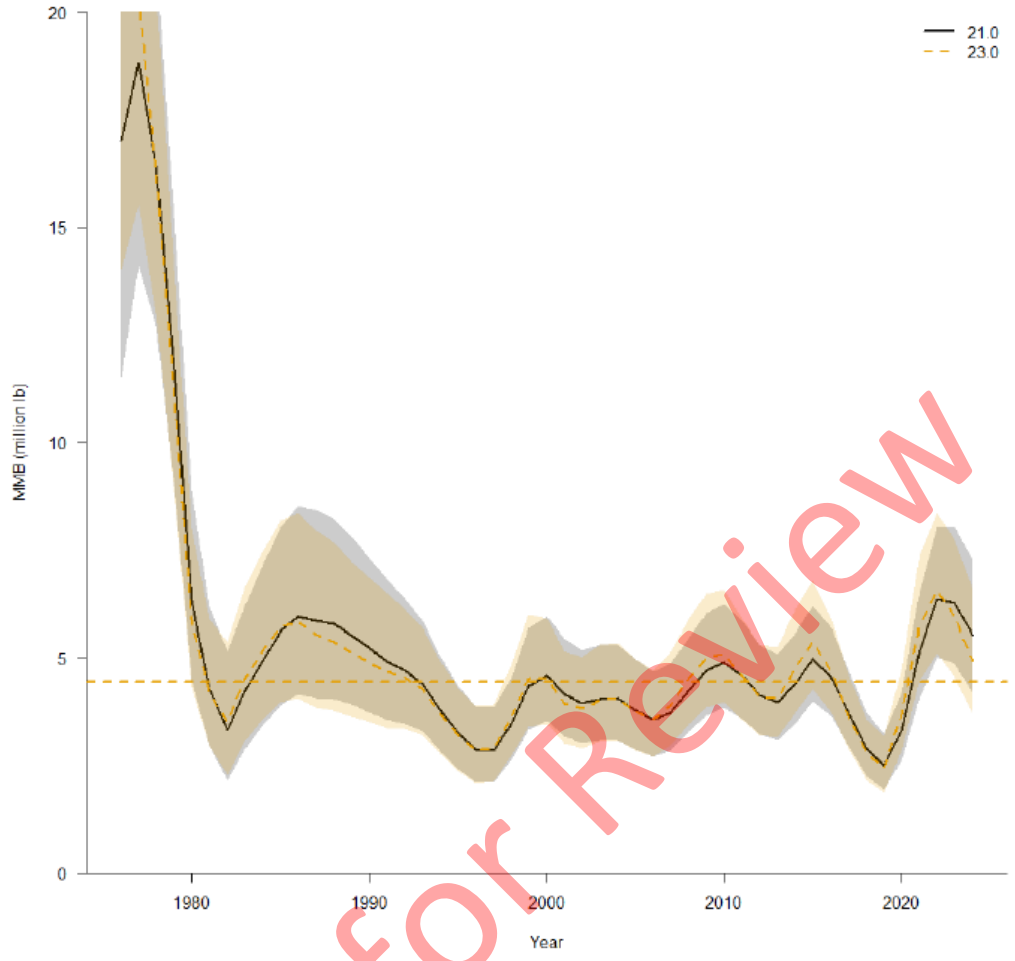

Figure 6: Estimated mean and 95% CI range of MMB (Biomass proxy) of Norton Sound red king crab from 1976-2024. Horizontal line is Bmsy (Average MMB of 1980-2024) (from (Hamazaki 2024).

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Low Concern

The most recent stock assessment of BBRKC was conducted in 2024 using data through the 2023-2024 season (Palof 2024). In 2023-2024, the stock mature male biomass was above MSST (B_{2024}/MSST=1.995), and hence was not overfished (ibid). Estimated mature male biomass has steadily declined from 2003 to 2018, and then slightly increased through 2023, and is currently around B_{MSY} (B_{2024}/B_{MSY}=0.77) (ibid). Therefore, as there is a recent stock assessment and the species is above the limit reference point and at least 75% of the target reference point, abundance is considered a “low concern” [per line 1. in table 1.1.1 of the Standard].

1.2 Fishing Mortality

Norton Sound Stock | Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Low Concern

The 2024 stock assessment for NSRKC found total fishing mortality (201mt), or landings plus incidental mortality across all fisheries, to be below the allowable biological catch level for the stock (217 MT) (Hamazaki 2024). The state establishes annual TACs at a level sufficiently below the Allowable Catch Level (ACL) considering a number of stock factors, including estimates of exploitable biomass, stock status, and recruitment, as well as scientific and management uncertainty and accountability measures so that the sum of the catch and the assumed uncertainty do not exceed the ACL (NPFMC 2021a). This stock supports three sub-fisheries. In 2023, overfishing did not occur; the summer commercial fishery harvested 187 MT of crab, while the winter commercial fishery and winter subsistence fishery accounted for 4.5 MT and 0.9 MT, respectively (Hamazaki 2024). Therefore, as it is probable that fishing mortality from all sources is at or below a sustainable level that is appropriate for the species, fishing mortality is considered a “low concern” [per line 1. of table 1.2.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Low Concern

The 2024 stock assessment for BBRKC found total fishing mortality or total catch of 1340 MT to be below the allowable biological catch level for the stock (3540 MT), which had been adjusted to have a 20% buffer since 2021-2022 (Palof 2024). The state establishes annual TACs at a level sufficiently below the Allowable Catch Level (ACL) considering a number of stock factors, including estimates of exploitable biomass, stock status, and recruitment, as well as scientific and management uncertainty and accountability measures so that the sum of the catch and the assumed uncertainty do not exceed the ACL (NPFMC 2021a). Therefore, as it is probable that fishing mortality from all sources is at or below a sustainable level that is appropriate for the species, fishing mortality is considered a “low concern” [per line 1. of table 1.2.1 of the Standard].

Supplementary Information

Catch in this fishery has declined since 2014, with the retained catch in 2020-2021 being about 1,257 MT following a reduction in total allowable catch (TAC) (Palof et al. 2022)(Palof 2024). The pot fishery was then closed from 2021-2023 due to low mature female abundance and in accordance with the Alaska state harvest strategy {Palof 2023}, but was opened again in 2023-2024 (Palof 2024).

Snow crab *(Chionoecetes opilio)*

1.1 Abundance

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

High Concern

The most recent stock assessment of EBS snow crab was conducted in 2024 using data through the 2023-2024 season, although the fishery was closed during this time (Szuwalski 2024). For 2023-2024, the stock mature male biomass (MMB = 13400 MT) was below the minimum stock size threshold (MSST=47400 MT) and B/B_{MSY} = 0.14, and was declared overfished in 2021 (ibid). Therefore, as it is probable that the stock is well below the limit reference point, abundance is considered a "high concern" [per table 1.1.1 of the Standard].

Supplementary Information

Immature female biomass observed in the survey during 2024 was the highest ever observed (Szuwalski 2024), indicating that there is potential for stock recovery in the future.

1.2 Fishing Mortality

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Low Concern

The EBS stock of snow crab is mostly caught in a targeted fishery that was closed from 2021-2023 but subsequently opened during the 2024-2025 fishing season, and snow crab is also caught and can be retained in the EBSTC fishery if the snow crab fishery is open and is sometimes discarded in the groundfish fishery (Stichert 2025, pers comm). For the 2023-2024 fishing season, total mortality was determined to be approximately 70 MT whereas the overfishing limit was set at 15,440 MT (Szuwalski 2024). Although the snow crab fishery was closed during this year, the total mortality has remained below the OFL as well as the ABC since 2015 (ibid.). Therefore, as it is probable that fishing mortality from all sources is at or below a sustainable level with signs of rebuilding, this factor is considered a "low concern" [per line 1. in table 1.2.1 of the Standard].

Supplementary Information

The recent decline of the snow crab has been predominantly attributed to starvation that coincides with a marine heat wave in the Bering Sea from 2018-2021 (Szuwalski et al. 2023b; Litzow et al. 2024). Although snow crab hasn't been retained in the Tanner crab fishery in years when the snow crab fishery is closed, snow crab is caught in the EBSTC fishery and the groundfish fishery. Because not all snow crab will survive post-release, fishing mortality will occur. Handling mortality in recent NOAA snow crab stock assessments was estimated at 30%, but this is not based on post-release field studies (Szuwalski 2024). Although the EBSSC fishery was opened in October of 2024, fishing mortality of snow crab in the EBSSC fishery, EBSTC fishery, and the groundfish fishery may affect the EBSSC stock's recovery.

Southern Tanner crab *(Chionoecetes bairdi)*

1.1 Abundance

Eastern Bering Sea Stock | Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Low Concern

EBSTC are considered distinct from stocks in the AI and ADF&G treats the eastern and western sub districts as separate stocks and sets separate TACs (GHLs) for them for added conservativism (Stockhausen 2023). The most recent stock assessment of EBSTC was conducted in 2024 using data through the 2023-2024 season (Stockhausen 2024). The stock has a B_{MSY} proxy of $MMB_{35\%}$, where MMB is mature male biomass and the target reference point is $MMB_{35\%}$ (Stockhausen 2024). The 2024 stock assessment estimated current biomass to be above B_{MSY} ($MMB_{current}/MMB_{35\%}$=1.34, based on the author's preferred model) (Stockhausen 2024). Although MMB has increased since 2019, mature male biomass has been on a generally declining trend since 2014/2015, the fishery was closed in 2019, but has since opened in 2020 and MMB approached historically low levels in 2020/2021; so the fishery has been closed for much of the past decade due to stock concerns (Stockhausen 2024) . Therefore, as there is a recent stock assessment that estimates biomass to be above a target reference point appropriate for the species, but there are concerns regarding stock trends over the past ten years, abundance is considered "low concern" [per line 1.b. in table 1.1.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Moderate Concern

There is no comprehensive stock assessment for KTC, and estimates of B_{MSY} are not available (Nichols 2022). Survey data from 1988-2022 are available, which is a long enough time series to cover more than three generations and can thus be used for scoring;

this abundance index is used by management to determine if a fishery should open annually.

The KTC fishery is subdivided into eight sections: Northeast, Eastside, Southeast, Southwest, Semidi Island Overlap, Westside, North Mainland, and South Mainland (Spalinger et al 2021). Six of them (all but the South Mainland and Semidi Island Overlap) are surveyed each year and have thresholds for opening (ADFG 2024b). Two of the sections with abundance thresholds have been closed long-term (Westside and North Mainland). In 2023, mature male abundance was above the threshold in three sections (Eastside, Southeast, Southwest), and below the threshold in a fourth (Northeast) (ADFG 2024b).

South Mainland opens if two adjacent surveyed sections (Westside, North Mainland and Southwest) are open, which has never happened and it will continue to be closed in 2024 (ADFG 2024b). The Semidi Island Overlap section is permitted to open if one of two adjacent surveyed areas opens (Southwest Kodiak or Chignik), which has occurred since 2022 and it will continue to be open in 2024 (ADFG 2024b).

Therefore, as a quantitative stock assessment is lacking, but there is an abundance index covering more than three generations showing that abundance is above a target threshold (or meets opening requirements) for at least 50% of the sections in this district, abundance is considered "moderate concern" [per table 1.1.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Low Concern

There is no comprehensive stock assessment for SPTC and estimates of B_{MSY} are not available. Survey data from 1988-2021 are available, which is a long enough time series to cover more than three generations and can thus be used for scoring this factor. Mature male abundance has been above the threshold (50%) managers use to determine whether a fishery can be opened in recent years for both sections of this district and is considered increasing and well above average for the time series (ADFG 2024b)(Spalinger et al 2021). Therefore, as a quantitative stock assessment is lacking, but there is a data-limited abundance index present covering more than three generations and showing that abundance has been above the average in recent years in both sections of this district (>70% of management units), abundance is considered a "low concern" [per line 2. in table 1.1.1 of the Standard].

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderate Concern

The biomass of mature male SEAKTC was estimated using an annual ADF&G crab pot survey and a catch-survey model based on the survey data (Wood et al. 2017; Rebert et al.

2019). Catch-survey modeling produced a regional biomass estimate of 2635 MT of mature male Tanner crab for 2021-2022, continuing a general increasing trend in recent years (Palof et al. 2022). Stock health across five categories was assessed by ADF&G relative to historical averages (1997–2010) of survey CPUE for females as well as pre-recruit and recruited males in the surveyed areas (Wood et al. 2017). Results were mixed for 2020–2021: “Poor” in one area, “Below Average” in one area, “Moderate” in three areas, “Above Average” in three areas, and “Healthy” in four areas (Palof et al. 2022).

As a quantitative stock assessment is lacking but there is a data-limited abundance index present covering more than three generations showing that abundance has been "healthy" or “above average” across 50% of the management units, this factor is scored a “moderate concern” [table 1.1.1 in the Standard].

Supplementary Information

1.2 Fishing Mortality

Eastern Bering Sea Stock | Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Low Concern

The 2024 stock assessment for EBS Tanner crab found the total mortality in 2023/2024 was 1090 MT (which includes landings plus incidental mortality across all fisheries) and was below the allowable biological catch (ABC) level for the stock (2715 MT) (Stockhausen 2024) . The state establishes annual TACs at a level sufficiently below the Allowable Catch Level (ACL) considering a number of stock factors, including estimates of exploitable biomass, stock status, and recruitment, as well as scientific and management uncertainty and accountability measures so that the sum of the catch and the assumed uncertainty do not exceed the ACL (NPFMC 2021a). The state also provides separate TACs for the Eastern and Western sub-districts, to prevent overharvest from a specific area. Therefore, as it is probable that fishing mortality from all sources is below a sustainable level that is appropriate for the species, fishing mortality is considered a “low concern” [per line 1. in table 1.2.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Moderate Concern

Fishing mortality estimates and reference points were not available for the KTC stock. The harvest strategy includes a mature male abundance threshold, computed at either 50% or 100% of the long-term abundance (1988-2021) (Nichols 2022). This is established for the sections within the district, and needs to be exceeded or met for a fishery to open. Further, the Kodiak District commercial Tanner crab season opens only when adjacent sections meet abundance and management thresholds, to ensure that the full fishery is not conducted in one area. Abundance must also be sufficient to provide for

a GHL of at least 100,000 pounds before a section may open (Nichols 2022). Therefore, as fishing mortality is unknown for this stock, it is considered a “moderate concern” [per line 3. in table 1.2.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Moderate Concern

Fishing mortality estimates and reference points were not available for the SPTC stock. The harvest strategy includes a mature male abundance threshold, computed at either 50% or 100% of the long-term abundance (1988-2021), which is established for the sections within the district, and needs to be exceeded or met for a fishery to open (Whiteside 2023). Abundance must also be sufficient to provide for a GHL of at least 90.7 MT before a section may open (Whiteside 2023). Therefore, as fishing mortality is unknown for this stock, this factor is considered a “moderate concern” [per line 3. in table 1.2.1 of the Standard].

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderate Concern

Fishing mortality estimates and reference points were not available for the SEAKTC stock. SEAKTC is also caught by fishers targeting SEAKGKC, based on ADF&G at-sea observer data and the fisheries often being open concurrently (Olson and Bishop 2012; ADFG 2023). Tanner crab may be retained in the GKC fishery, provided that the two fisheries occur concurrently and that fishers/permit holders are registered for the TC fishery (ADFG 2023). The mature male abundance estimate and the number of registered pots at the start of the fishery determine the commercial Tanner crab season length (Palof et al. 2022). The fishery is managed without a GHL, but management continues to determine stock health, establish a mature male harvest rate, and calculate GHLs to provide a benchmark to evaluate fishery performance so that regional exploitation should not exceed 20% of mature male or 38% of legal male biomass (Palof et al. 2022). Nevertheless, as appropriate reference levels have not been determined for this fishery, this factor is considered a “moderate concern” [per line 3. in table 1.2.1 of the Standard].

Criterion 2: Impacts on Other Species

All main retained and bycatch species in the fishery are evaluated under Criterion 2. Seafood Watch defines bycatch as all fisheries-related mortality or injury to species other than the retained catch. Examples include discards, endangered or threatened species catch, and ghost fishing. Species are evaluated using the same guidelines as in Criterion 1. When information on other species caught in the fishery is unavailable, the fishery's potential impacts on other species is scored according to the Unknown Bycatch Matrices, which are based on a synthesis of peer-reviewed literature and expert opinion on the bycatch impacts of each gear type. The fishery is also scored for the amount of non-retained catch (discards) and bait use relative to the retained catch. To determine the final Criterion 2 score, the score for the lowest scoring retained/bycatch species is multiplied by the discard/bait score. The Criterion 2 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Factor 2.3 (Fishing Mortality) is Crtitical

Guiding principles

- *Ensure all affected stocks are healthy and abundant.*
- *Fish all affected stocks at sustainable level.*
- *Minimize bycatch.*

Criterion 2 Summary

Criterion 2 score(s) overview

This table(s) provides an overview of the Criterion 2 subscore, discards+bait modifier, and final Criterion 2 score for each fishery. A separate table is provided for each species/stock that we want an overall rating for.

Golden king crab			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
Aleutian Islands Stock - United States - Alaska - Pots - 1,758 mt	1.732	1.000: < 100%	Red (1.732)
Southeast Alaska Stock - United States - Alaska - Pots - 72 mt	2.236	1.000: < 100%	Yellow (2.236)

Red king crab			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
Norton Sound Stock - United States - Alaska - Pots - 192 mt	4.284	1.000: < 100%	Green (4.284)
United States - Alaska - Pots - 973 mt - FAO Major Area: Pacific, Northeast - Management Unit: Bristol Bay	4.284	1.000: < 100%	Green (4.284)

Snow crab			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
United States - Alaska - Pots - 0 mt	4.284	1.000: < 100%	Green (4.284)

Southern Tanner crab			
Region / Method	**Sub Score**	**Discard Rate/Landings**	**Score**
United States - Alaska - Pots - 522 mt - FAO Major Area: Pacific, Northeast - Management Unit: South Peninsula	5.000	1.000: < 100%	Green (5.000)
United States - Alaska - Pots - 2,675 mt - FAO Major Area: Pacific, Northeast - Management Unit: Kodiak	5.000	1.000: < 100%	Green (5.000)
Eastern Bering Sea Stock - United States - Alaska - Pots - 910 mt	2.236	1.000: < 100%	Yellow (2.236)
Southeast Alaska Stock - United States - Alaska - Pots - 433 mt	2.236	1.000: < 100%	Yellow (2.236)

Criterion 2 main assessed species/stocks table(s)

This table(s) provides a list of all species/stocks included in this assessment for each 'fishery' (as defined by a region/method combination). The text following this table(s) provides an explanation of the reasons the listed species were selected for inclusion in the assessment.

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands			
Sub Score: 1.732	**Discard Rate: 1.000**		**Score: 1.732**
Species	**Abundance**	**Fishing Mortality**	**Score**
Corals and other biogenic habitats	1.000: High Concern	3.000: Moderate Concern	Red (1.732)
Humpback whale	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Golden king crab	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Pacific, Northeast - United States - Alaska - Pots - Bristol Bay			
Sub Score: 4.284	**Discard Rate: 1.000**		**Score: 4.284**
Species	**Abundance**	**Fishing Mortality**	**Score**
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Red king crab	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery			
Sub Score: 4.284	**Discard Rate: 1.000**		**Score: 4.284**
Species	**Abundance**	**Fishing Mortality**	**Score**
Snow crab	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery			
Sub Score: 2.236	**Discard Rate: 1.000**		**Score: 2.236**
Species	**Abundance**	**Fishing Mortality**	**Score**
Snow crab	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Southern Tanner crab	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Pacific, Northeast - United States - Alaska - Pots - Kodiak			
Sub Score: 5.000	**Discard Rate: 1.000**		**Score: 5.000**
Species	**Abundance**	**Fishing Mortality**	**Score**
Southern Tanner crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Pacific, Northeast - United States - Alaska - Pots - Norton Sound			
Sub Score: 4.284	**Discard Rate: 1.000**		**Score: 4.284**
Species	**Abundance**	**Fishing Mortality**	**Score**
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)
Red king crab	5.000: Very Low Concern	5.000: Low Concern	Green (5.000)
Pacific, Northeast - United States - Alaska - Pots - South Peninsula			
Sub Score: 5.000	**Discard Rate: 1.000**		**Score: 5.000**
Species	**Abundance**	**Fishing Mortality**	**Score**
Southern Tanner crab	3.670: Low Concern	3.000: Moderate Concern	Green (3.318)
Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery			
Sub Score: 2.236	**Discard Rate: 1.000**		**Score: 2.236**
Species	**Abundance**	**Fishing Mortality**	**Score**
Humpback whale	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Golden king crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Southern Tanner crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery			
Sub Score: 2.236	**Discard Rate: 1.000**		**Score: 2.236**
Species	**Abundance**	**Fishing Mortality**	**Score**
Humpback whale	1.000: High Concern	5.000: Low Concern	Yellow (2.236)
Golden king crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Southern Tanner crab	2.330: Moderate Concern	3.000: Moderate Concern	Yellow (2.644)
Gray whale	3.670: Low Concern	5.000: Low Concern	Green (4.284)

Species were included in Criterion 2 if: 1) they represent 5% or more of the total catch from the relevant Alaska king, Tanner, and snow crab fisheries; 2) they are listed as endangered, threatened, or protected (ETP) species and there is evidence of crab fishing gear causing entanglements that resulted in mortality above 5% of a sustainable level (or the fishery's impact is unknown); 3) species composition is unknown or data-limited and so they have been identified as a likely bycatch species according to the Seafood Watch Unknown Bycatch Matrix (UBM), which is based on a synthesis of peer reviewed literature and expert opinion on the bycatch impacts of each gear type (ranks the bycatch susceptibility of different taxonomic groups in various gear types; more information is available in Appendix B of the Seafood Watch criteria); or 4) a species used as bait in the fishery meets 1, 2, or 3 above.

The following paragraphs justify why species were included or excluded as Criterion 2 species for each fishery in this report:

AIGKC

Based on observer data from 2019-2023 (ADFG 2025), corals and other biogenic habitats make up less than 5% of the total catch, but have high vulnerability and are likely to interact with this fishery, so are considered a main species. According to the Seafood Watch UBM, marine mammals are highly susceptible to interactions with trap/pot fisheries, and the NOAA List of Fisheries includes this fishery under Category III for documented impacts from BSAI fisheries to gray whales and bowhead whales (NOAA 2024c). Although bowhead whales could be incidentally killed or injured in this fishery, the likelihood is low and well below a sustainable PBR, so they are not included here (NOAA 2024c). Eastern North Pacific (ENP) gray whale, could be impacted based on fishery timing and location and because the Pacific Coast Feeding Group (PCFG) has a low sustainable PBR, it could be impacted by pot fisheries in Alaska (Carretta et al. 2021), so gray whales are included as a main species. Due to the temporal and spatial overlap with humpback migrations, entanglements of humpback whale in this region, which are of particular concern, have also been reported so are included here (Young et al. 2023b; Young et al. 2023c). Fishermen often use bait such as cod, ground herring, and halibut heads that are fish processing scraps or caught incidentally in other fisheries, so are not considered as a main species here. For the AIGKC fishery, humpback whales limit the score for Criterion 2 due to their high vulnerability and unknowns surrounding this fishery's impacts.

SEAK GKC & SEAKTC

The bycatch and retained species caught in the SEAKGKC and SEAKTC fisheries are generally unknown, so bycatch is scored according to the Seafood Watch UBM. The taxa that are most likely to interact with this fishery include: finfish, marine mammals, corals and other biogenic habitats, and benthic invertebrates. Using observer data from 2019-2023 from other fisheries in this assessment as a proxy (ADFG 2025), finfish and benthic invertebrates may sometimes be caught in this fishery, although the volume harvested is likely less than 5% of total landings and they are not species of concern, so these taxa are not included here. Although corals and other biogenic habitats have high vulnerability, specific volumes and species are generally unknown and have not been identified in observer data so it is unlikely they interact significantly with single pot fisheries in southeast Alaska and they are not included here (ADFG 2025). Marine mammals are highly susceptible to interactions with trap/pot fisheries, and the NOAA List of Fisheries includes this fishery under Category III for documented impacts from BSAI fisheries to two stocks of humpback whales, which are of particular concern, and hence are considered here (NOAA 2024c). The Gray Whale PCFG, a sub-stock of the ENP gray whale stock, can overlap with the timing and location of this fishery and entanglements have occurred, although rare, so gray whale are also considered here (Carretta et al. 2021). In addition, the SEAKGKC fishery runs concurrently with the SEAKTC fishery and both are often caught together and estimated to be greater than 5% of the landings when not the target species (Olson and Bishop 2012), so each is included as a Criterion 2 species here for the concurrent fishery. For these fisheries, humpback whales limit the score for Criterion 2 due to their high vulnerability and unknowns surrounding these fisheries' impacts.

BBRKC & NSRKC & EBSTC & EBSSC

Based on observer data from 2019-2023 (ADFG 2025), finfish and benthic invertebrates are sometimes caught in the BBRKC, EBSTC, and EBSSC fisheries, although the volume harvested is less than 5% of total landings and they are not species of concern, so these taxa are not included here. Using these data as a proxy, the same can be assumed for the NSRKC fishery. Vulnerable corals and other biogenic habitats are not considered to overlap spatially with these fisheries (Stone and Shotwell 2007) so are not considered here. According to the Seafood Watch UBM, marine mammals are highly susceptible to interactions with trap/pot fisheries, and the NOAA List of Fisheries includes the fisheries in this region under Category III for documented impacts from BSAI fisheries to gray whales and bowhead whales (NOAA 2024c). Although bowhead whales could be incidentally killed or injured in this fishery, the likelihood is low and well below a sustainable PBR, so they are not included here (NOAA 2024c). The PCFG sub-stock of the ENP gray whale could be impacted based on fishery timing and location, so gray whale are included as a main species. In addition, for the EBSTC fishery specifically, snow crab (*Chionoecetes opilio*) was included as a Criterion 2 species for this fishery as reports indicate that catch of snow crab (retainment is allowed when the snow crab fishery is open; otherwise, crabs are discarded) has been greater than 5% of total catch volumes from 2020-2022 {Gaueman 2014; ADFG 2025), so snow crab limit the score for Criterion 2 for this fishery.

SPTC & KTC

The bycatch and retained species caught in the SPTC and KTC fisheries are generally unknown, so bycatch is scored according to the Seafood Watch UBM. The taxa that are most likely to interact with this fishery include: finfish, marine mammals, corals and other biogenic habitats, and benthic invertebrates. Using observer data from 2019-2023 from other fisheries in this assessment as a proxy (ADFG 2025), finfish and benthic invertebrates may sometimes be caught in this fishery, although the volume harvested is likely less than 5% of total landings and they are not species of concern, so these taxa are not considered here. Although corals and other biogenic habitats have high vulnerability, specific volumes and species are generally unknown and have not been identified in observer data so it is unlikely they interact significantly with single pot fisheries in the Gulf of Alaska and they are not included here (ADFG 2025). Although marine mammals are highly susceptible to interactions with trap/pot fisheries, there are no documented concerns with marine mammals in this region according to the NOAA List of Fisheries.

Criterion 2 Assessment

Scoring Guidelines

Factor 2.1 - Abundance

(same as Factor 1.1 above)

Factor 2.2 - Fishing Mortality

(same as Factor 1.2 above)

Factor 2.3 - Modifying Factor: Discards and Bait Use

Goal: Fishery optimizes the utilization of marine and freshwater resources by minimizing post-harvest loss. For fisheries that use bait, bait is used efficiently.

Scoring Guidelines: The discard rate is the sum of all dead discards (i.e. non-retained catch) plus bait use divided by the total retained catch.

Ratio of bait + discards/landings	**Factor 2.3 score**
<100%	1
>=100	0.75

Corals and other biogenic habitats *(Unknown coral spp.)*

2.1 Abundance

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

High Concern

Corals and other biogenic habitat-forming species (e.g., stony corals, soft corals, sponges, gorgonians, hydrozoans, tunicates) are present in ADF&G observer data at low levels for the AIGKC fishery, although all specific species and amounts are unknown (ADFG 2020e). Because corals and other biogenic habitat-forming species in AI are typically found in quite deep water they are expected to overlap with fisheries in these region. The slower growth rates of corals and other biogenic habitats in these areas amplify the impacts from seafloor disturbance through fishing or other activities (NOAA 2021b; Woodby et al. 2002). The high inherent vulnerability of deepwater corals makes them a species (or taxa) of concern for Seafood Watch; hence abundance is considered a "high concern" [per the unknown bycatch matrix of the Standard].

2.2 Fishing Mortality

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Moderate Concern

Corals and other biogenic habitat-forming species (e.g., stony corals, soft corals, sponges, gorgonians, hydrozoans, tunicates) are present in ADF&G observer data at low levels for the AIGKC fishery, although all specific species and amounts are unknown (ADFG 2025) (ADFG 2020e). Therefore, as fishing mortality is unknown relative to a sustainable level, fishing mortality is considered a "moderate concern" [per line 3. in Table 1.2.1 of the Standard].

Golden king crab *(Lithodes aequispinus)*

2.1 Abundance

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderate Concern

ADF&G reviews commercial fishery logbook CPUE, fish tickets, and dockside sampling for each of the seven GKC management areas in SE Alaska to determine relative stock health {Stratman 2021}. The most recent ADF&G stock status update for GKC in SE Alaska included reference points based on commercial fishery catch per unit effort

(CPUE), which currently cannot be used to assess whether the stock is overfished, so there is uncertainty surrounding the appropriateness of these reference points (Olson and Stratman 2022). Fishery CPUE in at least four management areas has declined since 2010, and a fifth area (Lower Chatham Strait) has not been fished in recent years (Olson and Stratman 2022). CPUE has been at levels similar to the 1990s, when a fishery collapse occurred (Stratman 2020; Olson and Palof 2020). Because of uncertainty regarding the Olson and Stratman (2022) data-limited assessment results and reference points, a productivity-sensitivity analysis (PSA) was conducted for this Seafood Watch report. As there is a data-limited assessment available with uncertainty surrounding the results such that a PSA was conducted determining the stock had low vulnerability (PSA score = 2.11), abundance is considered a "moderate concern" [per lines 2.c. and 2.e. in table 1.1.1 of the Standard].

Supplementary Information

Productivity-Susceptibility Analysis (PSA):

Table 3

Productivity			
Attribute	**Ranking**	**Score**	**Reference**
Average age at maturity	5-6 years	2	(ADFG 2024f)
Average maximum age	14 years	2	(ADFG 2024f)
Von Bertalanffy (Brody) growth coefficient (K)	Ranges from 0.2-0.4	1	
Fecundity	85,000-424,000 eggs per year	1	(ADFG 2024f)
Reproductive strategy	demersal egg layer or brooder	2	(ADFG 2024f)
Density dependence	No dynamics demonstrated or likely	2	(Zheng and Kruse 2003)
Productivity Score: (2+2+1+1+2+2)/6 = 1.67			

Table 4

Susceptibility		
Attribute	**Ranking**	**Score**
Areal overlap	Unknown	3
Vertical overlap	Target species/unknown	3
Seasonal availability	Fisheries overlap with species on average for >6 months per year	3
Selectivity of fishery	Target species, but "high risk" conditions do not apply	2
Post-capture mortality	Retained species	3
Susceptibility Score: (3+3+3+2+3)/5 = 2.8		

Table 5

Vulnerability Score
√(1.67+2.8) = 2.11

2.2 Fishing Mortality

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderate Concern

The ADF&G evaluates SEAKGKC stock status and establishes a guideline harvest level (GHL) and guideline harvest range (GHR) annually, using fishery dependent data including CPUE, harvest, biological information (such as carapace length, weight, and maturity) collected from dockside sampling of landings (Olson and Stratman 2022). Decision support rules are in place, including the reduction of GHL the following season, when logbook CPUE is less than the previous season and is between the limit and trigger reference points (ibid). Nevertheless, fishing mortality is not estimated for SEAKGKC, and harvest levels corresponding to MSY-based reference points have not been established (ibid). Harvest of SEAKGKC has been low in recent years relative to historical levels (see figure below); however, a sustainable level of harvest with respect to appropriate reference levels that will prevent continued declines has yet to be defined for

this fishery. Therefore, as fishing mortality with respect to appropriate reference levels is unknown, this factor is considered a “moderate concern” [per line 3. in table 1.2.1 of the Standard].

Supplementary Information

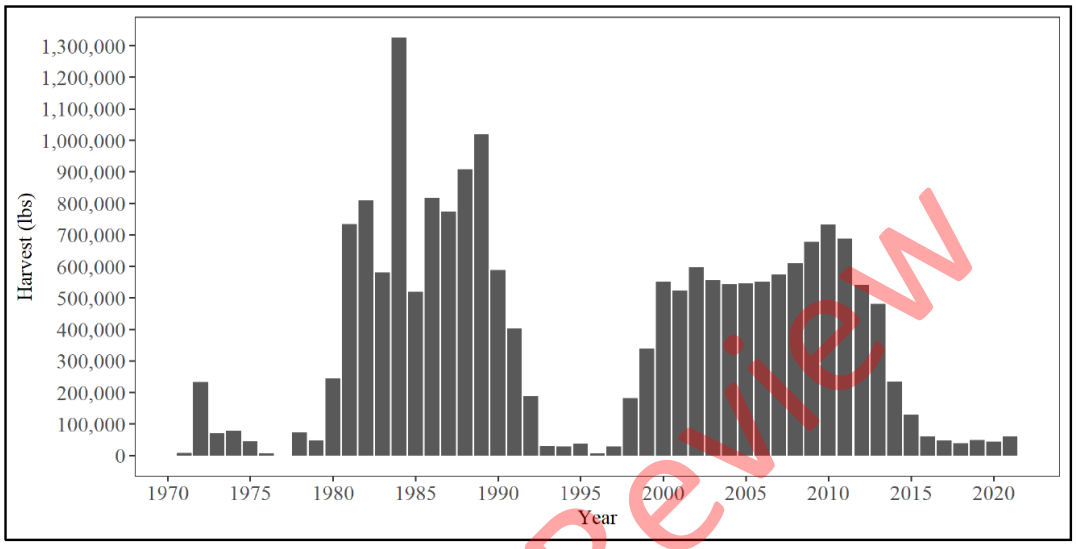

Figure 5: Harvests of golden king crab (lbs) in Southeast Alaska (Olson and Stratman 2022).

SEAKGKC is also caught by fishers targeting SEAKTC, based on ADF&G at-sea observer data and the fisheries often being open concurrently (Olson and Bishop 2012; ADFG 2023). GKC may be retained in the Tanner crab fishery, provided that the two fisheries occur concurrently and that fishers/permit holders are registered for the GKC fishery (ADFG 2023).

ADF&G evaluates stock status and establishes GHLs for seven GKC management areas in SEAK based on fishery-dependent data (ADFG 2023). Beginning with the 2020–21 season, reference points for commercial fishery CPUE began to be used to determine GHLs, but these were based on historical CPUE and not designed to measure harvest levels relative to MSY-based reference levels (Olson and Palof 2022). In recent years, commercial GKC fishery CPUE declined to historical lows for a longer duration than experienced during the 1990s fishery collapse, closing the fishery in several management areas for the entire 2019–20 season due to low fishery logbook CPUE and other poor indicators (Stratman 2020). All areas were reopened for the 2020–21 season despite quite low fishery CPUE in the most recent years for nearly all areas {Olson and Palof 2020}(ADFG 2021b). For the 2024 season, all management areas were open with GHLs similar to the previous season or higher (ADFG 2023).

Gray whale *(Eschrichtius robustus)*

2.1 Abundance

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Low Concern

The Eastern North Pacific (ENP) gray whale stock most often feeds in the Chukchi, Beaufort, and northwestern Bering Seas, while a portion of the stock, known as the Pacific Coast Feeding Group (PCFG), feed from SEAK to California, during summer and fall (Carretta et al. 2021). The ENP stock migration overlaps with the locations of several crab pot fisheries in the BSAI and SEAK. The Eastern North Pacific gray whale population has been estimated to be about 26,960 individuals based on a 2015-2016 survey (Carretta et al. 2021). They do not have a formal status under the MMPA and are not classified as a strategic stock. An ongoing gray whale Unusual Mortality Event (UME) resulted in 502 gray whale mortalities in the United States, Canada, and Mexico in 2019–21 (117 mortalities in Alaska) (NOAA 2022e). Although the UME has not yet been incorporated into estimates of the population size, it is likely that the ENP gray whale stock remains at a sustainable level due to the large population size before the UME began (Carretta et al. 2021). Therefore, as there is recent stock information available and there is confidence that the stock is healthy, abundance is considered a “low concern” [per line 2. in table 1.1.1 of the Standard].

Supplementary Information

The ENP stock migrates to wintering lagoons in Baja California, Mexico in late fall, where they remain until early spring before migrating north to feed (Jones 1990). In 2015, the minimum population estimate (N_{min}) for the ENP stock was 25,849, which was the highest recorded in the 1967–2015 time series (Carretta et al. 2021). The IUCN considers the status of the gray whale overall (not specific to the ENP population) to be "Least Concern" {Cooke et al. 2018}. In 1994, the ENP stock of gray whale was removed from the Endangered Species Act (ESA) (NMFS 1994). In 2011, the ENP population was estimated at 85% of carrying capacity, 129% of the maximum net productivity level, and within the range of an optimum sustainable population (Punt and Wade 2010).

Figure 7: Approximate distribution of the Eastern North Pacific stock of gray whale (shaded area) (Carretta et al. 2021).

2.2 Fishing Mortality

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Low Concern

The 2021 NOAA ENP gray whale stock assessment and the NOAA LOF indicate that crab pot fisheries in the Bering Sea may affect gray whales {NOAA 2019; Carretta et al. 2021). ENP and Pacific Coast Feeding Group (part of the ENP stock) gray whale migrations overlap temporally and spatially with BSAI and SEAK crab fisheries, respectively (Carretta et al. 2021). The potential biological removal (PBR) level for the ENP stock of gray whale is 801 animals per year (Carretta et al. 2021). The total human-caused serious injury and mortality on the ENP stock totals 62 ENP whales annually (ibid). Entanglement in commercial pot and trap fisheries along the U.S. West Coast is a source of gray whale mortality and serious injury (ibid). Although the stock assessment does not report any mortalities as a result of entanglement in BSAI crab fishery gear, 0.95 annual takes are attributed to unidentified pot gear, 3.65 takes are attributed to unidentified fishing gear, and 0.6 takes are attributed to unidentified fishery interactions involving unidentified whales prorated to gray whale (which comprises less than 1% of PBR). Therefore, as it is probable that fishing mortality from all sources is below a sustainable level that is appropriate for the species, fishing mortality is considered a “low concern" [per line 1. in table 1.2.1 of the Standard].

Humpback whale *(Megaptera novaeangliae)*

2.1 Abundance

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

High Concern

The Mexico - North Pacific unit (Mexico - North Pacific stock) of humpback whales is a Demographically Independent Population (DIP) delineated from the Mexico DPS listed as threatened under the ESA, and is considered depleted and strategic under the MMPA (Young et al. 2023c). It is unknown if the population is currently increasing (ibid). According to the most recent stock assessment, population size estimates are based on data more than 15 years old, so population size is considered unknown for this stock (ibid).

The Hawai'i - Southeast Alaska / Northern British Columbia DIP and the Hawai'i - North Pacific unit of humpback whales (Hawai'i stock) are Demographically Independent

Populations (DIP) delineated from the Hawai'i DPS, is not listed under the ESA, and is not considered depleted or strategic under the MMPA (ibid). There is currently no direct estimate of population trend for this stock (ibid). The best estimate for population size for the Hawai'i stock is 7,265 whales (ibid).

Therefore, as there are uncertainties in the stock data and one of the stocks is threatened under the ESA, abundance of humpback whales is considered a “high concern" [per line 1. in table 1.1.1 of the Standard].

Supplementary Information

Humpback whale has been listed as endangered under the ESA since 1970 (Young et al. 2023b). In 2016, NOAA fisheries revised the ESA listing to identify 14 Distinct Population Segments (DPS); the whales in Alaska waters (high-latitude summer feeding areas) are comprised of the Mexico DPS and the Hawaii DPS (ibid). At this time, four DPSs were determined to be "endangered" (Cape Verde/Northwest Africa, Western North Pacific, Central America, and Arabian Sea) (ibid). The Mexico DPS was determined as "threatened," while the remaining nine DPSs were determined "not at risk" (ibid). The most recent humpback whale stock assessment report, published in 2023, transitioned the stock delineation to be based on Demographically Independent Populations (DIPs) (ibid).

The evaluations of the four North Pacific DPSs resulted in three DIPs and four “units” that may contain multiple DIPs as well as five stocks from these delineations (ibid). The Mexico - North Pacific unit DIP, also considered the Mexico- North Pacific stock, is listed as threatened under the ESA (Young et al. 2023c). The Hawai'i - Southeast Alaska / Northern British Columbia DIP and the Hawai'i - North Pacific unit, or the Hawai'i stock, is not listed under the ESA (Young et al. 2023b). Genetics and movement data resulted in the delineation of these two DIPs/stocks (ibid). The Mexico-North Pacific unit/stock may also contain other DIPs based on movement data, but data is limited so it is considered as a separate stock (Young et al. 2023c).

2.2 Fishing Mortality

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Low Concern

The CNP stock of humpback whale is known to become entangled in crab pot gear in BSAI and SE Alaska, infrequently resulting in mortalities (Neilson et al. 2009; Muto et al. 2020b; NOAA 2020c}. The AIGKC and SEAKGKC fisheries can extend through the summer and fall months, and humpback whales may encounter pot gear from these fisheries during

migrations in the area in late spring through fall (ibid). In addition, SE Alaska crab pot fisheries were included in the NOAA LOF under Category III fisheries affecting CNP humpback whale (NOAA 2024c).

There were less than 4 (3.5) cases of humpback whale (all stocks) mortality and serious injury documented in Alaska fisheries from 2016-2020 due to unidentified fishing gear in the Gulf of Alaska and SEAK, with one being specifically attributed to unidentified commercial pot gear in SEAK (although this is not attributed directly to these crab fisheries) (Young et al. 2023b)(Young et al. 2023c). The cases of mortality and serious injury in the Gulf of Alaska and SEAK from 2016-2020 potentially being caused by these fisheries is an average of 0.7 whales per year (ibid).

This risk of 0.7 whales per year is far below the calculated annual PBR (127) of the Hawai'i stock, but the Mexico stock PBR is undetermined at this time due to a lack of quantitative data (ibid). There is some uncertainty regarding which stock each of the cases identified above are associated with, however the most recent U.S. Pacific Marine Mammal Stock Assessments prorated the impact of fisheries across the different DPIs based on point estimates of summer and winter movements (ibid). The total annual estimated mortality and serious injury rate (2016-2020) from all fisheries to the Hawai'i stock is 27.09 whales per year and to the Mexico stock is 0.57 whales (ibid). So, the potential risk from these fisheries (0.7 whales per year) is less than 5% of the total estimated fishing mortality for either stock.

Therefore, as the fishery is likely not a substantial contributor to fishing mortality for either stock of humpback whales, fishing mortality is considered a “low concern” [per line 3. in table 1.2.1 of the Standard].

Supplementary Information

None of the human-related humpback whale interactions that occurred from 2016-2020 were associated directly with these specific crab pot fisheries, so there were interactions that were categorized as unidentified (Young et al. 2023b)(Young et al. 2023c). The most conservative approach to assessing fishery impacts would consider that all unidentified interactions resulted from these crab pot fisheries. Observer coverage has not been assigned to all of the fisheries that are known to interact with these stocks, and many rely on strandings or sightings for data (Young et al. 2023b)(Young et al. 2023c). Threats to humpback whales include entanglement in fishing gear (mainly trap/pot gear with a smaller amount of gillnet gear), ship strikes, harassment, habitat impacts, and harvest (ibid).

Snow crab *(Chionoecetes opilio)*

2.1 Abundance

Bering Sea Stock | Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

High Concern

The most recent stock assessment of EBS snow crab was conducted in 2024 using data through the 2023-2024 season, although the fishery was closed during this time (Szuwalski 2024). For 2023-2024, the stock mature male biomass (MMB = 13400 MT) was below the minimum stock size threshold (MSST=47400 MT) and B/B_{MSY} = 0.14, and was declared overfished in 2021 (ibid). Therefore, as it is probable that the stock is well below the limit reference point, abundance is considered a "high concern" [per table 1.1.1 of the Standard].

Supplementary Information

Immature female biomass observed in the survey during 2024 was the highest ever observed (Szuwalski 2024), indicating that there is potential for stock recovery in the future.

2.2 Fishing Mortality

Bering Sea Stock | Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Low Concern

The EBS stock of snow crab is mostly caught in a targeted fishery that was closed from 2021-2023 but subsequently opened during the 2024-2025 fishing season, and snow crab is also caught and can be retained in the EBSTC fishery if the snow crab fishery is open and is sometimes discarded in the groundfish fishery (Stichert 2025, pers comm). For the 2023-2024 fishing season, total mortality was determined to be approximately 70 MT whereas the overfishing limit was set at 15,440 MT (Szuwalski 2024). Although the snow crab fishery was closed during this year, the total mortality has remained below the OFL as well as the ABC since 2015 (ibid.). Therefore, as it is probable that fishing mortality from all sources is at or below a sustainable level with signs of rebuilding, this factor is considered a "low concern" [per line 1. in table 1.2.1 of the Standard].

Supplementary Information

The recent decline of the snow crab has been predominantly attributed to starvation that coincides with a marine heat wave in the Bering Sea from 2018-2021 (Szuwalski et al. 2023b; Litzow et al. 2024). Although snow crab hasn't been retained in the Tanner crab fishery in years when the snow crab fishery is closed, snow crab is caught in the EBSTC fishery and the groundfish fishery. Because not all snow crab will survive post-release, fishing mortality will occur. Handling mortality in recent NOAA snow crab stock assessments was estimated at 30%, but this is not based on post-release field studies (Szuwalski 2024). Although the EBSSC fishery was opened in October of 2024, fishing mortality of snow crab in the EBSSC fishery, EBSTC fishery, and the groundfish fishery may affect the EBSSC stock's recovery.

Southern Tanner crab *(Chionoecetes bairdi)*

2.1 Abundance

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Moderate Concern

The biomass of mature male SEAKTC was estimated using an annual ADF&G crab pot survey and a catch-survey model based on the survey data (Wood et al. 2017; Rebert et al. 2019). Catch-survey modeling produced a regional biomass estimate of 2635 MT of mature male Tanner crab for 2021-2022, continuing a general increasing trend in recent years (Palof et al. 2022). Stock health across five categories was assessed by ADF&G relative to historical averages (1997–2010) of survey CPUE for females as well as pre-recruit and recruited males in the surveyed areas (Wood et al. 2017). Results were mixed for 2020–2021: "Poor" in one area, "Below Average" in one area, "Moderate" in three areas, "Above Average" in three areas, and "Healthy" in four areas (Palof et al. 2022).

As a quantitative stock assessment is lacking but there is a data-limited abundance index present covering more than three generations showing that abundance has been "healthy" or "above average" across 50% of the management units, this factor is scored a "moderate concern" [table 1.1.1 in the Standard].

Supplementary Information

2.2 Fishing Mortality

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Moderate Concern

Fishing mortality estimates and reference points were not available for the SEAKTC

stock. SEAKTC is also caught by fishers targeting SEAKGKC, based on ADF&G at-sea observer data and the fisheries often being open concurrently (Olson and Bishop 2012; ADFG 2023). Tanner crab may be retained in the GKC fishery, provided that the two fisheries occur concurrently and that fishers/permit holders are registered for the TC fishery (ADFG 2023). The mature male abundance estimate and the number of registered pots at the start of the fishery determine the commercial Tanner crab season length (Palof et al. 2022). The fishery is managed without a GHL, but management continues to determine stock health, establish a mature male harvest rate, and calculate GHLs to provide a benchmark to evaluate fishery performance so that regional exploitation should not exceed 20% of mature male or 38% of legal male biomass (Palof et al. 2022). Nevertheless, as appropriate reference levels have not been determined for this fishery, this factor is considered a "moderate concern" [per line 3. in table 1.2.1 of the Standard].

2.3 Discard Rate/Landings

Aleutian Islands Stock | Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

< 100%

A 20% handling mortality rate was assumed for this fishery in the 2023 stock assessment, but that rate is from RKC literature, with no studies to support use in the GKC fisheries (Siddeek 2002)(Siddeek et al. 2023). In 2022/2023, bycatch mortality was estimated to be 137 MT (compared to 2,369 MT retained catch) (Siddeek et al. 2023). Other nontarget species are also caught and discarded in this fishery, based on ADF&G onboard observer data, and made up approximately 2% of total catch in 2023 (ADFG 2025). In 2023, discards of GKC were approximately 33% of the amount of landings, including both the Eastern and Western regions of the fishery, although this includes both dead and live discards (dead discards are much less considering the 20% mortality rate) (ADFG 2025). Total bait use amounts are not known for this fishery, but fishermen often use bait such as cod, ground herring, and halibut heads that are fish processing scraps or caught incidentally in other fisheries (Stichert 2024, pers comm). Therefore, as bait use and discards are generally unknown, but it is unlikely the bait and dead discards to landings ratio is above 100%, discard rate/landings is scored as "1" or <100%.

Eastern Bering Sea Stock | Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

< 100%

A handling mortality rate of 32.1% was used for discarded Tanner crabs in the most recent EBSTC stock assessment (Stockhausen 2024). Other nontarget species are caught and discarded in this fishery, based on ADF&G onboard observer data, and made up approximately 11% of total catch in 2023 (ADFG 2025). In 2023, discards were approximately 18% of the amount of Tanner crab landings (ADFG 2025). Pacific cod is most often retained as bait in this fishery, as ADF&G regulation allows vessels to operate

up to 20 groundfish configured pots specifically for catching cod to use as crab bait (State of Alaska 2024). Federal regulations for the Bering Sea limits the amount of cod that can be retained to 20% based on the weight of the crab onboard, with all catch accounted for and debited from the Pacific cod annual catch limits (Stichert 2024, pers comm). In the 2023/2024 season, approximately 37 MT of Pacific cod was retained for bait in the EBS Tanner crab fishery, which is about 10% of the TAC for the season (Stichert 2024, pers comm). Therefore, as it is unlikely that the bait and dead discards to landings ratio is above 100%, bait use and discards/landings is scored as "1" or < 100%.

Norton Sound Stock | Pacific, Northeast - United States - Alaska - Pots - Norton Sound

< 100%

Limited data were available to estimate NSRKC bait use and discards. Preliminary discard estimates have been made in the past and discards were generally less than 50% of landed crab numbers, however there is high uncertainty with these discard estimates due to lack of consistency in observer coverage from 2012-2019 and no further coverage since (Hamazaki and Zheng 2021). Handling mortality is assumed to be 20% for discards (Hamazaki 2024). Other non-target species are also caught and discarded in this fishery based on ADF&G onboard observer data (ADFG 2020e), but total volumes of discards are not available for the past five years. Therefore, as bait use and discards are generally unknown, but it is unlikely the bait and dead discards to landings ratio is above 100%, bait use and discard/landings is scored as "1" or <100%.

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

< 100%

A handling mortality rate of 20% was assumed for the discarded RKC catch in the most recent stock assessment (Palof 2023). Other nontarget species are caught and discarded in this fishery, based on ADF&G onboard observer data, and made up approximately 7% of total catch in 2023 (ADFG 2025). In 2023, red king crab discards were approximately 41% of the amount of red king crab landings (ADFG 2025). Pacific cod is most often retained as bait in this fishery, as ADF&G regulation allows vessels to operate up to 10 groundfish configured pots specifically for catching cod to use as crab bait (State of Alaska 2024b). Federal regulations for the Bering Sea limits the amount of cod that can be retained to 20% based on the weight of the crab onboard, with all catch accounted for and debited from the Pacific cod annual catch limits (Stichert 2024, pers comm). In the 2023/2024 season, approximately 52 MT of Pacific cod was retained for bait in the BB RKC fishery, which is just over 5% of the TAC for the season (Stichert 2024, pers comm). Therefore, as it is unlikely that the bait and dead discards to landings ratio is above 100%, bait use and discards/landings is scored as "1" or <100%.

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

< 100%

A handling mortality rate of 30% was used for discarded Tanner crabs in the most recent EBS SC stock assessment (Szuwalski 2024). Other nontarget species are caught and discarded in this fishery, based on ADF&G onboard observer data, and made up approximately 3% of total catch in 2021 (ADFG 2025). In 2021, discards of snow crab were approximately 0.5% of the amount of snow crab landings (ADFG 2025). Bait use amounts are not known for this fishery, although based on information from BSAI crab pot fisheries, it is be relatively low (Kelleher 2005). Therefore, as it is unlikely that the bait and dead discards to landings ratio is above 100%, bait use and discards/landings is scored as "1" or <100%.

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

< 100%

There is limited information available regarding bait use and discards in the KTC and SPTC fisheries. Nontarget species as well as female and sublegal male Tanner crabs are caught and discarded in these fishery, but overall volumes of nontarget species discards and survival rates were not available for recent years. Considering the nearby SEAKTC fishery as a proxy, in 2020, approximately 12.6% of harvested SEAKTC was discarded due to deadloss or bitter crab (ADFG 2021f). Bait use is unknown for the Kodiak and South Peninsula fisheries, but using information from BSAI crab pot fisheries, it is relatively low (Kelleher 2005). Therefore, as these fisheries have relatively short open periods, and the other fisheries that target this species in this assessment have a bait use/discard rate lower than 100% of landings, bait use and discards are likely less than 100% of landings and is considered "1" or <100%.

Southeast Alaska Stock | Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

< 100%

Limited data were available to estimate bait use and discards in the SEAKGKC fishery. Based on historic onboard observer data, nontarget species as well as sublegal GKC are caught and discarded in this fishery, but overall volumes of nontarget species discards and survival rates were not available for recent years. Using the nearby AIGKC and SEAKTC fisheries as a proxy, discards are likely to be less than total landings (ADFG 2025). Bait use is unknown for SEAK, but based on information from BSAI crab pot fisheries, it is relatively low (Kelleher 2005). Therefore, as recent bait and discards are generally unknown but it is unlikely that the bait and dead discards to landings ratio is above 100%, especially considering the short duration of the fishery season, bait use and discards/ landings is scored as "1" or <100%.

< 100%

Limited data were available to estimate bait use and discards in the SEAK Tanner crab fishery. Nontarget species as well as female and sublegal male Tanner crabs are caught and discarded in this fishery, but overall volumes of nontarget species discards and survival rates were not available for recent years. In 2020, approximately 12.6% of harvested SEAK Tanner crab was discarded due to deadloss or bitter crab, although it is thought to be an underestimate (ADFG 2021f). Bait use is unknown for SEAK, but based on information from BSAI crab pot fisheries, it is relatively low (Kelleher 2005). Therefore, as recent bait and discards are generally unknown but it is unlikely that the bait and dead discards to landings ratio is above 100%, especially considering the short duration of the fishery season, bait use and discards/landings is scored as “1” or <100%.

Criterion 3: Management Effectiveness

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

- *5 (Very Low Concern) — Meets the standards of 'highly effective' for all five factors considered.*
- *4 (Low Concern) — Meets the standards of 'highly effective' for 'management strategy and implementation' and at least 'moderately effective' for all other factors.*
- *3 (Moderate Concern) — Meets the standards for at least 'moderately effective' for all five factors.*
- *2 (High Concern) — At a minimum, meets standards for 'moderately effective' for Management Strategy and Implementation and Bycatch Strategy, but at least one other factor is rated 'ineffective.'*
- *1 (Very High Concern) — Management Strategy and Implementation and/or Bycatch Management are 'ineffective.'*
- *0 (Critical) — Management Strategy and Implementation is 'critical'.*

The Criterion 3 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Rating is Critical if Management Strategy and Implementation is Critical.

Guiding principle

- The fishery is managed to sustain the long-term productivity of all impacted species.

Five factors are evaluated in Criterion 3: Management Strategy and Implementation, Bycatch Strategy, Scientific Research/Monitoring, Enforcement of Regulations, and Inclusion of Stakeholders. Each is scored as either 'highly effective', 'moderately effective', 'ineffective,' or 'critical'. The final Criterion 3 score is determined as follows:

Criterion 3 Summary

Fishery	Management Strategy And Implementation	Bycatch Strategy	Scientific Data Collection and Analysis	Enforcement of and Compliance with Management Regulations	Stakeholder Inclusion	Score
Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Green (4.000)
Pacific, Northeast - United States - Alaska - Pots - Bristol Bay	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Green (4.000)
Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Green (4.000)
Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Green (4.000)
Pacific, Northeast - United States - Alaska - Pots - Kodiak	Moderately Effective	Highly effective	Moderately Effective	Highly effective	Highly effective	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Norton Sound	Highly effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Green (4.000)
Pacific, Northeast - United States - Alaska - Pots - South Peninsula	Moderately Effective	Highly effective	Moderately Effective	Highly effective	Highly effective	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery	Moderately Effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery	Moderately Effective	Moderately Effective	Moderately Effective	Highly effective	Highly effective	Yellow (3.000)

Criterion 3 Assessment

Scoring Guidelines

Scoring Guidelines

Factor 3.1 - Management Strategy and Implementation

Considerations: What type of management measures are in place? Are there appropriate management goals, and is there evidence that management goals are being met? Do manages follow scientific advice? To achieve a highly effective rating, there must be appropriately defined management goals, precautionary policies that are based on scientific advice, and evidence that the measures in place have been successful at maintaining/rebuilding species.

Factor 3.2 - Bycatch Strategy

Considerations: What type of management strategy/measures are in place to reduce the impacts of the fishery on bycatch species and when applicable, to minimize ghost fishing? How successful are these management measures? To achieve a Highly Effective rating, the fishery must have no or low bycatch, or if there are bycatch or ghost fishing concerns, there must be effective measures in place to minimize impacts.

Factor 3.3 - Scientific Research and Monitoring

Considerations: How much and what types of data are collected to evaluate the fishery's impact on the species? Is there adequate monitoring of bycatch? To achieve a Highly Effective rating, regular, robust population assessments must be conducted for target or retained species, and an adequate bycatch data collection program must be in place to ensure bycatch management goals are met.

Factor 3.4 - Enforcement of Management Regulations

Considerations: Do fishermen comply with regulations, and how is this monitored? To achieve a Highly Effective rating, there must be regular enforcement of regulations and verification of compliance.

Factor 3.5 - Stakeholder Inclusion

Considerations: Are stakeholders involved/included in the decision-making process? Stakeholders are individuals/groups/organizations that have an interest in the fishery or that may be affected by the management of the fishery (e.g., fishermen, conservation groups, etc.). A Highly Effective rating is given if the management process is transparent, if high participation by all stakeholders is encouraged, and if there a mechanism to effectively address user conflicts.

3.1 Management Strategy And Implementation

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Highly effective

This fishery is assessed and managed by the ADF&G (state) and NOAA (federal) under the Fishery Management Plan (FMP) for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands (BSAI). Recent harvest strategies and management measures have been proactive in limiting fishing pressure on AIGKC, including setting the total allowable catch (TAC) well below the allowable biological catch (ABC), which provides a buffer between the ABC and TAC, to prevent stock declines. Stock abundance has been stable in recent years, demonstrating that the management strategy is successful. Therefore, as appropriate reference points that incorporate uncertainty have been defined for at least 70% of the main targeted and retained species in this fishery, there is evidence that the strategy is being implemented successfully, management is responsive to stock biomass changes over time, and harvest control rules include appropriate buffers, management strategy and implementation is considered as “highly effective” [per Table 3.1.1 of the Standard].

Supplementary Information

The AIGKC stock is assessed annually by the crab plan team and scientific and statistical committee, which includes ADF&G, NOAA and other crab specialists. The NPFMC adopted an observer CPUE-based stock assessment model for AIGKC in recent years (Siddeek et al. 2023). GKC in the AI is managed as two stocks in the areas east (EAG) and west (WAG) of 174° W. longitude. Abundance and fishing mortality are evaluated relative to MSY-proxy reference points and the annual ABC is set at 75% of the overfishing limit (OFL), resulting in a buffer to account for scientific uncertainty. Harvest is also constrained by a TAC that is adjusted annually by the state of Alaska based on their current harvest rate strategy. In 2019-23, the TAC was set at just below 80% of the ABC on average, in an attempt to account for uncertainty and the impacts of a fishery that only harvests male crabs (Siddeek et al. 2023). The TAC (historically a guideline harvest limit [GHL]) has generally declined since the late 1990s, but was stable in recent years and increased in 2019. Mature male biomass (MMB) has also been stable in recent years, after increasing slightly in 2018 and 2019.

Aside from the TAC, other measures are in place to limit harvest and effort in this fishery. The ADF&G harvest strategy for this stock was updated in 2019 and includes the following components (Siddeek et al. 2020): 1) if mature male abundance (MMA) is estimated for the EAG or the WAG at less than 25 percent of average MMA in 1985–2017 (in the EAG or WAG), then the fishery will not open in that area; 2) increases in harvest rate are allowed as estimates of MMA increase; 3) the fishery may only retain male GKC at least 6.0 in (152.5 mm) carapace width (CW), which is larger than the 50% maturity length of 120.8 mm CW for males; and 4) the fishing season is set at August 1 through April 30 (although it may be shortened based on harvest relative to the TAC or other factors; a cooperative stock assessment pot survey also typically runs in July prior to the regulatory season starting in August).

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Highly effective

This fishery is assessed and managed by the ADF&G (state) and NOAA (federal) under the Fishery Management Plan (FMP) for the Commercial king and Tanner crab fisheries in the Bering Sea/Aleutian Islands (BSAI). Recent harvest strategies and management measures have been proactive in limiting fishing pressure in the directed fisheries and fisheries that may catch and discard RKC incidentally, notably as managers reduced the TAC in recent years in response to stock declines, ultimately closing the fishery in 2021-2023 and reopening in 2023-2024 (Palof 2023). Pacific cod, which is sometimes retained in this fishery as well, is managed by NOAA Fisheries and the North Pacific Fishery Management Council under a single management plan for the BSAI region, using TACs, spatial and temporal restrictions, and stock monitoring. Therefore, as appropriate management targets and precautionary policies have been defined for more than 70% of the fishery's main targeted and retained species, management is responsive to changes in stock status,

there is evidence the strategy is being implemented successfully, and conservative buffers are in place, management strategy and implementation is considered as “highly effective” [per lines 1-6 in Table 3.2.1 of the Standard].

Supplementary Information

Abundance and fishing mortality are evaluated relative to MSY-proxy reference points and in recent years, the ABC was set at 80% of the OFL, resulting in a buffer to account for scientific uncertainty (Palof 2023). This buffer was increased to 25% for the 2020-2021 season to account for the lack of a trawl survey in 2020, which could not be conducted due to the COVID-19 pandemic, but was adjusted again to 20% for the 2023/2024 season (Palof 2023). The annual TAC (which is set for mature males as opposed to the OFL/ ABC, which is set for crabs of all sexes and sizes) is adjusted annually by the State of Alaska based on their current harvest rate strategy. The ADF&G harvest strategy allows for increases in harvest rates, as estimates of effective spawning biomass (ESB) increase. Although abundance has declined steadily in recent years, the TAC has also been reduced substantially by managers in an attempt to avoid further declines. In 2021-2023, the BBRKC fishing season was closed based on estimates of low abundance from the Eastern Bering Sea Continental Shelf Trawl Survey. For the 2023-2024 season, the TAC was set at 975 MT (approximately half of pre-closure TACs) as the stock was above MSST and below OFL following the closures (Palof 2023).

Aside from the TAC, other measures are in place to limit harvest and effort in this fishery. Only males ≥6.5-inch CW may be harvested (ADFG 2020a). Gear restrictions include a minimum size of 9-inch stretched mesh on one vertical panel of pots, to allow for escapement of undersize crabs (ADFG 2020a). The fishery is typically open October 15 through January 15, and is closed during crab molting and mating periods (Zheng and Siddeek 2020), but trawl fisheries continue during this time, and have impacts on the stock. Limits on the bycatch of king crab have been established in some other (non-crab directed) Bering Sea fisheries to reduce impacts on RKC (NPFMC 2021b). When bycatch limits are reached, fisheries responsible for the bycatch are closed for the rest of the season, or are prohibited from fishing in areas with historically high bycatch rates due to high release mortality rates (e.g., roughly 80% for trawl fisheries) (NPFMC 2021b).

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Highly effective

This fishery is assessed and managed by the ADF&G (state) and NOAA (federal) under the Fishery Management Plan (FMP) for the commercial king and Tanner crab fisheries in the Bering Sea/Aleutian Islands (BSAI). EBS snow crab biomass was at record highs in 2018, and then experienced a rapid decline in 2020-2021 and was declared overfished, resulting in the closure of the fishery through 2024 (Szuwalski 2024). The decline has been attributed to starvation associated with a marine heat wave that led to the northward

movement and concentration of snow crabs into a relatively small area coupled to increased metabolic demands (Szuwalski et al. 2023b; Litzow et al. 2024). Bait species such as Pacific cod are sometimes retained in this fishery, and are managed by ADFG which sets maximum exploitation at 20% of the mature biomass and is considered to be precautionary and lower than reference points for similar species. Therefore, as appropriate reference points that incorporate uncertainty have been defined for at least 70% of the main targeted and retained species in this fishery, there is evidence that the strategy is being implemented successfully, management is responsive to stock biomass changes over time, and harvest control rules include appropriate buffers, management strategy and implementation is considered as "highly effective" [per Table 3.1.1 of the Standard].

Supplementary Information

The EBS snow crab stock is assessed annually by the AFSC, who are assisted by the crab plan team and the SSC . The EBS population within U.S. waters is managed as a single stock; however, the distribution of the population extends into Russian waters. Abundance and fishing mortality are evaluated relative to MSY-proxy reference points (Szuwalski 2021). Harvest is constrained by a TAC that is adjusted annually by the State of Alaska based on its current harvest rate strategy. In 2015-2019, the TAC was set at approximately 36% of the ABC on average, in an attempt to account for uncertainty and the impacts of a fishery that only harvests male crabs within a certain size range. The TAC increased in 2018-2020 in response to notable increases in MMB relative to previous years (Szuwalski 2021). Retained catch has been maintained within the TAC . ADF&G adjusts the annual harvest rate based on the estimated mature biomass of EBS Tanner crab relative to B_{MSY} (Szuwalski 2021). The fishery is closed when Total Mature Biomass (TMB) is below 50% of the average MSST for 1983-1997 (time-frame used to calculate B_{MSY}).

In addition to the TAC, other measures are in place to limit harvest and effort in this fishery. The minimum legal size limit for snow crab is 3 inches CW; however, the snow crab market generally only accepts crab greater than 4 inches CW (Szuwalski 2024). The EBS snow crab fishing season is roughly mid-October through mid-May unless the TAC is achieved prior to this end date (ADFG 2020m).

In recent years the ABC was set at 80% of the OFL, resulting in a buffer to account for scientific uncertainty (Szuwalski 2024). The crab plan team recommended a 50% buffer between the OFL and ABC in the 2020-2021 season to account for additional uncertainty in the assessment model as well as the lack of the NOAA EBS Trawl Survey in 2020, which is a critical data source (ibid). However, the SSC did not concur and the buffer that actually went into place was 25% (ibid). In 2021, the Trawl Survey indicated a sharp drop in MMB to historically low levels, resulting in a declaration that the stock was overfished (ibid). Retained catch of snow crab in the 2020/21 fishing season was at the highest level since 2014 due to the relatively high MMB estimated in 2019 (ibid). However, the 2020/21 TAC may have been set lower than if the NOAA Trawl Survey data for 2020 had been available (ibid). A rebuilding plan was developed by NPFMC, and was implemented from August 31, 2023 (NMFS 2023).

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Highly effective

This fishery is assessed and managed by the ADF&G (state) and NOAA (federal) under the Fishery Management Plan (FMP) for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands (BSAI). The EBS Tanner crab stock MMB and MFB have declined over the past decade, with a slight increase over the past two years; however,

managers responded by reducing the TAC substantially, and in some years the fishery has been closed (Stockhausen 2023). Retained catch has not exceeded the TAC in recent years, but it is not clear whether the stock is substantially improving. Pacific cod, which is sometimes retained in this fishery as well, is managed by NOAA Fisheries and the North Pacific Fishery Management Council under multiple management plans using TACs, spatial and temporal restrictions, and stock monitoring. Therefore, as appropriate reference points that incorporate uncertainty have been defined for at least 70% of the main targeted and retained species in this fishery, there is evidence that the strategy is being implemented successfully, management is responsive to stock biomass changes over time, and harvest control rules include appropriate buffers, management strategy and implementation is considered as "highly effective" [per Table 3.1.1 of the Standard].

Supplementary Information

Abundance and fishing mortality of Tanner crab are evaluated relative to MSY-proxy reference points for both management areas within the EBS District (EBT and WBT) (Stockhausen 2023). In recent years, the ABC was set 20% lower than the OFL, resulting in a buffer to incorporate concerns regarding model uncertainty for this stock (Stockhausen 2023). Harvest is also constrained by a TAC that is adjusted annually by the state of Alaska based on the current harvest rate strategy (Stockhausen 2023). Reducing the harvest of males is likely appropriate when the mature female biomass (MFB) is at relatively low levels, thus ensuring optimal mating opportunities for incoming female recruits (Daly et al. 2020). In 2016–17 through 2019–20, the TAC was set at zero, and then was set at 6%, 2%, and 3.5% of the ABC in 2020-21, 2021-22, and 2022-23, respectively. The low TAC setting relative to the ABC was intended to account for uncertainty in modeling and the impacts of a fishery that harvests only male crabs in a certain size range (Stockhausen 2023). Recent fishing closures were primarily the result of the MFB dropping below a threshold level established within the ADF&G harvest strategy.

In addition to the TAC, other measures are in place to limit harvest and effort for this fishery. The harvest strategy was updated in 2020, and some of the components are: 1) if MMB is estimated for the EBT or the WBT at less than 25% of average MMB in 1982–2018 (for the relevant management area), then the fishery will not open in that area, as determined by ADF&G; 2) a sliding scale for exploitation rates as a function of the ratios of MMB and MFB to 1982–2018 averages; 3) the ADF&G threshold for opening the fisheries based on MFB was eliminated in 2020; and 4) the minimum size limit is 4.8 in. carapace width for EBT and 4.4 in. carapace width for WBT. The Bering Sea Tanner crab fishery season is typically mid-November through March unless the TAC is achieved before the scheduled end date (ADFG 2020l).

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Moderately Effective

The Kodiak Tanner crab fishery is managed by ADFG under the Fishery Management Plan

for the Kodiak District Commercial Tanner Crab Fishery that was most recently updated in 2022 (Nichols 2022). Management measures include the establishment of GHLs each season in response to survey results, size and gear restrictions, and a limited season length. Therefore, as management measures that are expected to be effective are in place and it is unlikely this fishery is having serious negative impacts on the retained populations, but there are some uncertainties surrounding the effectiveness of these measures since fishing mortality is not measured and is currently unknown, management strategy and implementation is considered as "moderately effective" [per line 2b. in Table 3.1.1 of the Standard].

Supplementary Information

Mature male abundance thresholds (either 50% or 100% of the long-term average abundance from 1988-2021) are established for six sections of this district and must be met or exceeded for the fishery to open (ADFG 2024b). In 2022, harvest strategies were updated to consider both mature male and female abundance when determining maximum legal male exploitation rates (Nichols 2022). The season for this fishery typically lasts from mid-January through the end of March, however ADFG does establish GHLs for both sections of this district based on results from a trawl survey (Nichols 2022). The legal minimum retainable size of Tanner crab in South Peninsula District is 5.5 inches carapace width and only legal male Tanner crab may be retained; all other crabs incidentally captured must be immediately returned to the water unharmed (Nichols 2022). There is also a gear limit of 30 pots per vessel and the fishery is managed using in season catch reports, which may result in closures occurring before GHLs are met (Nichols 2022). In 2024, three of the districts with abundance thresholds did not meet the thresholds to open, whereas three did: Eastside, Southeast, and Southwest (ADFG 2024b). The total GHL for the Kodiak fishery was determined to be 3,000,000 lbs, with the majority (~2,500,000 lbs) being attributed to the Eastside section of this district (ADFG 2024b).

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Highly effective

This fishery is assessed and managed by the ADF&G (state) and NOAA (federal) under the Fishery Management Plan (FMP) for the Commercial King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands (BSAI). Precautionary harvest strategies and management measures have limited fishing pressure in this fishery including the use of the GHL, set below the ABC to allow for a buffer, combined with the exclusive nature of the fishery have helped to keep the stock abundance near target reference points in recent years (Hamazaki 2024). Therefore, as appropriate reference points that incorporate uncertainty have been defined for at least 70% of the main targeted and retained species in this fishery, there is evidence that the strategy is being implemented successfully, management is responsive to stock biomass changes over time, and harvest control rules

include appropriate buffers, management strategy and implementation is considered as "highly effective" [per Table 3.1.1 of the Standard].

Supplementary Information

Abundance and fishing mortality are evaluated relative to MSY-proxy reference points (Hamazaki 2024). The annual ABC is set lower than the OFL, resulting in a buffer to account for scientific uncertainty. In 2015, managers chose a buffer of 20% (ABC = 80% OFL). In 2020, the buffer was increased to 30% (ABC = 75% OFL) over concern for low CPUE in 2018-2019, was adjusted to 40% in 2021, and then reduced back to 30% for 2023-2024 (Hamazaki 2024). Harvest is also constrained by a GHL that is adjusted annually by the State of Alaska based on its current harvest rate strategy.

The ADF&G harvest strategy includes a threshold of 1.25 million lb to open the fishery and allows for the harvest rate increases with higher estimates of effective spawning biomass (ESB) (Hamazaki 2024). In 2020-2023, on average, the GHL was set at approximately 85% of the ABC and retained catch exceeded GHL once (in 2023 by a small amount) (Hamazaki 2024). The current harvest strategy includes a GHL for both the summer and winter commercial fisheries, with the winter fishery allowed to harvest 8% of the total GHL. NOAA Fisheries declared the 2019 Norton Sound RKC commercial fishery to be a disaster due to the extremely small harvest (NOAA 2021c) and in 2020 and 2021, the summer fishery landings were zero (Hamazaki and Zheng 2021).

Aside from the GHL, other measures are in place to limit harvest and effort in this fishery. In 1994, a super-exclusive designation went into effect, which prohibited vessels registered for the Norton Sound crab fishery from taking king crabs in any other registration areas during that year (Hamazaki and Zheng 2021). A vessel moratorium (i.e., a cap on vessel registrations) was put into place before the 1996 season and a permit is required for subsistence harvesting, and daily effort and catch must be recorded.

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Moderately Effective

The South Peninsula Tanner crab fishery is managed by ADFG under the Fishery Management Plan for the South Peninsula District Commercial Tanner Crab Fishery that was most recently updated in 2023 (Whiteside 2023). Management measures include the establishment of GHLs each season in response to survey results, size and gear restrictions, and a limited season length. Therefore, as management measures that are expected to be effective are in place and it is unlikely this fishery is having serious negative impacts on the retained populations, but there are some uncertainties surrounding the effectiveness of these measures since fishing mortality is not measured and is currently unknown, management strategy and implementation is considered as "moderately effective" [per line 2b. in Table 3.1.1 of the Standard].

Supplementary Information

Mature male abundance thresholds (either 50% or 100% of the long-term average abundance from 1988-2021) are established for both the Eastern and Western sections of this district and must be met or exceeded for the fishery to open (Whiteside 2023). In 2022, harvest strategies were updated to consider both mature male and female abundance when determining maximum legal male exploitation rates (Whiteside 2023). The season for this fishery typically lasts from mid-January through the end of March, however ADFG does establish GHLs for both sections of this district based on results from a trawl survey (Whiteside 2023). The legal minimum retainable size of Tanner crab in South Peninsula District is 5.5 inches carapace width and only legal male Tanner crab may be retained; all other crabs incidentally captured must be immediately returned to the water unharmed (Whiteside 2023). There is also a gear limit of 20 pots per vessel and the fishery is managed using in season catch reports, which may result in closures occurring before GHLs are met (Whiteside 2023). In 2024, the total GHL for the South Peninsula fishery was determined to be 480,000 lbs (Whiteside 2023).

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderately Effective

Golden king crab and Tanner crab harvested in SEAK are managed by ADF&G under the Golden King Crab Management Plan and the Southeast Alaska Tanner Crab Management Plan, respectively (Stratman et al. 2021)(Palof et al. 2022). Golden king crab and Tanner crab are caught concurrently (Olson and Bishop 2012)(ADFG 2023). Because these fisheries occur concurrently, it is difficult to differentiate between which crabs are harvested as bycatch or directly targeted (Olson and Stratman 2022). Fishers with permits harvesting both species may do so if both fisheries are open (ADFG 2023). The SEAKTC fishery does not use MSY-based reference points to determine stock status and harvest rates and although reference points were introduced in 2020–21 for managing golden king crab, these are based on historical fishery CPUE data, and managers currently do not make a determination of whether the stock is overfished or overfishing is occurring (Olson and Palof 2020). Given the recent implementation of the new harvest strategies, and the quite low level of the stock overall, management effectiveness is uncertain. Without fishery-independent surveys of abundance that allow for MSY-based reference points, determining the appropriateness of current and past harvest levels for these fisheries will remain challenging. Also, golden king crab harvest in several management areas exceeded the respective GHLs in the recent fishing seasons. Therefore, as management measures that are expected to be effective are in place, but effectiveness is generally unknown, management strategy and implementation is considered “moderately effective” [per line 2. in Table 3.1.1 of the Standard].

Supplementary Information

The SEAKGKC stock is assessed annually using fishery-dependent data. Managers conduct annual reviews of landings, logbooks, and port sampling data to adjust guideline harvest ranges (GHRs) for each of seven management areas (Stratman et al. 2017). A new harvest strategy was implemented for the 2020–21 season, which utilized commercial fishery CPUE-based reference points, biological data, and local ecological knowledge in determining preseason GHLs and managing the fishery in season (Stratman et al. 2021). Reference points, which were used for the first time in 2020–21 for managing the stock, compared the latest CPUE with historic averages to determine stock health. The 2021–22 GHRs would allow for a harvest of 675,000 lb (306 t) if all management areas were open and stocks were healthy enough to support the maximum GHL, and these GHRs have held through 2024, although GHLs have been set below the maximum (Table 5) (ADFG 2022a). CPUE is reviewed biweekly by ADF&G for each management area, and if it is below a threshold reference point, management action may be taken to shorten the season in that area (ADFG 2021b).

Annual ADF&G stock assessments of SEAKTC do not use MSY-based reference points to determine stock status and harvest rates. The harvest strategy for this stock includes an MMA threshold (2.3 million lb) that is half the long-term average abundance (1997–2007) (Wood et al. 2017). Tanner crab biomass, both mature and legal, is estimated annually for each of the surveyed areas using a model that relies on inputs from an ADF&G biomass survey and the fishery (Rebert et al. 2019). Tiered harvest rates, with a maximum of 50% of legal males, are determined based on the biomass estimate. Available data related to stock abundance suggest a fairly stable biomass overall, although trends vary by survey area (Wood et al. 2017).

Measures are in place to limit harvest and effort in these fisheries. The annual fisheries typically start in early February, and continue until the season is closed due to resource conservation concerns or the attainment of established GHLs (ADFG 2023). Although harvest had generally been below GHLs in most management areas in recent years, harvests of GKC exceeded the GHLs in one area (North Stephens Passage) from 2018 to 2021 and in at least three additional areas in 2021-2022 (ADFG 2022a; ADFG 2024p). The GHLs across the management areas were increased substantially for the 2024 season (123.6mt), although harvest exceeded the GHLs in total (213.2mt) and in all areas (ADFG 2023) (ADFG 2024p). The GKC fishery is restricted to harvesting only male crabs with a minimum legal size of 7 in. and the TC fishery is restricted to male crabs of 5.5 in. (ADFG 2024e). The fisheries are “limited-entry,” with the number of fishers allowed to participate capped in 1984 (ibid).

3.2 Bycatch Strategy

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Moderately Effective

Some measures are in place to reduce impacts to bycatch species in the AIGKC fishery (ADFG 2020a); however, it is not clear that these are sufficient, given the vulnerability of deep-sea coral and other biogenic habitats to crab pot gear (Stone and Shotwell 2007) (NMFS 2004)(Heifetz et al. 2009; NOAA 2015}. Ghost gear is a potential issue in this fishery due to the possible entanglement of marine mammals (humpback and gray whales in particular) and the mortality of crabs and other biota trapped in lost pot gear, however measures such as biodegradable twine, required reporting, and trackable VHF beacons reduce the risk (Citta et al. 2013) (George et al. 2019). Additional measures are needed to evaluate, track, and reduce impacts from gear to coral and other biogenic habitats. Therefore, as some bycatch reduction measures are in place but the fishery has a demonstrated concern with impacts to highly vulnerable deep-sea corals and other biogenic habitats, and management measure effectiveness is uncertain, the bycatch strategy is considered as "moderately effective" [per line 1. of Table 3.2.1 of the Standard].

Supplementary Information

Gear restrictions have been implemented to reduce bycatch in crab pots and the potential for ghost gear, including the following (ADFG 2020a): 1) pots must be attached to a shellfish longline to minimize gear loss; 2) pots must have at least four circular escape rings of 5½ in. inside diameter, or have no less than one-third of a vertical surface covered with at least 9 in. of stretched mesh webbing to permit the escapement of undersize crab; 3) pots must have a minimum 18-in. opening within 6 in. of the pot bottom secured by untreated cotton twine no larger than 60 thread, to reduce the effects of ghost fishing if gear is lost.

ADF&G observers deployed on fishing vessels in the BSAI crab fisheries record the species composition of retained catch and discards (Gaeuman 2014; ADFG 2025) . Bycatch within pots used for the AIGKC fishery consists of a variety of species, mostly at low volumes. The only known species of concern caught in traps are deep-sea corals and other biogenic habitats (e.g., sponges), which are prevalent and diverse in the AI. Although much of the AIGKC fishing area is closed to trawling to protect deep-sea corals and other biogenic habitats, most of it is open to crab pot fishing. Fishing gear that contacts the bottom, including crab pot gear, can affect these fragile habitats greatly (Stone and Shotwell 2007)(NPRB 2008). Although there are substantial portions of high density coral habitat closed to crab pot fishing in this region, there are large areas of seafloor with the potential to support coral gardens outside of the areas closed to crab pot fishing (Woodby et al. 2009). Once damaged, these slow-growing habitats may never recover (NMFS 2004). GKC and other invertebrates and fish are known to be closely associated with coral and biogenic habitats in the AI (NMFS 2004). Without additional assessments of the condition of these habitats and impacts from crab pots, it is not clear if sufficient measures are in place for the AIGKC fishery to protect corals and other biogenic habitats.

Ghost gear is a concern for this fishery and federal regulations require the reporting of lost gear in rationalized fisheries in logbooks (Stichert 2025, pers comm). There were 138 lost crab pots reported to ADF&G by AI GKC fishers in the 2020–21 season, and an

average of 119 lost pots per season were reported since 2018–19 (Table 6) (ADFG 2021e). The impacts from BSAI crab fishery ghost gear (i.e., lost pot gear) likely include entanglement of whale species {Citta et al. 2013; George et al. 2019}. Other problematic impacts could include damage to vulnerable deep-sea coral and other biogenic habitats, and mortality of crab and fish species trapped in lost pots.

Regulations are in place to reduce the impacts to animals caught in the pots if gear is lost; however, the required biodegradable twine that is intended to disable lost crab pots could take more than 100 days to degrade enough for animals to escape pots. This rate of degradation is likely too long to ensure that trapped biota can escape, because survival of crabs (and likely other species) begins to decline greatly after being trapped in a pot for 28 days {Barnard 2008}; further, the trap could also continue to cause damage to vulnerable deep-sea habitats before it degrades and detaches from buoy lines. Pots must be attached to longlines in the AI, which should reduce the chances for losing individual pots; however, if an entire pot longline is lost, this may cause more impacts than a single lost trap (e.g., entanglements, dragging across the seafloor). However, longline strings are now equipped with a VHF beacon that emits a frequency that vessels can pick up to help locate it. Research has concluded that bottom-contact fishing, especially with bottom trawls but also including pots, causes substantial damage to coral and sponge habitat in the Aleutian Islands (Heifetz et al. 2009). These impacts from pots dragging through deep-sea habitats or causing entanglements can continue after the gear is no longer actively fishing, until the gear degrades sufficiently, which may take years even if the trap is disabled {NOAA 2015; Arthur et al. 2014).

Entanglements of marine mammals due to gear used in the BSAI crab fishery have been reported (NOAA 2024c) and species of concern include humpback whales and gray whales. The most recent stock assessment of the ETP stock of gray whale indicates that impacts from entanglements are low relative to the annual PBR. However, there is a greater risk to humpback whale stocks that frequent the region. No known regulations are in place to reduce or prevent these entanglements. Although gear marking of buoys is required, it may be insufficient to identify the gear responsible for entanglements (e.g., trap lines).

In 2020, the NPFMC initiated a review to ensure that the federal king and Tanner crab FMP is in compliance with Standardized Bycatch Reporting Methodology (SBRM) guidance. Specifically, the review focused on how bycatch information is collected and reported for the BSAI king and Tanner crab fisheries. The review was completed in February 2021, and the NPFMC determined that bycatch reporting is consistent with SBRM requirements; however, the language in the FMP will need to be modified to identify a SBRM and explain how it meets the purpose of collecting, recording, and reporting bycatch (NPFMC 2021c).

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Moderately Effective

Although the scale of impacts from this fishery is not thought to be significant (NOAA 2024c) and there have been some measures in place to address concerns (e.g., trap opening size restrictions and biodegradable twine on pots) (ADFG 2020a), there is a lack of bycatch risk assessments or further proactive measures (e.g., mandatory lost gear reporting and retrieval) to limit impacts from active or ghost gear to marine mammals (gray whales in particular) and other species. Therefore, as some bycatch reduction measures are in place but are of unknown effectiveness and there is room for improvement regarding the reporting, removal, and prevention of ghost gear, the bycatch strategy is considered as "moderately effective" [per line 2. of Table 3.2.1 of the Standard].

Supplementary Information

Pots must have a minimum size of 9-inch stretched mesh on one vertical panel, to allow for escapement of undersize crabs. To reduce impacts on target and bycatch species from lost pots, pots in this fishery must contain an opening of at least 18 inches in length secured by biodegradable cotton twine no larger than 30 thread to allow for trapped animals to escape should the pot be lost (ADFG 2020a).

ADF&G observers deployed on fishing vessels in the BSAI crab fisheries record species composition of retained catch and discards in rationalized fisheries (Gaeuman 2014; ADFG 2025). Considerable amounts of undersized crabs, and non-target species have been observed as discards in this fishery, although volumes over the past five years are minimal (ADFG 2025).

Marine mammal species have also been reported to be impacted by the crab fishery in the Bering Sea through entanglements, including gray whales, although the impact on this stock is low (NOAA 2024c). Ghost gear is a modest concern for this fishery given recent trends in reported lost pots. There were 17 lost crab pots reported to ADF&G by crab fishers in the Bristol Bay RKC fishery in the 2020/21 season, and an average of 30 lost pots per season since 2018/19 (ADFG 2021e). Lost pots were voluntarily reported by fishers to ADF&G, and it is not clear how many lost pots were not reported. The relatively low number of lost pots in recent years is likely due to reduced fishing effort resulting from smaller annual fishery TACs.

Other potential problematic impacts include mortality of crab and fish species trapped in lost pots. Regulations are in place to reduce impacts to animals caught in the pots if gear is lost. However, required biodegradable twine intended to disable lost traps could require more than 100 days to degrade enough for animals to escape (Barnard 2008). Ghost fishing impacts on king crab species have been demonstrated in other Alaska crab pot fisheries (Long et al. 2014). There are no known measures to assess and remove the impacts of derelict gear from the fishery, or a requirement for timely reporting of lost fishing gear (reporting is voluntary). Although understanding the scale and impacts of ghost gear from this fishery is an important management issue, there is not a demonstrated concern for vulnerable species.

In 2020, the NPFMC initiated a review to ensure the federal king and Tanner crab FMP is in compliance with Standardized Bycatch Reporting Methodology (SBRM) guidance. Specifically, the review focused on how bycatch information is collected and reported for the BSAI king and Tanner crab fisheries. The review was completed in February 2021, and the NPFMC determined bycatch reporting are consistent with SBRM requirements; however, the language in the FMP will need to be modified to identify a SBRM and explain how it meets the purpose of collecting, recording, and reporting bycatch (NPFMC 2021c).

Moderately Effective

Although there have been some measures in place to address concerns (e.g., trap opening size restrictions and biodegradable twine on pots) (Szuwalski 2024), there is a lack of bycatch risk assessments or proactive measures to limit impacts from active or ghost gear to marine mammals (gray whales in particular) and other species. Therefore, as some bycatch reduction measures are in place but are of unknown effectiveness and there is room for improvement regarding ghost gear, the bycatch strategy is considered as "moderately effective" [per line 2. of Table 3.2.1 of the Standard].

Supplementary Information

To reduce bycatch, measures are in place including the following (Szuwalski 2024): snow crab pots must have at least 8 circular escape rings of 4 inches placed within one mesh measurement from the bottom of the pot, with four escape rings on each side of the two sides of a four-sided pot, or one-half of one side of the pot must have a side panel composed of not less than 5 1/4 inch stretched mesh webbing.

ADF&G observers deployed on fishing vessels in the BSAI crab fisheries record species composition of retained catch and discards (Gaeuman 2014; ADFG 2025). Marine mammal species have also been reported to be affected by the crab fishery in the Bering Sea through entanglements (NOAA 2024c). Gray whale may be affected by entanglement in crab pot gear from this fishery (ibid). The most recent stock assessment of the ETP stock of gray whale indicates that impacts from entanglements are low relative to the annual PBR (Carretta et al. 2021). No known regulations are in place to reduce or prevent these entanglements.

Ghost gear is a concern for this fishery. Regulations are in place to reduce impacts to animals caught in the pots if gear is lost. But, the required biodegradable twine that is intended to disable lost traps could take more than 100 days to degrade enough for animals to escape (Barnard 2008). Understanding the scale and impacts of ghost gear from these fisheries is an important management issue, although there is currently no demonstrated conservation concern for vulnerable species (e.g., deep-sea corals and other biogenic habitats).

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Moderately Effective

Although the scale of impacts from this fishery is not thought to be significant and there have been some measures in place to address concerns (e.g., trap opening size restrictions and biodegradable twine on pots) (ADFG 2020a), there is a lack of bycatch risk assessments or proactive measures to limit impacts from active or ghost gear to marine mammals (gray whales in particular) and other species. Therefore, as some bycatch reduction measures are in place but are of unknown effectiveness and there is room for

improvement regarding ghost gear, the bycatch strategy is considered as “moderately effective” [per line 2. of Table 3.2.1 of the Standard].

Supplementary Information

To reduce bycatch, measures are in place, including the following (ADFG 2020a) (Szuwalski 2024) : 1) Tanner crab pots must have at least four circular escape rings of 5-in. diameter or no less than one-third of a vertical surface covered with at least 7 in. of stretched mesh webbing, to permit the escapement of undersize crab; 2) a 3-in. maximum tunnel height opening for Tanner crab pots, to inhibit the bycatch of red king crab; and 3) Tanner crab pots must also be fitted with a degradable escape mechanism consisting of cotton thread no larger than 30 thread.

ADF&G observers deployed on fishing vessels in the BSAI crab fisheries record species composition of retained catch and discards (Gaeuman 2014; ADFG 2025). Based on observer data from 2020-2023 snow crab is the primary species of concern caught in pots used in the Bering Sea Tanner crab fishery (ADFG 2025). Observer data indicate that large numbers of legal and sublegal snow crab were caught in the EBS Tanner crab fishery in these years. The EBS snow crab stock has recently been declared overfished and the directed snow crab fishery has been closed because stock biomass declined below the ADF&G management threshold. Before the snow crab fishery closure, legal-sized snow crab could be retained in the targeted Tanner crab fishery if both fisheries were open. With the snow crab fishery closure, all snow crab must be discarded, which will result in handling mortality.

Marine mammal species have also been reported to be affected by the crab fishery in the Bering Sea through entanglements. Gray whale may be affected by entanglement in crab pot gear from this fishery. The most recent stock assessment of the ETP stock of gray whale indicates that impacts from entanglements are low relative to the annual PBR. No known regulations are in place to reduce or prevent these entanglements. Although gear marking of buoys is required, it may be insufficient to identify gear responsible for entanglements (e.g., trap lines).

Ghost gear is a concern for this fishery. In 2020–21, 72 lost pots were reported in the EBS Tanner crab fishery, and an average of 57 lost pots in the 2018–19 through 2020–21 seasons (ADFG 2021e). Lost pots were voluntarily reported by fishers to ADF&G, and it is not clear how many lost pots were not reported. Other problematic impacts could include damage to vulnerable deep-sea coral and other biogenic habitats, and mortality of crab and fish species trapped in lost pots. Regulations are in place to reduce impacts to animals caught in the pots if gear is lost. But, the required biodegradable twine that is intended to disable lost traps may take more than 100 days to degrade enough for animals to escape (Barnard 2008). Ghost fishing impacts on king crab species have been demonstrated in other Alaska crab pot fisheries (Long et al. 2014). Also, there are no known measures to assess and remove the impacts of derelict gear from the fishery, or a requirement for timely reporting of lost fishing gear. Although annual lost pot numbers

are substantial, and understanding the scale and impacts of ghost gear from these fisheries is an important management issue, there is currently no demonstrated conservation concern for vulnerable species (e.g., deep-sea corals and other biogenic habitats).

In 2020, the NPFMC initiated a review to ensure that the federal king and Tanner crab FMP is in compliance with Standardized Bycatch Reporting Methodology (SBRM) guidance. Specifically, the review focused on how bycatch information is collected and reported for the BSAI king and Tanner crab fisheries. The review was completed in February 2021, and the NPFMC determined that bycatch reporting is consistent with SBRM requirements and amendments to the FMPs have been modified to identify SBRM and how it meets the purpose of collecting, recording, and reporting bycatch (NMFS 2021).

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Highly effective

Considering observer data from other fisheries in nearby regions as a proxy (ADFG 2025), it is likely this fishery has very low levels of bycatch or impacts on other species (finfish, benthic invertebrates, and corals and biogenic habitats). Management measures have been established to address potential bycatch and ghost fishing concerns (e.g., escape rings and degradable escape mechanisms on pots) (ADFG 2022a), although there have been no documented interactions with marine mammals in this region and the risk is likely minimal (NOAA 2024c). Therefore, as this fishery likely has very low bycatch with no bycatch of species of concern and has some precautionary management measures in place to address any potential issues, the bycatch strategy is considered as “highly effective” [per line 1. of Table 3.2.1 of the Standard].

Supplementary Information

Regulations to reduce bycatch include a requirement for escape mesh or rings to allow escapement of sublegal crabs and nontarget species (ADFG 2022a) . To reduce ghost fishing, all pots must have a biodegradable escape mechanism with an opening 18 inches or greater in length and secured with a cotton twine no larger than 30 thread. Boats are also limited to operating no more than 20 pots per vessel which are among the most restrictive pot limits in the state and reduces the amount of gear operated in each fishery (Stichert 2025, pers comm).

At-sea observers have not been deployed by ADF&G in the Kodiak Tanner crab fishery, so bycatch in crab pots is unknown, but likely to be minimal.

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Moderately Effective

Known impacts to bycatch species are low with the possible exception of RKC discards. As the observer program has been terminated, it is unlikely that any bycatch concerns (including discarded RKC) will be identified. Although there have been some measures in place to address concerns (e.g., trap opening size restrictions and biodegradable twine on pots), there is a lack of bycatch risk assessments or proactive measures to limit impacts from active or ghost gear to marine mammals (gray whales in particular) and other species. Therefore, as some bycatch reduction measures are in place but are of unknown effectiveness and there is room for improvement regarding ghost gear, the bycatch strategy is considered as "moderately effective" [per line 2. of Table 3.2.1 of the Standard].

Supplementary Information

Onboard observations occurred opportunistically at low levels for the Norton Sound commercial summer RKC fishery prior to 2021, but data were not collected for the winter commercial fishery (ADFG 2020f). As of 2021, the observer program was discontinued for this fishery (Hamazaki and Zheng 2021). Observer data for 2012-2019 indicate bycatch in pots includes a variety of species, mostly occurring in very small numbers (ADFG 2020f). Pacific cod, snow crab and hermit crab were observed in moderate numbers, and large numbers of sea stars were observed (ADFG 2020f). Although the sample size was too low to estimate percentages of the catch with any certainty, ADF&G personnel report that it is unlikely any bycatch species alone would comprise more than 5% of the overall catch.

Marine mammal species have also been reported to be impacted by the crab fishery in the Bering Sea through entanglements. Gray whales of the Eastern North Pacific (ENP) stock are present in Norton Sound during RKC fishery operations that can occur throughout much of the summer, and may be impacted by entanglement in crab pot gear {NOAA 2019}. The most recent stock assessment of the ENP gray whale indicates impacts from entanglements are low relative to the annual PBR. No known regulations are in place to reduce or prevent these entanglements. Although gear marking of buoys is required, it maybe insufficient to identify gear responsible for entanglements (trap lines etc.).

Ghost gear is a concern for this fishery. Although recent annual numbers of lost pots for Norton Sound RKC fisheries were not available, estimates for other BSAI crab fisheries suggests this could be an issue in Norton Sound. To reduce impacts on target and bycatch species from lost pots, pots in this fishery must contain an opening of at least 18 inches in length secured by biodegradable cotton twine no larger than 30 thread to allow for trapped animals to escape should the pot be lost (ADFG 2020a). However, required biodegradable twine intended to disable lost traps could require more than 100 days to degrade enough for animals to escape (Barnard 2008). Ghost fishing impacts on king crab species have been demonstrated in other Alaska crab pot fisheries (Long et al. 2014). Additionally, there are no known measures to assess and remove the impacts of derelict gear from the fishery, or a requirement for timely reporting of lost fishing gear. Although understanding the scale and impacts of ghost gear from this fishery is an important management issue, there is no demonstrated impact to species of concern.

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Highly effective

Considering observer data from other fisheries in nearby regions as a proxy (ADFG 2025), it is likely this fishery has very low levels of bycatch or impacts on other species (finfish, benthic invertebrates, and corals and biogenic habitats). Management measures have been established to address potential bycatch and ghost fishing concerns (e.g., escape rings and degradable escape mechanisms on pots) (ADFG 2022a), although there have

been no documented interactions with marine mammals in this region and the risk is likely minimal (NOAA 2024c). Therefore, as this fishery likely has very low bycatch with no bycatch of species of concern and has some precautionary management measures in place to address any potential issues, the bycatch strategy is considered as “highly effective” [per line 1. of Table 3.2.1 of the Standard].

Supplementary Information

Regulations to reduce bycatch include a requirement for escape mesh or rings to allow escapement of sublegal crabs and nontarget species (ADFG 2020a). To reduce ghost fishing, all pots must have a biodegradable escape mechanism with an opening 18 inches or greater in length and secured with a cotton twine no larger than 30 thread. Boats are also limited to operating no more than 20 pots per vessel which are among the most restrictive pot limits in the state and reduces the amount of gear operated in each fishery (Stichert 2025, pers comm).

At-sea observers have not been deployed by ADF&G in the SP Tanner crab fishery, so bycatch in crab pots is unknown, but likely to be minimal.

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderately Effective

Evaluation of the bycatch strategy for the SE Alaska GKC and TC fisheries includes species caught in crab pots and those affected by entanglements in the gear (ropes, buoys, and traps). Observed impacts to bycatch species from these fisheries were low; however, current bycatch data (since 2010) were not available. Monitoring for impacts to marine mammals, as well as assessing, tracking, and removing ghost gear are needed, given the potential impacts to other species such as endangered humpback whales (Neilson et al. 2009). Although the scale of impacts from these fisheries is likely not significant (NOAA 2024c) (Carretta et al. 2021) and there have been some measures in place to address concerns (e.g., escape rings and biodegradable twine on pots) {ADF&G 2020a}, there is a lack of bycatch risk assessments or further proactive measures (e.g., mandatory reporting of lost gear and retrieval) to limit impacts from active or ghost gear to marine mammals and other species. Therefore, as some bycatch reduction measures are in place but the fishery has a demonstrated concern (NOAA 2024c) (Carretta et al. 2021) with ghost fishing and impacts to marine mammals, and management measure effectiveness is uncertain, the bycatch strategy is considered as “moderately effective” [per line 1. of Table 3.2.1 of the Standard].

Supplementary Information

Regulations to reduce bycatch include a requirement for escape rings to allow escapement of small crabs {ADF&G 2020a}. Biodegradable twine no larger than 60 thread is required to hold pots together, thus reducing impacts from ghost fishing because lost pots will eventually open {ADF&G 2020a}. There is also a prohibition on "side-loading" pots, to reduce halibut bycatch (Wood et al. 2017).

An at-sea observer program for this fishery was in place from 1998 to 2004 and 2007 to 2016 (it was discontinued after 2016). Data were only available through 2010, with 4.3% of commercial landings on average observed annually {Olson et al. 2012}. Based on this information, there were many species caught in the pots in small numbers

The potential impacts of the fishery on endangered humpback whale in the area due to entanglements are not mitigated through any management measures. The available literature indicates that the fishing gear most often associated with entanglement of humpback whale in SE AK is pot gear (Neilson et al. 2009).

Ghost gear from this fishery could affect multiple species, including endangered humpback whales and gray whales. Gear restrictions are in place to reduce impacts to animals caught in the pots if gear is lost. But, the required biodegradable twine that is intended to disable lost traps could take more than 100 days days to degrade enough for animals to escape (Barnard 2008). Also, there are no known measures to assess and remove the impacts of derelict gear from the fishery, or a requirement for timely reporting of lost fishing gear (it is voluntary).

3.3 Scientific Data Collection and Analysis

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderately Effective

Data to support stock assessments for target species in the AIGKC, NSRKC, BBRKC,

EBSTC, and EBSSC fisheries are collected, allowing for estimates of stock abundance (Jackson 2024) (Hamazaki 2024; Palof 2024; Stockhausen 2024; Szuwalski 2024). Stock assessments are not conducted for the SEAKGKC, SEAKTC, KTC, or SPTC stocks, but data limited methodologies are used (e.g., abundance indices across multiple generations and pot survey data) to better understand stock status (Nichols 2022; Spalinger et al 2021) (Stratman 2020)(Olson and Stratman 2022)(Palof et al. 2022). Bycatch within crab pots is monitored by at-sea observers for the BBRKC, EBSSC, EBSTC, and AIGKC fisheries, with the observing level and methods likely adequate. Data on entanglements of marine mammals were available through NOAA stock assessments, but more extensive monitoring is needed to help prevent these incidents and assess the scope of the problem (Young et al. 2023b)(Young et al. 2023c). Data collection on ghost gear and its impacts to marine life from these fisheries is insufficient, and more effort is needed to understand and mitigate the impacts of this issue. Therefore, as some data related to stock abundance and health are collected and analyzed, but some improvement is needed regarding bycatch and ghost fishing monitoring, scientific research and monitoring is considered as "moderately effective" [per line 1. of Table 3.3.1 of the Standard].

Supplementary Information

Data collection to support stock assessments for target stocks in the Alaska BSAI crab fisheries and conducting data limited assessments for SE Alaska is a priority for managers. The 2023-2024 stock assessments of the AIGKC, NSRKC, BBRKC, EBSTC, and EBSSC stocks were all peer-reviewed and approved through the NPFMC process (Jackson 2024) (Hamazaki 2024; Palof 2024; Szuwalski 2024; Stockhausen 2024). AIGKC, EBSTC, and EBSSC stocks are managed as Tier 3 stocks, meaning that reliable estimates of the spawner-recruit relationship are available, but proxies for F_{MSY} and B_{MSY} can be estimated (NPFMC 2021d). A NOAA trawl survey is conducted annually in the EBS, including BB, from which estimates of biomass and other key stock assessment inputs are derived for stocks in those areas (Stockhausen 2024). Recent stock assessments of AIGKC have used a model with data derived from onboard observers, including CPUE and tag-recapture growth, which has proved sufficient for informing stock assessment models (Jackson 2024).

In addition to data collection by NMFS and ADF&G for target stocks, the Bering Sea Fisheries Research Foundation (BSFRF) conducts cooperative research with industry, ADF&G, and NMFS to improve the science used in Bering Sea crab fisheries management (BSFRF 2024). The BSFRF is funded by the Bering Sea crab fishing industry and coordinates project design, field research, analyses, and reporting. Also, in the AI, a cooperative golden king crab pot-based survey was conducted by the Aleutian Islands King Crab Foundation (an industry group) and ADF&G for the past few seasons, with the goal of eventually using this survey to inform stock assessments.

ADF&G operates an onboard observer program for BSAI fisheries annually to monitor bycatch in the fisheries (ADFG 2022e). ADF&G observers deployed on catcher-processors and catcher vessels in the BSAI crab fisheries record the gear and location information for

a random sample of pot lifts, the species composition of catch, and the sex and legal status of commercially important captured crabs (Gaeuman 2014; ADFG 2022e). ADF&G onboard observers and dockside samplers document overall vessel catch and effort, and size-frequencies of catch species for all fisheries (ADFG 2022e). Observing coverage goals have been defined for rationalized BSAI fisheries based on either the percent of randomly selected catcher vessels observed or the percent of landings observed, as shown in the table below:

Table 6

Fishery	Observer Coverage
AIGKC	50%
BBRKC	20%
EBSTC	30-100%
EBSSC	30-100%

Beyond observers onboard fishing vessels, data were not available regarding air or sea surveys for entangled marine mammals in BSAI or SEAK fisheries. The main source of information about these interactions is reports of entanglements to marine mammal stranding networks, which are summarized in annual NOAA marine mammal stock assessments (Young et al. 2023b)(Young et al. 2023c). In these reports, entangling gear is often not traced to a particular fishery, likely due to insufficient gear marking protocols and while they do contain estimates of mortalities from entanglements, these are uncertain, given the lack of consistent surveys to report incidents (Muto et al. 2020a) (Young et al. 2023b)(Young et al. 2023c).

Lost crab fishing gear that may affect species caught in pots, vulnerable habitats, or entanglements with marine mammals (i.e., ghost gear) are voluntarily reported to ADF&G by commercial BSAI crab fishers. Reporting is not mandatory, so it is unclear whether all lost gear is reported. The fate of these lost pots is unknown and data on any retrieved gear were not available. Impacts from ghost gear are not regularly evaluated aside from voluntary reports of entanglements in marine mammal stock assessments, where gear is often not assigned to a specific fishery. In 2020, the NPFMC initiated a review to ensure that the federal king and Tanner crab FMP is in compliance with Standardized Bycatch Reporting Methodology (SBRM) guidance. NPFMC determined that bycatch reporting is consistent with SBRM requirements and amendments to the FMPs have been modified to identify SBRM and how it meets the purpose of collecting, recording, and reporting bycatch (NMFS 2021).

3.4 Enforcement of and Compliance with Management Regulations

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Highly effective

Enforcement measures are in place and TACs or GHLs have not been exceeded in recent years by Alaskan commercial king, Tanner, and snow crab fisheries. Therefore, as there are appropriate permits, regulations, and arrangements that are regularly enforced and verified and the capacity to control, ensure, and report compliance are appropriate to the fishery, enforcement of and compliance with management regulations is considered as "highly effective" [per Table 3.4.1 of the Standard].

Supplementary Information

ADF&G reports that an active vessel monitoring system (VMS) is federally required for all BSAI fisheries (ADFG 2024e). The enforcement of VMS, to ensure vessels are fishing in the legal areas, and all other regulations, including crab size limits, in these fisheries is the shared responsibility of Alaska Wildlife Troopers (AWT) and the NOAA Office of Law Enforcement (OLE). VMS is monitored for malfunctions during the fishing seasons, suggesting a need to notify a vessel's captain if there are issues before being addressed by the NOAA OLE if the issue is not corrected (NOAA 2024b). ADF&G also conducts dockside enforcement of legal sized male crabs and any sublegal or female crab observed in the retained catch are seized, counted, and reported to AWT (Stichert 2025, pers comm). It is unclear how often regulations are broken and what impacts may result for target and nontarget stocks. According to the most recent stock assessments, fishery landings have not exceeded TACs or GHLs in recent years for any of the BSAI crab fisheries (note that overall harvest above the TAC in BBRKC and AIGKC fisheries was due to an ADF&G cost-recovery program rather than commercial fisheries) (Siddeek et al. 2023)(Hamazaki 2024)(Palof 2024)(Stockhausen 2024)(Szuwalski 2024).

3.5 Stakeholder Inclusion

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Highly effective

Stakeholders are encouraged to participate in management processes for Alaska crab fisheries through numerous public meetings, comment opportunities, and advisory committees held by the NPFMC as well as the State of Alaska (NPFMC 2024b) (NPFMC 2018b) (ADFG 2024d). Therefore, as the management process involves transparent decision making, encourages multiple avenues for stakeholders and major user groups to participate in management, and offers well-organized conflict resolution and relationship building across groups, stakeholder inclusion is considered as “highly effective” [per line 1-5. in table 3.5.1 of the Standard].

Supplementary Information

Management decisions by the NPFMC that affect BSAI fisheries are made through public meetings, where stakeholders can provide input on decisions and issues of concern and engage with the Council, Scientific and Statistical Committee (SSC), and the Advisory Panel (AP) (NPFMC 2024b). In addition, the NPFMC process involves multiple committees that hold meetings open for public comment, including the BSAI Crab Plan Team that was formed primarily to provide the NPFMC with the best available scientific information regarding appropriate measures for the conservation and management of the BSAI crab fisheries (e.g., stock assessments) (NPFMC 2021e). The BSAI Crab FMP also established a Pacific Northwest Crab Industry Advisory Committee to provide the Alaska Board of Fisheries (BOF) with advice on preseason and in-season management measures for BSAI crab fisheries, including advice from nonresidents of Alaska (NPFMC 2021a). The Community Engagement Committee was recently formed to identify and recommend strategies for the NPFMC to provide effective community engagement with rural and Alaska Native communities (NPFMC 2018b).

The Alaska Board of Fisheries (BOF) determines regulations governing access to fisheries, harvest plans for each stock, and how fisheries are allocated (ADFG 2024c). Stakeholders, ADF&G, and the general public can make a proposal to the BOF to propose agenda items, change existing regulations, or propose new regulations and are able to give testimony about fishery management to the BOF through submitted written comments or verbally at BOF meetings that are held multiple times a year across the state (ADFG 2024c).

In addition, more than 80 Advisory Committees (ACs) which comprise stakeholders in communities across Alaska listen to and discuss concerns about fishing regulations and submit proposed changes to the BOF as well as other comments and recommendations on proposals that may impact their region (ADFG 2024d). ADF&G staff members work closely with and attend AC meetings to explain regulations and proposals or to provide data and fishery updates, and may help them with developing proposals for BOF consideration (ADFG 2024d).

For cases of gear conflicts or gear interference, there may be regulatory guidance to guide resolution and enforcement agencies may assist, but for conflicts where there is no regulatory guidance, issues are often taken before the BOF or the NPFMC, depending on where the conflict is located and which parties are involved (NPFMC 2024b) (ADFG 2024d).

Criterion 4: Impacts on the Habitat and Ecosystem

This Criterion assesses the impact of the fishery on seafloor habitats, and increases that base score if there are measures in place to mitigate any impacts. The fishery's overall impact on the ecosystem and food web and the use of ecosystem-based fisheries management (EBFM) principles is also evaluated. Ecosystem Based Fisheries Management aims to consider the interconnections among species and all natural and human stressors on the environment. The final score is the geometric mean of the impact of fishing gear on habitat score (factor 4.1 + factor 4.2) and the Ecosystem Based Fishery Management score. The Criterion 4 rating is determined as follows:

- Score >3.2 = **Green** or Low Concern
- Score >2.2 and ≤3.2 = **Yellow** or Moderate Concern
- Score ≤2.2 = **Red** or High Concern

Guiding principles

- Avoid negative impacts on the structure, function or associated biota of marine habitats where fishing occurs.
- Maintain the trophic role of all aquatic life.
- Do not result in harmful ecological changes such as reduction of dependent predator populations, trophic cascades, or phase shifts.
- Ensure that any enhancement activities and fishing activities on enhanced stocks do not negatively affect the diversity, abundance, productivity, or genetic integrity of wild stocks.
- Follow the principles of ecosystem-based fisheries management.

Rating cannot be Critical for Criterion 4.

Criterion 4 Summary

Fishery	Physical Impact of Fishing Gear on the Habitat/Substrate	Modifying Factor: Mitigation of Gear Impacts	Ecosystem-based Fisheries Management	Score
Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands	Score: 2	Score: 0	Moderate Concern	Yellow (2.828)
Pacific, Northeast - United States - Alaska - Pots - Bristol Bay	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Kodiak	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Norton Sound	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - South Peninsula	Score: 3	Score: 0	Moderate Concern	Yellow (3.000)
Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery	Score: 3	+.5	Moderate Concern	Green (3.240)
Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery	Score: 3	+.5	Moderate Concern	Green (3.240)

Criterion 4 Assessment

Scoring Guidelines

Factor 4.1 - Physical Impact of Fishing Gear on the Habitat/Substrate

Goal: The fishery does not adversely impact the physical structure of the ocean habitat, seafloor or associated biological communities.

- *5 - Fishing gear does not contact the bottom*
- *4 - Vertical line gear*
- *3 - Gears that contacts the bottom, but is not dragged along the bottom (e.g. gillnet, bottom longline, trap) and is not fished on sensitive habitats. Or bottom seine on resilient mud/sand habitats. Or midwater trawl that is known to contact bottom*

occasionally. Or purse seine known to commonly contact the bottom.

- *2 - Bottom dragging gears (dredge, trawl) fished on resilient mud/sand habitats. Or gillnet, trap, or bottom longline fished on sensitive boulder or coral reef habitat. Or bottom seine except on mud/sand. Or there is known trampling of coral reef habitat.*
- *1 - Hydraulic clam dredge. Or dredge or trawl gear fished on moderately sensitive habitats (e.g., cobble or boulder)*
- *0 - Dredge or trawl fished on biogenic habitat, (e.g., deep-sea corals, eelgrass and maerl) Note: When multiple habitat types are commonly encountered, and/or the habitat classification is uncertain, the score will be based on the most sensitive, plausible habitat type.*

Factor 4.2 - Modifying Factor: Mitigation of Gear Impacts

Goal: Damage to the seafloor is mitigated through protection of sensitive or vulnerable seafloor habitats, and limits on the spatial footprint of fishing on fishing effort.

- *+1 —>50% of the habitat is protected from fishing with the gear type. Or fishing intensity is very low/limited and for trawled fisheries, expansion of fishery's footprint is prohibited. Or gear is specifically modified to reduce damage to seafloor and modifications have been shown to be effective at reducing damage. Or there is an effective combination of 'moderate' mitigation measures.*
- *+0.5 —At least 20% of all representative habitats are protected from fishing with the gear type and for trawl fisheries, expansion of the fishery's footprint is prohibited. Or gear modification measures or other measures are in place to limit fishing effort, fishing intensity, and spatial footprint of damage caused from fishing that are expected to be effective.*
- *0 —No effective measures are in place to limit gear impacts on habitats or not applicable because gear used is benign and received a score of 5 in factor 4.1*

Factor 4.3 - Ecosystem-Based Fisheries Management

Goal: All stocks are maintained at levels that allow them to fulfill their ecological role and to maintain a functioning ecosystem and food web. Fishing activities should not seriously reduce ecosystem services provided by any retained species or result in harmful changes such as trophic cascades, phase shifts or reduction of genetic diversity. Even non-native species should be considered with respect to ecosystem impacts. If a fishery is managed in order to eradicate a non-native, the potential impacts of that strategy on native species in the ecosystem should be considered and rated below.

- *5 — Policies that have been shown to be effective are in place to protect species' ecological roles and ecosystem functioning (e.g. catch limits that ensure species' abundance is maintained at sufficient levels to provide food to predators) and effective spatial management is used to protect spawning and foraging areas, and prevent localized depletion. Or it has been scientifically demonstrated that fishing practices do not have negative ecological effects.*
- *4 — Policies are in place to protect species' ecological roles and ecosystem functioning*

but have not proven to be effective and at least some spatial management is used.

- *3 – Policies are not in place to protect species' ecological roles and ecosystem functioning but detrimental food web impacts are not likely or policies in place may not be sufficient to protect species' ecological roles and ecosystem functioning.*
- *2 – Policies are not in place to protect species' ecological roles and ecosystem functioning and the likelihood of detrimental food impacts are likely (e.g. trophic cascades, alternate stable states, etc.), but conclusive scientific evidence is not available for this fishery.*
- *1 – Scientifically demonstrated trophic cascades, alternate stable states or other detrimental food web impact are resulting from this fishery.*

4.1 Physical Impact of Fishing Gear on the Habitat/Substrate

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Score: 2

Crab pot fishing areas in the AI contain vulnerable deep sea corals and other biogenic habitats (Zaleski et al. 2022; Hoff et al. 2021)(Stone and Shotwell 2007). Therefore, as crab pot fisheries can and have caused damage to these vulnerable coral habitats through contact with and potentially dragging across the seafloor, physical impact of fishing gear on the habitat/substrate is considered a "2" [per table 4.1.1 of the Standard].

Supplementary Information

Few studies have been undertaken to study the effects of pot fishing on seafloor habitat in Alaska. During pot retrieval, or if dragging occurs while pots are deployed in rough seas or strong currents, the area of seafloor contacted may be relatively large and the forces on the seafloor may be substantial (Stone and Shotwell 2007; Zaleski et al. 2022). Soft corals are most often cited as being impacted, although the cumulative impacts to hard coral and sponges may be greater (Stevens 2021). Pot longlines used in the AI GKC fishery particularly have the potential to cause extensive damage to coral habitat because the spatial distribution of fishing is extensive in some areas of high coral abundance (Stone and Shotwell 2007; Heifetz et al. 2009; Zaleski et al. 2022).

The AI contain a high density and diversity of deep sea corals, often forming unique "coral garden" habitats that are similar in structural complexity to shallow tropical reefs, with a rigid framework, high topographic relief, and high taxonomic diversity (Zaleski et al. 2022; Stone 2006; Stone and Shotwell 2007; Hoff et al. 2021). Impacts from crab pot gear in the AI have been observed, where the seafloor was scoured to bare substrate (Stone 2006). AI corals are especially at high risk to disturbance from the GKC fishery (Zaleski et al. 2022; Heifetz et al. 2009).

In addition, ADF&G onboard observer data indicate that hard and soft corals, as well as sponges, tunicates, and hydroids, are regularly caught by the AI GKC fishery (ADFG 2025).

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Score: 3

Despite the presence of soft corals, crab pot fisheries deploying single pots in the EBS, SEAK, and Gulf of Alaska likely have a minimal effect on coral habitat, because they generally occur in soft-sediment areas with minimal corals, and a relatively small area of the seafloor is contacted with the gear (Stone and Shotwell 2007). Therefore, as crab pots contact the seafloor but have a low likelihood of interacting with vulnerable habitats in these fisheries, physical impact of fishing gear on the habitat/substrate is considered a "3" [per table 4.1.1 of the Standard].

Supplementary Information

Few studies have been undertaken to specifically examine the effects of pot fishing on seafloor habitat in Alaska, although there is potential for extensive damage depending on presence of corals, gear deployment and retrieval methods, seafloor bathymetry, and environmental conditions (Stone and Shotwell 2007; Zaleski et al. 2022). The EBS, SEAK, and Gulf of Alaska contain low densities of hard corals while some aggregations of soft corals are present on the continental shelf (Stone and Shotwell 2007). Although, corals are in relatively low abundance when compared to populations present in the AI due to the scarcity of habitat preferred by most corals other than sea pens (Hoff et al. 2021).

4.2 Modifying Factor: Mitigation of Gear Impacts

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Score: 0

The Alaska Seamount Habitat Protection Areas, encompassing sixteen seamounts in Federal waters off of Alaska (fifteen of which are in the Gulf of Alaska; one being in the Aleutian Islands), total 5,329nm^2 and prohibit the use of bottom-contact gear, including the pots used in the fisheries under assessment (NPFMC 2024). Six Habitat Conservation Zones in the Aleutian Islands with especially high density coral and sponge habitat, totaling to 110nm^2, are also closed to all bottom-contact fishing gear (NPFMC 2024). However, it is unclear what the total presence of representative vulnerable habitats is in this region and what percentage of said habitats are protected. Therefore, as some vulnerable habitats are protected, but it cannot be said that a substantial proportion (more than 20%) of all representative high density coral habitats are protected from all bottom contact, mitigation of gear impacts is considered a "0.0" and no additional modifying score is given [per table 4.2.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Score: 0

The Alaska Seamount Habitat Protection Areas, encompassing sixteen seamounts in Federal waters off of Alaska (fifteen of which are in the Gulf of Alaska; one being in the Aleutian Islands), total 5,329nm^2 and prohibit the use of bottom-contact gear, including the pots used in the fisheries under assessment (NPFMC 2024). Although this does protect some vulnerable coral habitats in the Gulf of Alaska, the total area of representative vulnerable habitats in question is generally unknown and the space that is protected is thought to be less than 20% of representative habitats being considered. In the Bering Sea and Gulf of Alaska, there are no spatial habitat protections beyond the Pribilof Islands limiting the use of pot fishing gear. Therefore, as a substantial proportion of representative habitats is not protected from all bottom contact, mitigation of gear impacts is considered a “0” and an additional modifying score is not given [per Table 4.2.1 of the Standard].

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

+.5

The Alaska Seamount Habitat Protection Areas, encompassing sixteen seamounts in Federal waters off of Alaska (fifteen of which are in the Gulf of Alaska; one being in the Aleutian Islands), total 5,329nm^2 and prohibit the use of bottom-contact gear, including the pots used in the fisheries under assessment (NPFMC 2024). Although this does protect some vulnerable coral habitats, the total area of representative vulnerable habitats in question is generally unknown. In Southeast Alaska, three sites with large aggregations of long-lived Primnoa coral have also been identified as vulnerable and of concern (totaling 67 nm^2), and Habitat Protection Areas have been designated here (totaling 13.5nm^2), which is approximately 20% of representative vulnerable habitats. Therefore, as a substantial proportion of representative habitats is protected from all bottom contact, mitigation of gear impacts is considered a “0.5” and has earned an additional modifying score [per Table 4.2.1 of the Standard].

4.3 Ecosystem-based Fisheries Management

Pacific, Northeast - United States - Alaska - Pots - Aleutian Islands

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Golden King Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Norton Sound

Pacific, Northeast - United States - Alaska - Pots - Bristol Bay

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Snow Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - South Peninsula

Pacific, Northeast - United States - Alaska - Pots - Kodiak

Pacific, Northeast - United States - Alaska - Pots - Eastern Bering Sea - Eastern Bering Sea Tanner Crab Fishery

Pacific, Northeast - United States - Alaska - Pots - Southeast Alaska - Southeast Alaska Tanner Crab Fishery

Moderate Concern

Spatial and temporal management measures have been put in place for BSAI, SEAK, and Gulf of Alaska crab fisheries, as well as some protections of vulnerable habitats. These strategies include mechanisms to avoid overfishing, consideration of ecosystem functioning, monitoring, stakeholder involvement, Ecosystem and Socioeconomic Profiles, Ecosystem Report Cards, and habitat protections (Kruse et al. 2025). The target species in these fisheries are considered to have an intermediate trophic role (Divine 2016); however as there are numerous species at this trophic level and these fisheries often stay within harvest management limits, detrimental trophic impacts are not expected with regular harvest. Therefore, as more than 70% of the fishery's main targeted and retained species have policies aimed to protect ecosystem functioning and account for their ecological role, temporal and spatial management is used to protect ecosystem functioning, and detrimental food web impacts are not likely, ecosystem-based fisheries management is considered a “low concern” [per line 2.a. in table 4.3.1 of the Standard].

Supplementary Information

Management plans are in place for all fisheries in this report. BSAI fisheries are covered by the NPFMC FMP (NPFMC 2021a), while the SEAK fisheries are covered by state of Alaska management plans (Stratman 2020; Wood et al. 2017). Managers of the BSAI and SEAK king, Tanner, and snow crab fisheries have implemented temporal and spatial management or other policies to protect ecosystem functioning and account for capture species' ecological role. A few areas within BSAI are closed to all fishing (including crab pots), but most areas remain open to crab pot gears. Spatial management in SE AK crab fishing areas is quite limited, and mostly focused in Glacier Bay National Park.

Temporal management in BSAI and SEAK varies considerably among species, but is often linked to prevent TACs or GHLs from being exceeded or the harvest of crabs during periods of mating or molting. Some fisheries may be open year-round, depending on harvest levels and other factors. According to the FMP for BSAI crab fisheries, the state of Alaska establishes TACs to maximize harvest and associated economic and social benefits, when biological and ecological conditions allow (NPFMC 2021a). In addition, ADF&G staff report that ecosystem indicators are currently used to qualitatively inform environmental uncertainty in management of BSAI fisheries and can be used to: 1) reduce or "buffer" TACs; or 2) temper confidence in assessment model-based population estimates. Management plans for SEAKGKC and TC fisheries do not mention ecosystem-based management strategies specifically.

The NPFMC adopted the Bering Sea Fishery Ecosystem Plan (BSFEP) in December 2018 (NPFMC 2018). The BSFEP establishes a framework for NPFMC in moving toward ecosystem-based management of the Bering Sea fisheries, and describes research to address NPFMC priorities. The NPFMC views the FEP as a tool to promote ecosystem science, provide a systematic approach to identifying ecosystem considerations and priorities, enhance ecosystem considerations as they are incorporated into Council decisions, and provide a flexible, adaptive platform to address management and conservation needs in the face of climate and ecosystem change. Any output of the FEP and associated research is intended to be informative but not prescriptive, and recommendations are reviewed through the normal NPFMC process. In addition, the NPFMC's Ecosystem Committee considers North Pacific management in the light of national ecosystem discussions, and suggests new ways for the NPFMC to engage in ecosystem-based management (NPFMC 2022b).

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Appendix A: ADF&G BSAI Crab Fisheries Onboard Observer Data

ADF&G provided onboard observer data for 2017–2019 for the red king crab, golden king crab, tanner crab, and snow crab fisheries in the BSAI, and these data were used in this report.

Appendix B: Key Changes (2024)

The 2015 Alaska King Crab and Tanner and Snow crab assessments were reviewed and it was determined that major changes were necessary to reflect changes in the fisheries' performance against the Seafood Watch Standard for Fisheries, such that the most recent version of the Seafood Watch standard should be used in 2024.

Following a review of which fisheries were to be open in the 2024-2025 season, five fisheries were added to the scope of the assessment (NSRKC, SPTC, KTC, SEAKTC, SEAKGKC) in addition to the four that were included in the 2015 assessment and were reassessed (BBRKC, AIGKC, EBSTC, EBSSC). Regarding the four fisheries that were assessed in 2015, BBRKC, EBSTC, and EBSSC have remained green, and AI GKC has been downgraded from green to yellow.

Criterion 1 – Impacts on the Species Under Assessment

Updated scoring has been developed for the BBRKC, AIGKC, EBSTC, and EBSSC fisheries based on an update to Version 4 of the Seafood Watch standard and more recent stock assessments for these populations (Jackson 2024) (Palof 2024) (Szuwalski 2024) (Stockhausen 2024). BBRKC, AIGKC, and EBSTC have remained green for Criterion 1 following these updates despite some slight scoring changes, whereas EBSSC has received a score decrease resulting in yellow for Criterion 1 particularly attributed to a recent population crash that occurred in 2021, although the crash was primarily attributed to environmental drivers.

Scoring has been developed for the five fisheries that were added to the scope of the assessment (NSRKC, SPTC, KTC, SEAKTC, SEAKGKC) based on the most up to date stock information available (Olson and Stratman 2022) (Hamazaki 2024) (Palof et al. 2022) (Nichols 2022) (Spalinger et al 2021).

Criterion 2 – Impacts on Other Capture Species

Updated scoring has been developed for the BBRKC, AIGKC, EBSTC, and EBSSC fisheries based on an update to Version 4 of the Seafood Watch standard and available catch composition and bycatch data collected since the last version of the assessment (ADFG 2025) (ADFG 2020e) (NOAA 2024c). BBRKC and EBSSC have remained green for Criterion 2 following these updates despite some slight scoring changes due to the addition of gray whale, whereas AIGKC and EBSTC has received score decreases resulting in red and yellow for Criterion 2, respectively. For AIGKC, this is driven primarily by the inclusion of coral and biogenic habitats, which are highly vulnerable, as well as gray whales and humpback whales. For EBSTC, this is driven by the inclusion of snow crab and gray whales.

Scoring has been developed for the five fisheries that were added to the scope of the assessment (NSRKC, SPTC, KTC, SEAKTC, SEAKGKC) based on the inclusion of humpback whales, gray whales, TC, and GKC as Criterion 2 species.

Criterion 3 – Management Effectiveness

Updated scoring has been developed for the BBRKC, AIGKC, EBSTC, and EBSSC fisheries based on an update to Version 4 of the Seafood Watch standard and current management plans and measures. BBRKC, EBSTC, EBSSC, and AIGKC have remained green overall for Criterion 3.

Scoring has been developed for the five fisheries that were added to the scope of the assessment (NSRKC, SPTC, KTC, SEAKTC, SEAKGKC).

Criterion 4 – Impacts on the Habitat and Ecosystem

Updated scoring has been developed for the BBRKC, AIGKC, EBSTC, and EBSSC fisheries based on an update to Version 4 of the Seafood Watch standard, potential impacts on the habitat, and approaches to ecosystem based management. BBRKC, EBSTC, and EBSSC have remained green for Criterion 4, whereas AI GKC has remained yellow in Criterion 4 despite some slight scoring changes due to the potential impacts to the substrate that include highly vulnerable corals.

Scoring has been developed for the five fisheries that were added to the scope of the assessment (NSRKC, SPTC, KTC, SEAKTC, SEAKGKC).

Appendix C: U.S. king, Tanner, and snow crab fisheries in Alaska. Includes 2023-2024 status and historical closure information.

Table 2

Species	Fishery Region	2023-2024 Status	Notes
Red King Crab	Norton Sound	Open	Occasional closures since 2020.
Red King Crab	Bristol Bay	Open	Closed from 2021-2023.
Red King Crab	Western Aleutian Islands	Closed	Closed in 1996. Opened briefly 1998/1999-2003/2004 in a limited area, but has been closed since.
Red King Crab	Dutch Harbor	Closed	Closed since 1984.

Red King Crab	Pribilof Islands	Closed	Closed since 1999.
Red King Crab	Adak	Closed	Closed since 1996.
Red King Crab	Prince William Sound	Closed	Closed since 1995.
Red King Crab	Cook Inlet	Closed	Closed since 1984.
Red King Crab	Yakutat	see notes	Open fishery, but no harvests since 2000/2001 - vessels registered in 2013/2014 and 2017/2018, but no harvest occurred.
Red King Crab	Southeast Alaska	Closed	Closed since 2017.
Blue King Crab	Pribilof Islands	Closed	Closed since 1999.
Blue King Crab	Saint Matthew Island	Closed	Closed since 2016-2017 season.
Blue King Crab	Yakutat	see notes	Open fishery, but no harvests since 2000/2001 - vessels registered in 2013/2014 and 2017/2018, but no harvest occurred.
Golden King Crab	Pribilof Islands	see notes	Status of this fishery is unknown.
Golden King Crab	Aleutian Islands	Open	Catch has stayed below TAC since 1996/1997, but close to allowable levels.
Golden King Crab	Southeast Alaska	Open	Opens concurrently with Tanner Crab fishery. Some sub-regions closed depending on the year.
Tanner Crab	Bering Sea	Open	Eastern region has been closed since 2015/2016 except for 2022/2023 and western region has been closed 2016/2017 and 2019/2020 seasons.

Tanner Crab	South Peninsula	Open	Closed 2014-2021, open since 2022.
Tanner Crab	Chignik	Closed	Closed 2013-2021, open in 2022 and 2023, closed in 2024.
Tanner Crab	Kodiak	Open	Closed in 2021, open since 2022.
Tanner Crab	Southeast Alaska	Open	Season lasts 5 days minimum - biomass and number of pots registered determines if season is extended. Opens concurrently with Golden King Crab fishery.
Tanner Crab	Prince William Sound	Closed	Closed since 1998, and opened briefly in 2022. Harvest was less than half of GHL and low biomass led to it being closed again in 2023 and 2024. Limited test fishery also occurred around 2022.
Tanner Crab	Cook Inlet	Closed	Closed since 1995.
Snow Crab	Bering Sea	Closed	Closed from 2021-2023 due to major stock crash. Recently determined to be opened again in 2024-2025.