Revised

Biological Evaluation for the General NPDES Permit for Offshore Seafood Processors within Federal Waters off the Coast of Alaska

Permit No. AKG524000

Prepared for

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ACRONYMS

AAC	Alaska Administrative Code
ACMP	Alaska Coastal Management Program
ADEC	Alaska Department of Environmental Conservation
AI	Aleutian Islands
BAT	Best available pollution control technology economically achievable
BE	Biological Evaluation
BCT	Best conventional pollution control technology
BiOp	Biological Opinion
BOD	Biochemical oxygen demand
BPT	Best practicable control technology
BPJ	Best professional judgement
BS	Bering Sea
CFR	Code of Federal Regulations
CMP	Coastal Management Plan
CWA	Clean Water Act
CZMP	Coastal Zone Management Program
DO	Dissolved oxygen
DPS	Distinct Population Segment
EEZ	Economic Exclusion Zone
EFH	Essential Fish Habitat
ELG	Effluent limitations guidelines
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESU	Evolutionary Significant Unit
FC	Fecal coliform
FMP	Fisheries Management Plan
FR	Federal Register
GC/MS	Gas chromatography/mass spectrometry
GOA	Gulf of Alaska
HPC	Habitat of Particular Concern
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MLLW	Mean lower low water
MMPA	Marine Mammal Protection Act
MSA	Magnuson-Stevens Act
MSD	Marine Sanitation Device
nm	Nautical mile
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NSPS	New Source Performance Standards
ODCE	Ocean Discharge Criteria Evaluation
ppm	Parts per million
ppt	Parts per thousand
SFA	Sustainable Fisheries Act
TSS	Total suspended solids
TMDL	Total Maximum Daily Load
USFWS	U.S. Fish and Wildlife Service
µg/L	micrograms per liter
ZOD	Zone of Deposit

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1.0. BACKGROUND

1.1 Project history

The U.S. Environmental Protection Agency's (EPA) is proposing to reissue the National Pollutant Discharge Elimination System (NPDES) General Permit for the discharge of seafood processing wastes by offshore seafood processors in federal waters located greater than 3 nautical miles (nm) from Alaskan coastline pursuant to the provisions of the Clean Water Act, 33 U.S.C. 1251. EPA published the draft General Permit for public review on March 25, 2019 with a 45-day public comment period. The comment period closes on May 9, 2019. The existing General Permit for Offshore Seafood Processors in Alaska expired on February 28, 2015 (hereafter referred to as, "2009 General Permit").

EPA submitted a Biological Evaluation (BE) to the National Marine Fisheries Services (NMFS) and U.S. Fish and Wildlife Service (USFWS) ("Services") in July 2018 and requested initiation of informal consultation. Subsequent to the July 2018 submittal, EPA revised the draft General Permit. This revised BE reflects the revisions made to the Draft General Permit.

Section 301(a) of the Clean Water Act (CWA) provides that the discharge of pollutants to surface waters of the United States is unlawful except in accordance with a National Pollutant Discharge Elimination System (NPDES) permit. EPA's regulations authorize the issuance of general NPDES permits, as opposed to individual NPDES permits, to categories of discharges when a number of point source discharges:

- Involve the same or substantially similar types of operations;
- Discharge the same types of wastes;
- Are located within a geographic area;
- Require the same effluent limitations;
- Require the same operating conditions;
- Require the same or similar monitoring requirements; and
- In the opinion of EPA, are more appropriately controlled under a general permit than under individual permits (40 CFR 122.28).

EPA has determined that the owners and operators of offshore seafood processing facilities described in Section I of the Draft Permit are authorized to discharge seafood processing wastes and the concomitant wastes set out in Section II to waters of the United States as described in Section III of the permit, in accordance with effluent limitations, monitoring requirements and other conditions set forth in the Draft Permit under the provisions of a general permit.

1.2 Federal Action History

This section summarizes exchanges between EPA, the Services, and Alaska's Department of Environmental Conservation (DEC) concerning the 2009 General Permit (Permit No. AKG524000) and draft General Permit.

EPA has previously consulted with the Services on the 2009 General Permit (AKG524000) under the Endangered Species Act and the Magnuson-Stevens Act. The following milestones represent significant actions by the EPA, USFWS, and NOAA directly related to this General Permit:

June 23, 2008 Submitted proposed General Permit, Fact Sheet, Biological Evaluation and Essential Fish Habitat Evaluation to NMFS and USFWS for review.

Oct 31, 2008 EPA Finalized ESA Consultation on the existing AKG524000 General Permit.

Oct 31, 2008 EPA approves the State of Alaska program for NPDES permits.

Dec 4, 2009 EPA Issued AKG524000 Offshore Seafood Processors in Alaska General Permit (2009 General Permit).

Feb 28, 2015 2009 General Permit Expired and was not administratively extended by the EPA.

Aug 12, 2015 USFWS and NMFS reinitiated formal consultation on the effects of the Federal and State parallel groundfish fisheries in the GOA and BSAI on the short-tailed albatross and the Alaska-breeding population of Steller's eider.

Dec 23, 2015 USFWS issues Biological Opinion (BiOp) and Finalizes Formal Consultation on the Effects of the Federal and State of Alaska Parallel Groundfish Fisheries in the Gulf of Alaska and Aleutian Islands/Bering Sea (Consultation #07CAAN00-2015-F-0145).

June 9, 2016 NMFS publishes Final Marine Mammal Protection Act Section 101(a)(5)(E) – Negligible Impact Determination for the Humpback Whale, (Western and Central North Pacific stocks), Steller Sea Lion (Western U.S. stock), Bearded Seal (Alaska stock), and Ringed Seal (Alaska stock).

Jan 24, 2018 EPA receives updated species lists from USFWS (Consultation codes: 07CAAN00-2018-E-00287 and 07CAFB00-2018-SLI-0049)

July 2018 EPA submits letters requesting informal consultation to NMFS and USFWS. Submittal packages include revised Biological Evaluation (BE), Ocean Discharge Criteria Evaluation (ODCE), Draft General Permit, and Fact Sheet for AKG524000 General Permit Reissuance.

2.0 DESCRIPTION OF ACTION AND ACTION AREA

2.1 Discussion of Federal Action and Legal Authority

The federal action that is the subject of this Biological Evaluation (BE) is EPA's proposed reissuance of the NPDES General Permit for Offshore Seafood Processors in Alaska (AKG524000), subsequently referred to as the "draft Permit" and "draft General Permit". Federal waters begin 3 nm from shoreline or closure line, including the contiguous zone, economic exclusion zone (EEZ) and oceans. EPA is the permitting authority for these federal waters. NPDES permits are written for a term of five years after which the permit conditions are reviewed and a renewed permit is issued subject to any applicable regulatory changes, changes to water quality standards, or changes deemed acceptable by EPA.

2.1.1 Endangered Species Act [16 U.S.C. § 1531 et al.]

Section 7(a) of the Endangered Species Act ("ESA"), 16 U.S.C. Section 1536(a), requires that each federal agency:

- In consultation with the Services, insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or to result in the destruction or adverse modification of any designated critical habitat of each such species (Section 7(a)(2)); and
- Confer with the Service on any agency action that is likely to jeopardize the continued existence of any species that is proposed for listing or result in the destruction or adverse modification of any critical habitat proposed to be designated for any such species (Section 7(a)(4)).

A BE provides an analysis of the potential effects of a proposed federal agency action on any proposed and listed species or the designated critical habitat of any such species based on the best scientific or commercial information available. This BE has been prepared to assist the U.S. Environmental Protection Agency, Region 10 (EPA or Agency) and the Services in carrying out their activities pursuant to ESA Sections 7(a)(2) and 7(a)(4) as they pertain to EPA's draft Permit. The ESA requires federal agencies to review their actions as they apply to proposed and listed species.

2.1.2 Magnuson-Stevens Fishery Management and Conservation Act [U.S.C. § 1801 et al.]

The Magnuson-Stevens Act of 1976 (16 U.S.C. § 1801, et seq.) authorized the U.S. to manage its fishery resources in an area extending from a State's territorial sea (to 3 nm from shore) to–200 nm (4.8 km to 320 km) off its coast (termed the Exclusive Economic Zone or EEZ). The management of these marine resources is vested in the Secretary and in regional Fishery Management Councils. In the Alaska Region, the Council is responsible for preparing Fisheries Management Plans (FMPs) for marine fishery resources requiring conservation and management.

The Sustainable Fisheries Act of 1996 (SFA; Public Law 104-297) reauthorized and made significant amendments to the Magnuson-Stevens Act. While the original focus of the Magnuson-Stevens Act was to Americanize the fisheries off the coasts of the U.S., the SFA included provisions aimed at the development of sustainable fishing practices in order to guarantee a continued abundance of fish and continued opportunities for the U.S. fishing industry. The SFA included provisions to prevent overfishing, ensure the rebuilding of overfished stocks, minimize bycatch, identify and conserve essential fish habitat, and address impacts on fish habitat.

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act set forth a number of new mandates for the NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat. The Councils, with assistance from NMFS, are required to delineate "essential fish habitat" (EFH) for all managed species. Federal action agencies that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH, and respond in writing to the fisheries service's recommendations.

The EFH regulations define an *adverse effect* as "any impact which reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions". NMFS or a Council may recommend measures for attachment to the federal action to protect EFH; such recommendations are advisory, not proscriptive, in nature.

2.2 PERMIT PURPOSE AND OBJECTIVES

2.2.1 Seafood Processing Procedures and Discharge Characterization

The quantity and character of the seafood wastes generated in Alaska vary due to the types of fish processed, seasonal variation in their abundance, and the openings and closings of fishing seasons that are used to manage the target and non-target stocks of fish and shellfish species. Target species of commercial fishing operations in Alaska primary include groundfish (e.g. pollock, Pacific cod, sablefish, rockfish, Pacific halibut, and other species of flatfish) in addition to five species of salmon, herring, and crab (Dungeness and species of king and Tanner crab) (EPA 1994b).

Currently, there are fewer than 100 permitted seafood processing facilities that discharge effluent into waters of the U.S. and operate more than 3 NM from the shore of Alaska. The permitted vessels are discussed in more detail in Section 2.2.2.2. This section describes the typical processing of seafood products.

2.2.1.1 Seafood Processing

Seafood processing results in the following recoverable products:

- H&G blocks (headed and gutted fish with tails removed)
- Fillet blocks
- Minced blocks
- Surimi blocks
- Fishmeal
- Fish oil

All offshore processing vessels vary in their production line(s), processing steps, capacity, finished products, etc. The following narrative provides a generalized description of how processing works aboard an offshore processor.

Sea water is used to move fish and waste via flumes to grinders and discharge chutes and secondarily for clean-up and sanitation.

Freshwater is either generated onboard or acquired from a shore-based source. It is then used in the surimi making process, for employee housing and sanitation needs.

The production process begins when fish is hauled on board. The fish are emptied into a holding bin. From the holding bin the fish are transferred onto a sorting belt where the catch is sorted by primary species. All the fish is weighed as it travels along the belt. The prohibited species are sent to the observer, and the rest of the bycatch, that is not processed, is returned to the sea via the discard chute. The remaining catch is sent to the starting point of one of the processing lines.

The fish is then sorted by size for processing on alternative processing lines. Each line consists of a machine that will head, gut, debone and skin the fish. If the desired product is H&G fish only the first two processes are performed. Otherwise the end product is boned and skinned fillets. The belly flap trim is transferred to a mince processing line, if the vessel has that capability onboard. On vessels that have a fishmeal processing line, the head, guts and skin are transferred there for further processing. On vessels where no fishmeal processing line exists, these materials are ground and discharged.

Fillets are transferred by conveyor to the candling table where they are checked for defects and parasites. Those fillets that meet quality standards are packed in a plastic basket, check weighted and transferred into a freezer frame with a box liner. The freezer frame is transferred to the plate freezers and frozen. The frozen blocks are packed in master cartons, strapped and transferred to a storage hold. Those fillets that do not meet quality standards as fillets are transferred either to the mince operation if the quality meets mince standards, to fishmeal if they do not meet mince standards, or are ground and discharged if no further processing is available.

The backbones go to the surimi processing line to extract as much flesh from the bones as possible. This process produces a paste that is extruded into plastic bags and then is frozen in a manner that is similar to the fillets. After the flesh is extracted from the bones, they are transferred to the fishmeal processing line, if available. If the fishmeal line cannot handle all the fish bones due to the volume of the catch, the excess bones are transferred to the discharge sump, ground and discharged.

The only other processing-related waste that is discharged is a portion of the wash down operation of fish products that end up inadvertently on the vessel floor. This waste is ground and pumped overboard.

Fish processed as H&G recover approximately 50 percent of raw input. Fish processed into fillets have recovery rates ranging from 25 to 50 percent. Surimi production, a minced flesh product, recovers from 7 to 22 percent of the whole fish depending on the primary product of the processing effort. Reported estimates for recovery as fishmeal range from 3 to 7 percent, and a recovery estimate has been reported for fish oil of one percent of raw input.

2.2.1.2 Solid Wastes from Seafood Processing

Seafood processing waste streams generally consist of the material that cannot be processed by the onboard processing plant and is piped or conveyed to the collecting sumps on the processing deck where it is ground and pumped overboard. It is assumed that the ground fish waste has a low impact on the receiving water due to the wide dispersion of waste over a large area and volume of water, as well as the biodegradable nature of the waste.

Unground solid waste is comprised of sea debris, prohibited species fish and by-catch that is neither processed nor retained. All these are discharged directly from the vessel. This category of discharge material represents an extremely small fraction of the solid waste.

The quantity and chemical composition of the solid waste discharged by seafood processing facilities determines the effects that the discharges may have on the aquatic environment. As noted above, seafood processing solid waste consists of both organic and inorganic material including protein, fat (oil and grease), and ash (inorganic component of fish waste).

Tables 1 and 2 present details on the measured contents and theoretical composition of groundfish wastes. Most of the solid fish waste contains at least 75 percent water. The percentages of protein were similar for most types of fish waste sampled (approximately 10-15 percent wet weight). The percentage of fat was generally less than 3 percent, although viscera from pollock had a much higher fat content (40 percent of wet weight). The percentage of ash, which represents the inorganic component of fish waste, was generally less than 5 percent wet weight. The percent of carbon, nitrogen, phosphorus, and sulfur based on wet weights is estimated at 16.7, 2.9, 0.3 and 0.3 percent respectively. The results of these analyses are consistent with the information presented in Table 1.

Table 1: Approximate Composition (Percent) of Whitefish Fillet and Surimi Wastes

Type	Sample	n[1]	Moisture	Protein	Fat	Ash	Source
Pollock	Machine fillet (winter)	4	81.3	11.3	3.0	3.6	Crapo, 1988
Pollock	Machine fillet (spawning)	4	82.0	12.5	1.9	3.7	Crapo, 1988
Pollock	Hand fillet	n/a	74.8	13.8	8.9	2.7	Babbitt, 1982
Pollock	Heads	n/a	81.1	13.6	1.4	4.9	Babbitt, 1982
Pollock	Viscera	n/a	45.0	8.2	40.1	0.8	Babbitt, 1982
Pollock	Frame	n/a	80.4	15.9	0.7	3.3	Babbitt, 1982
Pollock	Skin	n/a	81.8	18.0	0.3	0.9	Babbitt, 1982
Pollock	Bloodwater	3	98.5	0.9	0.2	0.3	Crapo, 1988
Surimi	Filet waste	3	81.3	11.3	3.0	3.6	Crapo, 1988
Surimi	Bloodwater	3	97.9	1.3	0.4	0.3	Crapo, 1988
Surimi	Deboner waste	3	86.1	10.7	0.8	0.7	Crapo, 1988
Surimi	Refiner waste	3	86.4	12.1	0.7	0.4	Crapo, 1988

Type	Sample	n[1]	Moisture	Protein	Fat	Ash	Source
Surimi	Rotary screen wastewater	3	98.8	0.8	0.2	0.2	Crapo, 1988

2.2.1.3 Bottom Accumulations of Solid Waste

Accumulations of waste material on the bottom of the receiving water occur when the rates of deposition at a specific location exceed the rates at which material can be assimilated by the community that feeds at that location and/or the rate at which the material is likely to be dispersed by hydrodynamic forces. The likelihood of bottom accumulations due to offshore seafood processing is very low for two reasons:

1. Dischargers are in constant motion. Reported vessel speeds are maintained between 1 and 18 knots (1.1 and 20.7 mph) at all times.
2. In general, the Alaskan continental shelf is hydrodynamically energetic and well flushed. The combination of wind, tide and water depth greatly increases mixing and dispersion of discharges.

2.2.1.4 Dissolved Wastes from Seafood Processing

Current effluent data on discharges from offshore seafood processors in the action area are not available. Table 2 presents effluent characteristics of dissolved wastes from shore-based groundfish dischargers operating in Alaska in 1992 and 1993. Seafood processing waste discharge characteristics in offshore waters are expected to be similar to this shore-based data because the processing is virtually identical. Discharge characteristics are not expected to have changed significantly since these data were collected. Caution should be used when comparing the median and maximum values for each effluent type because the data points, even if equal in number, may be from different facilities or time periods.

Table 2: Effluent data for Alaskan shore-based seafood processors discharging under individual permits in 1992 and 1993[1]

Product[2]		TSS mg/L		Oil & Grease (mg/L)		BOD (mg/L)	
		Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
Bottomfish	Median	105	150	73	91	n/a	n/a
	n	120	124	101	106	n/a	n/a
	Minimum	10	6.0	2.8	4.5	n/a	n/a
	Maximum	4,553	3,324	1,621	1,486	n/a	n/a
Meal	Median	88	142	28	44	80	120
	n	18	18	18	18	15	15
	Minimum	16	24	1.4	1.4	36	36
	Maximum	1,330	1,949	153	284	13,356	39,750
Stickwater	Median	4,900	9,540	2.1	5.6	7,600	7,600
	n	53	53	25	25	47	47
	Minimum	9	23	0.2	0.2	1.5	2
	Maximum	84,000	110,000	91,139	203,800	148,950	432,000
Surimi	Median	1,079	1,366	208	257	2,323	1,845

Product[2]		TSS mg/L		Oil & Grease (mg/L)		BOD (mg/L)	
		Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.	Monthly Avg.	Daily Max.
	n	25	25	25	25	6	6
	Minimum	24	33	8	17	286	286
	Maximum	6,209	7,808	282,400	295,200	7,328	7,750

n/a = not available

[1] Obtained from Discharge Monitoring Reports (DMRs) submitted to EPA's Permit Compliance System (PCS)

[2] Product Classifications are as follows:

Bottomfish = Bottomfish (pollock, cod, sablefish, etc.) sections
Meal = Fishmeal
Stickwater = Stickwater from fish meal operations
Surimi = Surimi production from Pollock

In addition to oil and grease, Biochemical Oxygen Demand (BOD), and Total Suspended Solids (TSS), other contaminants can be present in effluent from seafood processing facilities. The dissolved wastes may include disinfectants used to maintain sanitary conditions in compliance with requirements for the production of food for human consumption. The following sections provide greater detail on stickwater, surimi wastewater, wash-down water, sanitary wastewater and other wastewaters.

Stickwater
Stickwater is the mixture of water, oil, proteins, fats and ash separated from the press liquor generated during the production of fish meal. After decanting to remove oil, this stream is a dilute solution of insoluble fines, very fine denatured solubles, and water soluble connective tissue. A small amount of fish oil is present as an emulsion with the protein. The impact of this stream is low due to dilute concentration, fine particle size and inability of the oil fraction to coalesce. Note that the effluent data, summarized above in Table 2.3 shows that stickwater has one of the highest median concentrations for TSS and BOD compared to other wastewaters.

Surimi Wastewater
Surimi production is a washed minced fish product. The manufacturing process includes gutting, heading, deboning and filleting followed by mincing and washing. Surimi wastewater is relatively high in TSS and BOD and had the highest median and maximum values for oil and grease compared to other liquid wastes as shown in Table 2.

Wash-down Water
Wash-down water is used to remove wastes and maintain sanitary standards during processing operations. In addition to the organic materials, these discharges may include disinfectants that could contain chlorine-, iodine-, or ammonium chloride-based solutions. These wastes are generally low in volume.

Sanitary Wastewater
Sanitary waste is human body waste discharged from toilets and urinals. The pollutants associated with this discharge include TSS, BOD, bacteria, and residual chlorine. All vessels must employ properly functioning Type I or Type II Marine Sanitation Devices (MSDs).

Other Wastewaters
Other wastewaters include other liquid wastes generated during seafood processing operations. These low-volume wastes include catch transfer water, live tank water, refrigerated seawater, cooking water, boiler water, cooling water, refrigerator condensate, pressure relief water, clean-up water and scrubber water. Wastewaters not having contact with seafood are not required to be discharged through the seafood process waste-handling system. These wastes would not be expected to contain concentrations of contaminants that would be detrimental to marine organisms.

2.2.2 Distribution and Discharge of Permitted Facilities

This section provides a summary of available data on the character and quantity of discharge by facilities operating under the Alaska Seafood Processors General NPDES Permit. Processors are categorized as offshore facilities that discharge at distances greater than 3 nm from shore as delineated by mean lower low water (MLLW).

2.2.2.1 Distribution of Permitted Facilities

Offshore processors covered under this permit may be found only in offshore federal waters (greater than 3m from shore) across much the same range with a few vessels as far north as Norton Sound. Annual reports provided by the vessels indicate that vessels do not discharge in single locations but instead discharge in multiple locations within the action area.

2.2.3. Discharge Characterization for Permitted Facilities

Vessels

The annual waste discharges from the offshore vessels submitting 2014 and 2015 annual reports ranged from 0 (no discharge) to 88,188,314 pounds. Of the 83 vessels that reported data in 2015, 12 reported zero discharge. Like the shore-based processors, the frequency distribution of vessels is also positively skewed with 65 percent of the facilities discharging less than 10 million pounds. The median annual waste discharge for vessels in 2015 was 6,215,365 pounds. Total discharge for all offshore vessels reporting in 2015 was 1,123,131,855 pounds.

The annual reports submitted for 2015 include, vessel discharge recorded by month and a daily reported location marker by latitude, longitude. It is estimated, based on probable vessel location at various times of the year, that the vessels discharged approximately 1,079,748,081 pounds in the Bering Sea/Aleutian Islands area, 42,285,333 pounds in the Gulf of Alaska area, and 1,098,441 pounds in SE Alaska.

Of the annual reports submitted for 2015, only 52 out of 81 vessels provided a breakdown of species caught. The majority of seafood processed on vessels was groundfish (approximately 96%). The reported, groundfish processed consisted of approximately 58% pollock and 11% and Pacific cod; species caught also included sablefish, arrowtooth flounder, Pacific hake, jack mackerel, Pacific Ocean perch, rockfish (canary, chilipepper, darkblotched, shortraker, widow and yellowtail), sculpin, spiny dogfish shark, skate, sole (butter, flathead, rex, rock and yellowfin), and Greenland turbot.

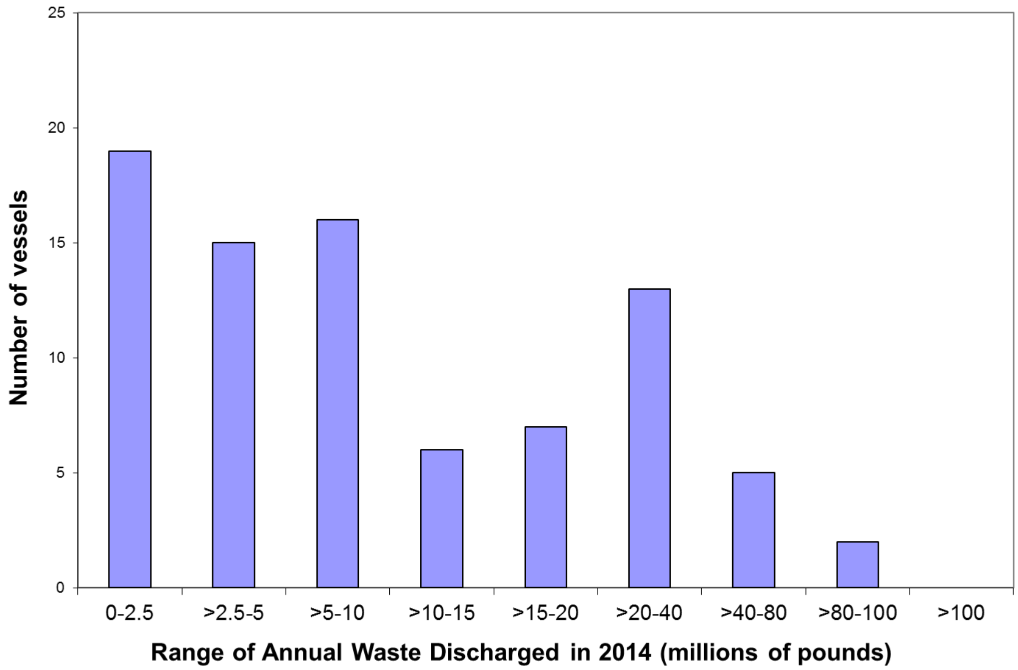

Figure 1: Frequency distributions of annual seafood waste disposal for seafood processors covered under NPDES General Permit AKG524000 filing annual reports for the year 2014.

Source Data: EPA NPDES General Permit for Alaskan Seafood Processors Database (2016).

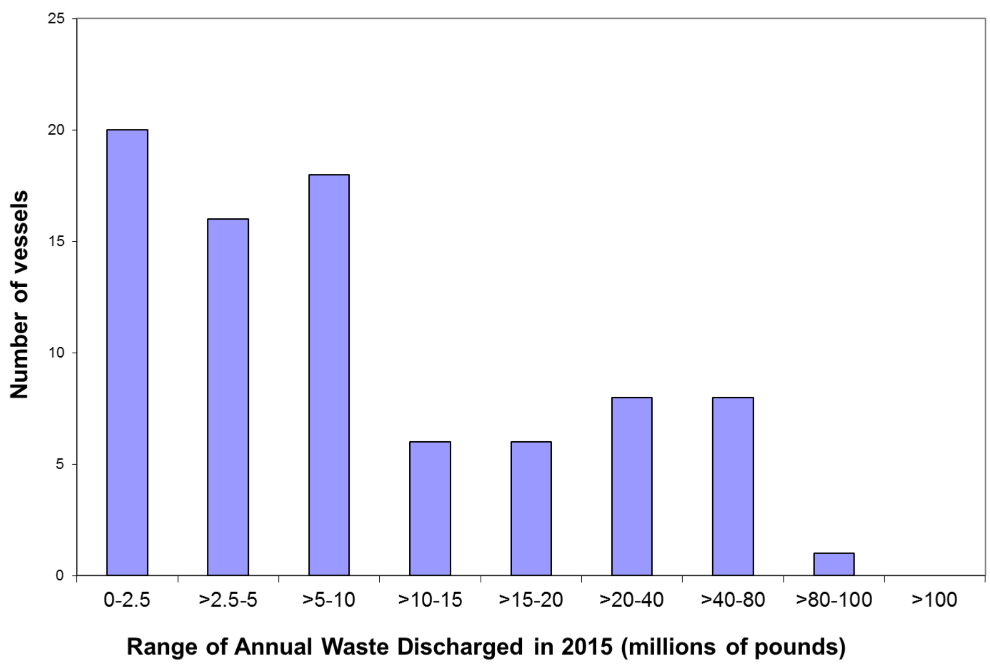

Figure 2: Frequency distributions of annual seafood waste disposal for seafood processors covered under NPDES General Permit AKG524000 filing annual reports for the year 2015.

Source Data: EPA NPDES General Permit for Alaskan Seafood Processors Database (2016).

2.3. PERMIT DESCRIPTION

EPA's Region 10 proposes to issue the NPDES General Permit for Offshore Seafood Processors in Alaska (Permit No. AKG524000). Offshore seafood processing facilities covered under this permit are those facilities discharging seafood waste at distances greater than 3 nm from shoreline or closure line.

2.3.1 Facilities

2.3.1.1 Authorized Facilities

Subject to the restrictions of this Permit, the following categories of dischargers are authorized to discharge the pollutants set out in Part II of this Permit once a Notice of Intent has been filed with and a written authorization is received from EPA:

1. Operators of off-shore vessels, operating and discharging "seafood processing waste" greater than 3 nautical mile (NM) from shore as delineated by mean lower low water (MLLW), engaged in the processing of fresh, frozen, canned, smoked, salted or pickled seafood or the processing of seafood mince, paste, or meal and other secondary by-products.

2.3.1.2 Unauthorized Facilities

1. All discharges occurring less than 3.0 nm from the Alaskan shore. The permit does not authorize any pollutants which are not expressly authorized in the permit. This includes, but is not limited to, petroleum hydrocarbons and toxic pollutants listed in 40 CFR 401.15.

2.3.2. Pollutants

2.3.2.1 Covered Pollutants

This Permit authorizes the discharge of the following pollutants subject to the limitations and conditions set forth herein:

1. Seafood processing wastewater and wastes, including the waste fluids, heads, organs, flesh, fins, bones, skin, chitinous shells, and stickwater produced by the conversion of aquatic animals from a raw form to a marketable form.

    Utilization. Permittees must fully utilize to the extent practicable all treatment processes available on board their vessel, including but not limited to fishmeal and fish oil production.

    Permittees must discharge effluents into hydrodynamically energetic waters with a high capacity of dilution and dispersion.

2. Wash-down water, which include disinfectants added to wash-down water to facilitate the removal of wastes and to maintain sanitary standards during processing or to sanitize seafood processing areas.

3. Sanitary wastewater must be discharged in accordance to U.S. Coast Guard regulations.

4. Other wastewater generated in the seafood processing operation, including, seafood catch transfer water, live tank water, refrigerated seawater, cooking water, boiler water, gray water, cooling water, refrigeration condensate, freshwater pressure relief water, clean-up water, and scrubber water.

2.3.2.2 Unauthorized discharges

The Draft Permit proposes to exclude any pollutants which are not expressly authorized in the Draft Permit. The Draft Permit also proposes to prohibit the discharge of petroleum (e.g., diesel, kerosene, and gasoline) or hazardous substances into or upon the navigable waters of the U.S., adjoining shorelines, into or upon the waters of the contiguous zone which may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the U.S., under 33 U.S.C.A. 1321(b)(3).

2.3.3 Receiving Waters

1. This General Permit authorizes discharges of pollutants into Federal Waters of the United States off the coast of Alaska (i.e., seaward of 3 nm from the coastal shoreline of Alaska), except where noted below.

2.3.4 Areas Excluded from Authorization under this General NPDES Permit

The Permit does not authorize the discharge of pollutants in the following circumstances:

A. Protected water resources, critical habitats and special areas:

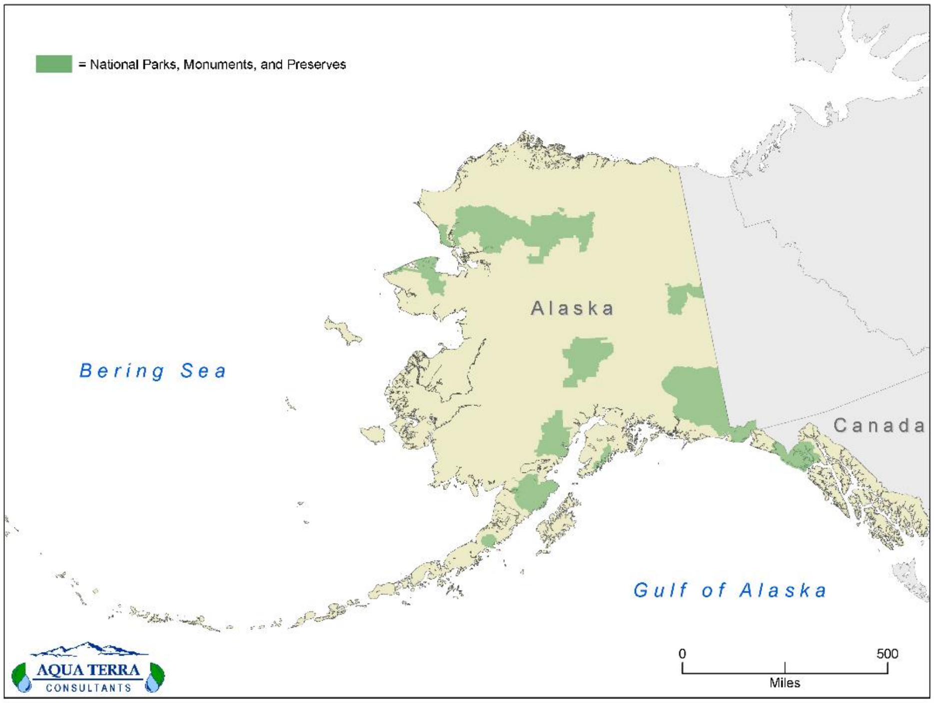

Figure 3: National parks, monuments, and preserves.
Sources: National Parks Service and ESRI.

1. Waters within one (1) nautical mile of the boundary of a National Park, Monument, or Preserve (Figure 2.7), any bay, fjord, or harbor enclosed by a National Park, Monument, or Preserve are excluded from coverage by the current permit.

   Congressional mandates and Presidential proclamations have provided that federal parks, monuments, and preserves be maintained to provide the scenic beauty and quality of landscapes in their natural state, to protect environmental integrity and habitat for and populations of fish and wildlife, including marine mammals, seabirds, and waterfowl, and to provide continued opportunities for wilderness recreational activities (16 U.S.C. 1 et. seq.). Of the national parks, monuments, and preserves in Alaska, only four coastal units (Aniakchak, Glacier Bay, Katmai Fjord, and Kenai Fjord) are proximal to commercial fisheries (EPA 2001a).

2. Waters within one (1) nautical mile of the boundary of a National Wildlife Refuge (Figure 2.8) are excluded from coverage under the current permit.

   National Wildlife Refuges are maintained to protect environmental integrity and populations of fish and wildlife and their habitats, as well as to provide the scenic beauty and quality of landscapes in their natural state and opportunities for wilderness recreational activities (16 U.S.C. 661 et seq.). Of the national wildlife refuges in Alaska, six coastal units (Alaska Maritime, Alaska Peninsula, Kenai, Kodiak, Togiak, and Yukon Delta) are proximal to commercial fisheries (EPA 2001a).

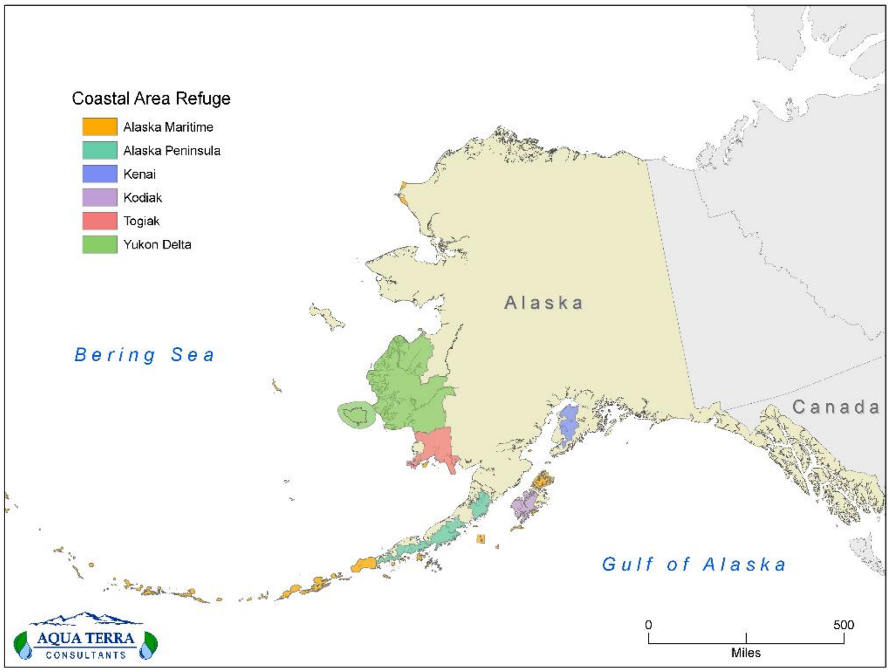

Figure 4: National wildlife refuges.
Sources: U.S. Fish and Wildlife Service and ESRI.

3. Waters within one (1) nautical mile of a National Wilderness Area

There are 48 designated Wilderness Areas in Alaska. The largest is the Wrangell-Saint Elias Wilderness and the smallest is the Hazy Islands Wilderness. The discharge of pollutants is not authorized within one (1) nm of a National Wilderness Area. The managing agencies in Alaska are U.S. Fish and Wildlife Service, Forest Service and the National Park Service. All the Alaskan Wilderness Areas are listed as follows:

1. Aleutian Islands Wilderness
2. Andreafsky Wilderness
3. Becharof Wilderness
4. Bering Sea Wilderness
5. Bogoslof Wilderness
6. Chamisso Wilderness
7. Chuck River Wilderness
8. Coronation Island Wilderness
9. Denali Wilderness
10. Endicott River Wilderness
11. Forrester Island Wilderness
12. Gates of the Arctic Wilderness

26. Misty Fjords National Monument Wilderness
27. Mollie Beattie Wilderness
28. Noatak Wilderness
29. Nunivak Wilderness
30. Petersburg Creek-Duncan Salt Chuck Wilderness
31. Pleasant/Lemusurier/Inian Islands Wilderness
32. Russell Fjord Wilderness
33. Saint Lazaria Wilderness
34. Selawik Wilderness

13. Glacier Bay Wilderness
14. Hazy Islands Wilderness
15.Innoko Wilderness
16.Izembek Wilderness
17.Karta River Wilderness
18.Katmai Wilderness
19. Kenai Wilderness
20. Kobuk Valley Wilderness
21.Kootznoowoo Wilderness
22.Koyukuk Wilderness
23.Kuiu Wilderness
24.Lake Clark Wilderness
25.Maurille Islands Wilderness
35.Semidi Wilderness
36.Simeonof Wilderness
37.South Baranof Wilderness
38.South Etolin Wilderness
39.South Prince of Wales Wilderness
40.Stikine-LeConte Wilderness
41.Tebenkof Bay Wilderness
42.Togiak Wilderness
43.Tracy Arm-Fords Terror Wilderness
44.Tuxedni Wilderness
45.Unimak Wilderness
46.Warren Island Wilderness
47.West Chichagof-Yakobi Wilderness
48.Wrangell-Saint Elias Wilderness

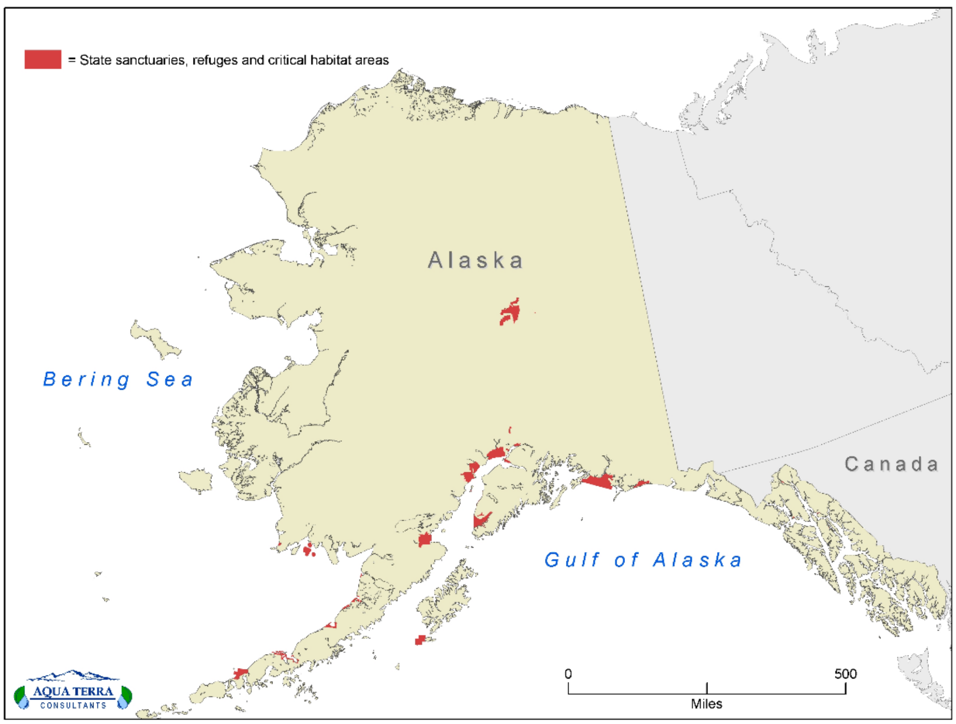

Figure 5: State sanctuaries, refuges and critical habitat areas (Legislatively
Sources: Alaska Dept of Fish and Game, ESRI.

4. Waters within one (1) nautical mile of the boundary of a State Game Sanctuary, Game Refuge, Park, Marine Park or Critical Habitat (Figure 2.7) are excluded from coverage by the current permit.

   The Alaska State Legislature has classified certain areas, designated as a sanctuary, refuge, or critical habitat, as being essential to the protection of fish and wildlife habitat (5 ACC Part 95). The three State sanctuaries are

Walrus Islands, McNeil River, and Stan Price. The twelve State refuges include Cape Newenham, Izembek, Trading Bay, Susitna Flats, Anchorage Coastal, Goose Bay, Palmer Hay Flats, Minto Flats, Cramer's Filed, Yakataga, Mendenhall Wetlands, and McNeil River. The sixteen State critical habitat areas include Egegik, Pilot Point, Cinder River, Port Heiden, Port Moller, Tugidak Island, Kalgin Island, Redoubt Bay, Willow Mountain, Clam Gulch, Anchor River and Fritz Creek, Fox River Flats, Kachemak Bay, Copper River Delta, Dude Creek, and Chilkat River (ADFG 1991).

5. Waters within three (3) nautical miles of a rookery or major haulout of the Steller sea lion are excluded from coverage by the current permit. In 1997, the Steller sea lion population was split into a western distinct population segment (DPS) and an eastern DPS based on demographic and genetic dissimilarities (FR 62(86):24345-24356). The National Marine Fisheries Service (NMFS) designated critical habitat for the eastern DPS Steller sea lion as waters within 3000ft (0.9km) of a rookery or major haulout of the Steller sea lion pursuant to the ESA. Critical habitat for the western DPS Steller sea lion, an "endangered" species, is designated as waters within 20 nm of each major rookery and major haulout in Alaska that is west of longitude 144°W. Three special aquatic areas are also designated as critical habitat in Alaska: Shelikof Strait area; Bogoslof area; and Seguam Pass area (50 CFR § 226.202).

   Pinniped rookeries and haulouts are vulnerable to disturbance and degradation by seafood processor discharges (EPA 2001b) and should be protected (Marine Mammal Protection Act, 16 U.S.C. 1361 et seq; 50 CFR 226). For regulatory purposes, the waterway boundary of rookeries and haulouts has been defined as MLLW. However, biologically, the boundaries are not easily delineated, for the surrounding nearshore waters are an integral component of these habitats, especially for foraging by post-parturient females and by young animals which are developing swimming and hunting behaviors. Conservation of rookeries, haulouts, and foraging areas are essential to the maintenance of pinniped populations in general and to the recovery of Steller sea lions populations in particular (EPA 2001a).

6. Waters within one (1) nautical mile of designated critical habitat for the Steller's eider, including nesting, molting and wintering units. During breeding season (May through August) Steller's eider nesting critical habitat units is located on the Yukon-Kuskokwim Delta and North Slope. Molting habitat (July through October) for Steller's eiders includes Izembek Lagoon, Nelson Lagoon and Seal Islands. Wintering habitat (October through March) for Steller's eider includes Nelson Lagoon, Izembek Lagoon, Cold Bay, Chignik Lagoon and several other locations along the Aleutian Islands.

7. Waters within one (1) nautical mile of designated critical habitat for the spectacled eider, with the seasonal exception noted below. During breeding season (May through August) spectacled eider nesting critical habitat is located on the Yukon-Kuskokwim Delta and North Slope. Molting habitat for spectacled eider includes Ledyard Bay and Norton Sound. Wintering habitat (October through March) for spectacled eider is in the Bering Sea between St. Lawrence and St. Matthews Islands. From June 10 through December 31,

discharge is permitted within 1 NM of spectacled eider critical habitat in USFWS-designated Wintering Area Unit 5. Discharge is not permitted within Unit 5 from January 1 through June 9.

8. "Living substrates", such as submerged aquatic vegetation, kelp and eelgrass in shallow coastal waters (generally less than minus 60 ft. depth MLLW).

B. At risk resources and waterbodies.

This Permit does not authorize the discharge of pollutants in the following at-risk water resources and waterbodies:

1. A discharge to less than 60 feet MLLW, with inadequate flushing.

Areas with poor or inadequate flushing may include but are not limited to sheltered waterbodies such as bays, harbors, inlets, coves, lagoons, and semi-enclosed water basins bordered by sills. For the purposes of this section, "poor flushing," means average currents of less than 0.33 of a knot at any point in the receiving water within 300 feet of the outfall. It is the responsibility of the permittee to prove adequate flushing in all cases where the discharge is less than 60 feet MLLW.

C. Areas covered by other NPDES permits.

1. This Permit does not authorize the discharge of pollutants to receiving waters covered by other general or individual NPDES permits.

2.3.5 Revision to the Grind Requirement

In the 2009 General Permit, the EPA applied the Seafood Processing ELGs described in 40 CFR Part 408 for "remote" Alaskan locations to the offshore Alaskan seafood processors. This requirement is to "grind solid seafood processing wastes to 0.5 inch or smaller in any dimension prior to discharge." The ELGs were promulgated in 1975 (see 40 CFR Part 408).

In 2013, the Freezer Longline Coalition petitioned the EPA regarding the grinding requirement which prompted the EPA to review the administrative record for the development of the remote Alaska seafood processing ELGs. After the review of the record, the EPA found that at the time the ELGs were promulgated, the offshore seafood processing industry was in its infancy. Thus, this part of the sector was not included when determining what was technologically and economically feasible. The EPA concluded that the remote Alaska seafood processing ELGs, which include the half inch size requirement, was not applicable to offshore seafood processors. As such, there are no applicable ELGs for the offshore seafood processing sector in Alaska.

The EPA was additionally asked by some Permittees under the 2009 General Permit to evaluate whether the grinding condition is technologically feasible as written for the offshore industry. Specifically, the Permittees had compliance concerns with regard to meeting the part of the permit limit that required them to grind the seafood waste to 0.5 inch “in any dimension”. The EPA evaluated whether it is impracticable for the offshore seafood processing industry to comply with the grind requirement of 0.5 inches or less “in any dimension.” Upon further review, the EPA concluded that due to the performance limitations for commercial grinders the requirement would be revised to “the grinding system must be designed and operated to grind solids to 0.5 inch or smaller prior to discharge.” This revised language was proposed in the 2017 Washington/Oregon Seafood General Permit.

In March 2018, Congress passed the Omnibus Agreement for Remainder of Fiscal Year 2018 (FY18 Omnibus) which contained the following directions regarding the implementation of the Alaska seafood processing ELGs in onshore and offshore Alaskan waters:

> “Under a Clean Water Act general permit, onshore seafood processors in Alaska are allowed to grind and discharge seafood waste. The permit requires that all seafood waste be ground to a size of no more than one-half inch in any dimension. Unfortunately, in some instances, the best available technology is unable to achieve a half inch grind dimension on a consistent basis due to the malleable nature of fish waste. The Agency should develop a policy to ensure that fish processors using the best available technology and/or best conventional practice will be considered in compliance. Additionally, processing vessels operating in waters off-shore of Alaska are subject to the same one-half inch grinding requirement even though there are no documented water quality issues that require such grinding. The Agency should exempt offshore processing vessels from the requirement.”

In response, the EPA has investigated whether the half-inch grind requirement could be removed to allow for the discharge of whole (unground) fish waste. This investigation evaluated the potential ecological effects of discontinuing the grinding requirement in offshore Alaskan waters through a literature review and interviewing subject matter experts. Results of the investigation tentatively concluded that impacts to the seafloor and water quality from the discharge of whole or ground fish are expected to be fairly minimal (ODCE, USEPA, et. al., 2018). The EPA currently lacks the resources to monitor the ecological and environmental impacts of ground versus unground discharge on the sea floor. The discharges occur at least three NM offshore and in waters with depths typically near 35 fathoms (210 feet). Deep-sea monitoring is difficult and expensive and would likely require the employment of a specialized research vessel. While grinding has been shown to increase the rate of settling and dispersion, the overall effects of discontinuing the grinding requirement in the Alaskan Ocean may be minimal for the following reasons:

- The offshore waters of the Bering Sea and Gulf of Alaska provide for highly turbulent and rapid mixing of the effluent. The combination of wind, tide and water depth greatly increases mixing and dispersion of discharges both whole and ground. This also minimizes concentrated oxygen consumption, sedimentation of solids, and potential impact on sea life and water quality.

- There is expected to be some removal of material from the water column by consumption or transformation (decay or loss).

- This Permit includes a BMP requiring vessels to be moving while discharging unless doing so would compromise the safety of the vessel. This BMP is expected to promote the dispersion of wastes and minimize accumulation on the sea floor.

- The 2009 ODCE included a modeling study which estimated the depth of accumulation at the sea floor from discharging ground effluent to be 0.5 centimeters deep. The EPA currently lacks the resources to monitor the ecological and environmental impacts of ground versus unground discharge on the sea floor. The discharges occur at least three NM offshore and in waters with depths typically near 35 fathoms (210 feet). Deep-sea monitoring is difficult and expensive, and would likely require the employment of a specialized research vessel.

In accordance with Section 7 of the Endangered Species Act, the EPA engaged the NMFS and the USFWS to understand the impact of removing the grinding requirement on ESA-listed species. Literature and subject matter experts at NMFS expressed concern to listed species if the grinding requirement were removed. NMFS believed that larger pieces of seafood waste are more attractive to the Steller sea lion. NMFS suspected that Steller sea lion foraging behavior would be disrupted if large pieces of its primary prey species were discharged by vessels. In contrast, USFWS expressed that the larger pieces of seafood waste may be less attractive to the short-tailed albatross, in other words, removing the grinding requirement may lessen the impact of the discharge on the short-tailed albatross.

As a result of the concerns raised by NMFS regarding potential impacts on Steller sea lion foraging behaviors, the EPA considered including a provision in the Permit that would require grinding only in cases where vessels discharge within the Steller sea lion critical habitat areas described in 50 CFR § 226.202. However, the EPA recognizes that the imposition of any grinding requirement could result in operational, economic, and safety challenges for the smaller vessels. In response, the EPA is providing an exemption to the grinding requirement in Steller sea lion critical habitat for the smaller vessels, using a discharge volume threshold of less than 10 million pounds per reporting year to delineate smaller vessels.

Additional discussion on consultation under Section 7 of the ESA is provided in Section X of the Fact Sheet, including NMFS' suggested mitigation measures for vessels exempt from grinding in Steller sea lion critical habitat. In summary, the EPA is proposing to remove the effluent grinding requirements for all vessels if discharge occurs outside of Steller sea lion critical habitat areas. Within Steller sea lion critical habitat areas, vessels that discharge less than 10 million pounds annually[2] will not be required to grind seafood waste prior to discharge, while vessels that discharge greater than 10 million pounds annually[1] will be required to grind seafood waste prior to discharge. Further, recognizing the performance limitations of commercial grinders expressed by the sector, the draft General Permit specifies that in cases where grinding is required prior to discharge, permittees must use grinding equipment that

[2] A Permittee is determined to discharge greater than 10 million pounds according to their annual discharge as reported in their NOI. This applies across all Alaska waters where discharges are authorized by the Permit.

is designed to grind seafood wastes to 0.5 inches or smaller, rather than applying a requirement to grind to 0.5 inch in any dimension. This change in wording allows pieces of seafood that are more difficult to grind, such as skin, to exceed the 0.5 inches in size as long as the grinder and grinding blades are operating in accordance with manufacturer recommendations and designed to grind pieces to 0.5 inches or smaller. This revised language is the same language that was used in the recently issued 2019 Washington/Oregon Seafood General Permit. Section V.A.3 of the draft Permit states:

Table 1: Revised Grind Requirement Language

2009 General Permit		Draft General Permit	
Permit §II.A.1.a:	"Permittees must grind solid seafood processing wastes to 0.5 inch or smaller in any dimension prior to discharge."	Permit §V.A.3:	If discharging in Steller sea lion critical habitat, permittees that discharge greater than 10 million pounds of seafood processing waste per annual report year must send all solid seafood processing wastes through a properly maintained and operating grinder system. The grinding system must be designed and operated to grind solids to 0.5 inch or smaller prior to discharge. A Permittee is determined to discharge greater than 10 million pounds according to their annual discharge as reported in their NOI. Critical habitat areas are designated by NMFS and identified in 50 CFR Part 226.202 and Tables 1 and 2 to Part 226.

2.3.6 Effluent Limitations

Sections 101, 301(b), 304, 308, 401, and 402 of the Clean Water Act (CWA) provide the basis for the effluent limitations and conditions of the permit. EPA first determines which technology-based limits apply to the discharges in accordance with the national effluent guidelines and standards (30 CFR 408). EPA then determines which water quality-based limits apply to the discharges.

2.3.6.1 Technology Based Limitations

The CWA requires particular categories of industrial dischargers to meet technology-based effluent limitations established by EPA. The CWA initially focused on the control of traditional pollutants (i.e., conventional pollutants and some metals) through the use of best practicable control technology currently available (BPT). For conventional pollutants (i.e., pH, BOD, TSS, oil and grease, and fecal coliform), CWA Section 301(b)(1)(E), 33 U.S.C. § 1311(b)(1)(E), requires the imposition of effluent limitations based on best conventional pollutant control technology (BCT). For nonconventional and toxic pollutants, CWA Section 301(b)(2)(A), (C), and (D), 33 U.S.C. §1311(b)(2)(A), (C), and (D), require the imposition of effluent limitations based on best available technology economically achievable (BAT). CWA Section 301(b), 33 U.S.C. § 1311(b), requires compliance with BCT and BAT no later than March 31, 1989. Where EPA has not yet developed guidelines for a particular industry, permit conditions must be established using Best Professional Judgment (BPJ) procedures (40 CFR 122.43, 122.44 and 125.3).

The EPA evaluated whether backsliding of the grinding requirement complies with the anti-backsliding provisions. As discussed above, the EPA reviewed the administrative record for the development of the remote Alaska seafood processing ELGs and found that the offshore sector in federal waters was not included when determining what was technologically and economically feasible. In the previous permit, the "0.5-inch grind" provision was mistakenly applied as a TBEL in accordance with the grinding ELG. Since the TBEL was misapplied due to a mistaken interpretation of the law, the EPA may remove the provision under the antibacksliding exception found at CWA Section 402(a)(1)(b).

2.3.6.2 Water Quality Based Limitations

This Draft General Permit will only authorize discharges to Federal waters. Therefore, Alaska State Water Quality Standards (18 AAC Part 70) will not apply.

2.3.7 Best Management Practices Plan

Purpose. Through implementation of a BMP Plan, a Permittee must prevent or minimize the generation and discharge of wastes and pollutants from the facility to the waters of the United States. Pollution should be prevented or reduced at the source. By-product recovery should be maximized where available. Potential pollutants should be recycled in an environmentally safe manner whenever feasible. The discharge of pollutants into the environment should be conducted in such a way as to have a minimal environmental impact.

1. Objectives. A Permittee must develop its BMP Plan consistent with the following objectives:
    1. The number and quantity of pollutants and the toxicity of the effluents that are generated, discharged, or potentially discharged from the facility must be minimized by a Permittee to the extent feasible by controlling each discharge or potential pollutant release.
    2. Evaluations for the control of discharges and potential releases of pollutants must include the following:
        i. Each facility component or system must be examined for its pollutant minimization opportunities and its potential for causing a release of significant amounts of pollutants to receiving waters due to the failure or improper operation of equipment. The examination must include all normal operations (including raw material and product storage areas), in-plant conveyance of product, processing and product handling areas, loading or

unloading operations, wastewater treatment areas, sludge and waste disposal areas, and refueling areas.

ii. Equipment must be examined for potential failure and any resulting release of pollutants to receiving waters. Provision must be made for emergency measures to be taken in such an event.

3. Under the BMP plan and any Standard Operating Procedures (SOPs) included in the plan, the Permittee must ensure the proper operation and maintenance of the facility and the control of the discharge or potential release of pollutants to the receiving water.

2. Requirements. The BMP Plan must be consistent with the purpose and objectives in Parts VI.A.3 and 4 and must include the following:
   1. The BMP Plan must be consistent with the general guidance contained in the publication entitled "Guidance Manual for Developing Best Management Practices", USEPA 1993, or its subsequent revisions and "Seafood Processing Handbook for Materials Accounting Audits and Best Management Practices Plans, EPA and Bottomline Performance, 1995 (available on EPA Region 10's General Permits website, or at https://www3.epa.gov/npdes/pubs/owm0274.pdf; https://www.epa.gov/sites/production/files/2017-10/documents/r10-npdes-ak-offshore-seafood-akg524000-seafood-processing-handbook-1995.pdf
   2. The BMP Plan must be documented in narrative form, must include any necessary plot plans, drawings or maps, and must be developed in accordance with good engineering practices. The BMP Plan must be organized and written with the following structure:

(1) Name and physical location(s) of the vessel;
(2) Statement of BMP policy;
The policy statement provides two major functions: (1) it demonstrates and reinforces management's support of the BMP Plan, and (2) it describes the intent and goals of the BMP Plan.
(3) Materials accounting of the inputs, processes and outputs of the facility;
Materials accounting is used to trace the inflow and outflow of components in a process stream and to establish quantities of these components.

Inflow = outflow + accumulation

Example 1: For the entire facility

- Inflow = Seafood catch, fresh water, salt water, cleaning chemicals, processing additives, boiler or cook water.
- Accumulation = Product, including by-products produced
- Outflow = Inflow minus accumulation

Example 2: Process step of head-and-gut

- Inflow = Whole seafood, cleaning water
- Accumulation = Headed and gutted seafood (to next process step)
- Outflow = Heads, guts, blood, slime, scales, trimmings, unusable seafood, water.

As can be seen from the above examples, the flows can be broken down into components. Identifying and measuring the key components for a process is the basis for doing materials accounting audits. If secondary by-products are produced, such as fish meal, the Permittee must estimate or measure the volume lost to the atmosphere through water vapor. The calculation used to measure vapor must be reported to the EPA in the Annual Report.

3. Risk identification and assessment of pollutant discharges;
    1. Review existing materials and plans, as a source of information, to ensure consistency and to eliminate duplication.
    2. Characterize actual and potential pollutant sources that might be subject to release.
    3. Evaluate potential pollutants based on the hazards they present to human health and the environment. This includes minimizing toxic disinfection use where applicable, as disinfectants are known to be toxic to marine organisms at relatively low concentrations.
    4. Identify pathways through which pollutants identified at the site might reach environmental and human receptors.
    5. Identify pathways through which pollutants identified at the site might reach environmental and human receptors.
    6. Prioritize potential releases.

4. Specific management practices and standard operating procedures to achieve the above objectives, including, but not limited to:
    1. The modification of equipment, facilities, technology, processes and procedures;
    2. The improvement in management, inventory control, materials handling or general operational phases of the facility; and
    3. To reduce or eliminate any discharge of wastes that have the potential to collect and foul set or drift nets used in subsistence or commercial fisheries in nearby traditional use areas.

5. Good housekeeping;
   Good housekeeping means the maintenance of a clean, orderly work environment. Maintaining an orderly facility means that materials and equipment are neat and well-kept to prevent releases to the environment.

6. Preventative maintenance;
   Preventative maintenance means periodically inspecting, maintaining, and testing plant equipment and systems to uncover conditions that can cause breakdowns or failures. Preventative maintenance is periodically inspecting, maintaining, and testing plant equipment and systems to uncover conditions that can cause breakdowns or failures. Preventative maintenance focuses on preventing environmental releases.

7. Inspections and records;
    1. Inspections provide an ongoing method to detect and identify sources of actual or potential releases. Inspections are effective in evaluating the good housekeeping and preventative maintenance programs.
    2. Recordkeeping focuses on maintaining records that are pertinent to actual or potential environmental releases. These records may include the BMP Plan itself, inspection reports, preventative maintenance records, and employee training materials.

8. Employee training:
   Employee training is a method used to instill in personnel, at all levels of responsibility, a complete understanding of the BMP Plan, including the reasons for developing the plan, the positive impacts of the plan, and employee and managerial responsibilities under the BMP Plan.

9. Moving while discharging:
   Vessels should be moving while discharging in order to aid dispersion of the discharge, unless doing so would compromise the safety of the vessel.

10. The BMP Plan must include the following provisions concerning its review:
    1. Be reviewed by the facility manager and appropriate staff; and
    2. Include a statement that the above review has been completed and that the BMP Plan fulfills the requirements set forth in this Permit. The statement must be certified by the dated signature of the facility manager.

11. Documentation:
    1. A new Permittee must submit to EPA written certification (in accordance with IX.E), signed by a principal officer or a duly appointed representative of the Permittee, of the development and implementation of its BMP Plan, upon completion of the BMP Plan. The certification must be received by EPA no later than 60 days after authorization.
    2. A continuing Permittee must review its BMP Plan and resubmit certification that the BMP Plan has been reviewed and revised as-needed with its NOI.
    3. Each Permittee must maintain a copy of its BMP Plan on-board the vessel and must make the plan available to EPA upon request.
    4. All business offices and/or operational sites of a Permittee which are required to maintain a copy of this Permit and authorization must also maintain a copy of the BMP Plan and make it available to EPA inspectors upon request.

12. Modification:
    1. A Permittee must amend the BMP Plan whenever there is a change in the facility or in the operation of the facility which materially increases the generation of pollutants and their release or potential release to the receiving waters.
    2. A Permittee must also amend the Plan, as appropriate, when facility operations covered by the BMP Plan change. Any such changes to the BMP Plan must be consistent with the objectives and specific requirements listed. All changes in the BMP Plan must be reviewed by the facility manager.

       a. At any time, if a BMP Plan proves to be ineffective in achieving the general objective of preventing and minimizing the generation of pollutants and their release, the BMP Plan must be modified to incorporate revised BMP requirements.

2.3.8 Sea Surface Visual Monitoring Requirements

Applicability. During the term of this General Permit, the Permittee must conduct a sea surface monitoring program.

The draft General Permit includes a new provision intended to ensure compliance with marine water quality criteria and to monitor potential interactions with ESA-listed species. The requirements of the sea surface monitoring program are detailed in Part VI.C. of the draft General Permit. Logs of this monitoring must be kept on-board the vessel and submitted to the EPA with the Annual Report.

The sea surface monitoring must estimate the occurrence and number of the following ESA-listed species attracted to the discharge identified within the survey area: short-tailed albatross (Phoebastria albatrus), spectacled eider (Somateria fischeri), Steller's eider (Polysticta stelleri), and Steller sea lion (Eumetopias jubatus) (Permit Section VI.C.3(3)). This condition will collect information on endangered species interactions with the offshore processing industry.

2.3.9 Other Monitoring and Reporting Requirements

1. Waste Conveyance system:

    The waste conveyance and waste treatment system must be inspected daily whenever seafood processing occurs. This inspection is necessary to ensure that miscellaneous items (e.g., earplugs, rubber bands, etc.) are not entrained within the conveyance system and discharged through the outfall. A daily log must be maintained on site, and the results of the inspection must be submitted at the request of the EPA.

2. Outfall System

    A pre-operational check of the outfall system must be performed at the beginning of each processing season to ensure that the outfall system is operable. Any failure of the outfall system must be reported to the EPA in accordance with Part VII.G.

3. Representative Pictures

    For each outfall location, the Permittee must take at least four pictures quarterly while processing is occurring. Each quarter the four pictures must include at least one of each of the following:

a) The receiving water in the immediate vicinity of where the outfall system is discharging;
b) An extended view of the receiving water showing processing waste (if any) on the sea surface behind the vessel; and
c) An extended view from the sides of/or behind the vessel showing any interactions with seabirds or marine mammals (if any).
d) The effluent sample (showing residues size), in cases where grinding of seafood waste is required under Section V.A.3 of the Permit.

Each picture must be labelled with date, time, name of person taking the picture, and a description of what the picture represents.

See the Notice of Intent and Annual Report for details (Attachments to the re-proposed Draft General Permit).

2.4 ACTION AREA

Alaska is the largest state in the United States with a total area of 1,593,438 square kilometers (km^2), including 70,849 km^2 of coastal waters and approximately 690,000 km^2 of wetlands with more than 8,000 km^2 of estuarine wetlands (low-wave energy environments), approximately 190 km^2 of marine wetlands (high-energy wave environments), and 15,000 identified anadromous waterbodies. Alaska's major offshore marine fisheries include the Bering Sea, Aleutian Islands and Gulf of Alaska (NMFS 2005).

2.4.1 Gulf of Alaska

The Gulf of Alaska (GOA) has approximately 160,000 km^2 of continental shelf and a relatively open marine system with landmasses to the east and the north. The fish fauna of the GOA consists of a mix of temperate and subarctic species, resulting in a large gradient in species composition along the shelf from the eastern to the western GOA (Mueter and Norcross 2002) and at least 384 fish species have been reported (Mueter 2004).

Commercial species are more diverse in the GOA than in the Bering Sea, but less diverse than in the Washington-California region. The most diverse set of species in the GOA is the rockfish group; 30 species have been identified in this area (NMFS 2005). GOA also supports other commercially important fisheries including pollock, salmon, Pacific halibut, Pacific herring, crab and shrimp (Mueter 2004). Additionally, at least 18 species of marine mammals and 38 species of marine birds use the shelf and offshore habitats of the GOA (Hunt et al. 2000).

The dominant circulation in GOA (Musgrave et al. 1992) is characterized by the cyclonic flow of the Alaska gyre. The circulation consists of the eastward-flowing Subarctic Current system at approximately 50º N and the Alaska Coastal Current (Alaska Stream) system along the northern GOA. Large seasonal variations in the wind-stress curl in the GOA affect the meanders of the Alaska Stream and nearshore eddies. The variations in these nearshore flows and eddies affect much of the region's biological variability (NMFS 2005).

2.4.2 Bering Sea

The Bering Sea (BS) is a semi-enclosed, high-latitude sea. Of its total area of 2.3 million km^2, 44% is continental shelf, 13% is continental slope, and 43% is deep-water basin. Its broad continental shelf is one of the most biologically productive areas of the world. The BS contains approximately 300 species of fish, 150 species of crustaceans and mollusks, 50 species of seabirds, and 26 species of marine mammals (Livingston and Tjelmeland 2000). However, commercial fish species diversity is lower in the BS than in the GOA (NMFS 2005).

A special feature of the BS is the pack ice that covers most of its eastern and northern continental shelf during winter and spring. The dominant circulation of the water begins with the passage of North Pacific water (the Alaska Stream) into the BS through the major passes in the Aleutian Islands (Favorite et al. 1976). There is net water transport eastward along the north side of the Aleutian Islands and a turn northward at the continental shelf break and at the eastern perimeter of Bristol Bay. Eventually BS water exits northward or westward and south along the Russian coast, entering the western North Pacific via the Kamchatka Strait. Some resident water joins new North Pacific water entering Near Strait, which sustains a permanent cyclonic gyre around the deep basin in the central BS (NMFS 2005).

Three fronts, the outer, mid-, and inner shelves, follow along the 200, 100, and 50m bathymetric contours, respectively; thus, four separate oceanographic domains appear as bands along the broad BS shelf. The oceanographic domains are the deep water (more than 200m), the outer shelf (200–100m), the mid-shelf (100–50m), and the inner shelf (less than 50m). The vertical physical system also regulates the biological processes that lead to separate cycles of nutrient regeneration. The source of nutrients for the outer shelf is the deep oceanic water; for the mid-shelf, it is the shelf-bottom water. Starting in winter, surface waters across the shelf are high in nutrients. Spring surface heating stabilizes the water column; then the spring bloom begins and consumes the nutrients. Steep seasonal thermoclines over the deep BS (30–50m), the outer shelf (20–50m), and the mid-shelf (10–50m) restrict vertical mixing of water between the upper and lower layers. Below these seasonal thermoclines, nutrient concentrations in the outer shelf water invariably are higher than those in the deep BS water with the same salinity. Winter values for nitrate-N/phosphate-P are similar to the summer ratios, which suggests that, even in winter, the mixing of water between the mid-shelf and the outer shelf domains is substantially restricted (Hattori and Goering 1986).

Important water column properties over the BS include temperature, salinity, and density. These properties remain constant with depth in the near-surface mixed-layer, which varies from approximately 10 to 30 m in summer to approximately 30 to 60 m in winter (Reed 1984). The inner shelf (less than 50 m) is one layer and is well mixed most of the time. On the middle shelf (50 to 100 m), a two-layer temperature and salinity structure exists because of downward mixing of wind and upward mixing due to relatively strong tidal currents (Kinder and Schumacher 1981). On the outer shelf (100 to 200 m), a three-layer temperature and salinity structure exists due to downward mixing by wind, horizontal mixing with oceanic water, and upward mixing from the bottom friction due to relatively strong tidal currents (NMFS 2005).

2.4.3 Aleutian Islands

The Aleutian Islands (AI) lie in an arc that forms a partial geographic barrier to the exchange of northern Pacific marine waters with BS waters. The AI continental shelf is narrow compared with the BS shelf, ranging in width on the north and south sides of the islands from about 4 km or less to 42 to 46 km. The AI comprises approximately 150 islands and extends about 2,260 km in length (NMFS 2005).

The patterns of water density, salinity, and temperature are very similar to the GOA. Along the edge of the shelf in the Alaska Stream, a low salinity (less than 32.0 ppt) tongue-like feature protrudes westward. On the south side of the central AI, nearshore surface salinities can reach as high as 33.3 ppt, as the higher salinity BS surface water occasionally mixes southward through the AI. Proceeding southward, a minimum of approximately 32.2 ppt is usually present over the slope in the Alaska Stream; values then rise to above 32.6 ppt in the oceanic water offshore. Whereas, surface salinity increases toward the west as the source of fresh water from the land decreases, salinity values near 1,500 m decrease very slightly. Temperature values at all depths decrease toward the west (NMFS 2005).

2.4.4 Anadromous Fisheries Waters

There are 16,000 streams, rivers or lakes in Alaska that have been specified as being important for the spawning, rearing, or migration of anadromous fish. It is estimated that at least 20,000 or more anadromous water bodies have not yet been identified (ADFG 2006). Identified waters are outlined in The Alaska Department of Fish and Game's *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes* (Johnson and Weiss 2006a - 2006f). Anadromous species in Alaska include forms of Pacific trout and salmon of the genus *Oncorhynchus* (rainbow trout/steelhead and cutthroat trout and Chinook, coho, sockeye, chum and pink salmon), Arctic char, Dolly Varden, sheefish, smelts, lamprey, whitefish, and sturgeon (ADFG 2006). These waters are not within the action area of the proposed General Permit. However, they are connected to the habitats and migrational corridors of many threatened and endangered species encountered 3 nm or greater from the Alaskan shore.

3.0 THREATENED AND ENDANGERED SPECIES

The ESA of 1973, as amended (16 U.S.C. 1531 *et seq*; ESA), provides for the conservation of endangered and threatened species of animals and plants. The designation of an ESA-listed species is based on the biological health of that species. The status determination is either threatened or endangered. Threatened species are those likely to become endangered in the foreseeable future (16 U.S.C. § 1532[20]). Endangered species are those in danger of becoming extinct throughout all or a significant portion of their range (16 U.S.C. § 1532[20]). Species may also be designated as candidate species if there is enough information to warrant proposing them for listing, but that have not yet been proposed because of higher listing priorities (USFWS 2006a).

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

Federal agencies have an affirmative mandate to conserve listed species. Federal actions, activities, or authorizations must be in compliance with the provisions of ESA. Section 7 of ESA provides a mechanism for consultation by the federal action agency with the appropriate expert agency (NMFS or USFWS). Table 3 lists the 21 species (or populations) located in Alaska that are currently listed as endangered, threatened, or candidate species under the ESA (updated October 10, 2017). EPA is requesting that the Services verify the respective species under each jurisdiction in the list below at the time of requesting consultation.

Table 3: Endangered, Threatened and Candidate species in Alaska pursuant to the Endangered Species Act

SPECIES AND STATUS		RANGE IN ALASKA	CRITICAL HABITAT IN ALASKA
Endangered			
Short-tailed albatross	(*Phoebastria albatrus*)	U.S. Territorial waters, Gulf of Alaska, Aleutian Islands, Bering Sea	No
Western DPS Steller sea lion (west of 144^{o})	(*Eumetopias jubatus*)	Bering Sea, Aleutian Islands, Cook Inlet, Gulf of Alaska, SE Alaska	Yes
Blue whale	(*Balaenoptera musculus*)	Bering Sea, Gulf of Alaska, N. Pacific	No
Bowhead whale	(*Balaena mysticetus*)	Chukchi Sea, Beaufort Sea, Bering Sea	No
Fin whale	(*Balaenoptera physalus*)	Chukchi Sea, Bering Sea, Cook Inlet, Gulf of Alaska, SE Alaska, Aleutian Islands, N. Pacific	No
Western North Pacific DPS Humpback whale	(*Megaptera novaeangliae*)	Beaufort Sea, Chukchi Sea, Cook Inlet, Bering Sea, Gulf of Alaska, Aleutian Islands, N. Pacific	No
North Pacific right whale	(*Eubalaena japonica*)	Bering Sea, Gulf of Alaska, N. Pacific	Yes
Sei whale	(*Balaenoptera borealis*)	Gulf of Alaska, SW Bering Sea, Aleutian Islands, N. Pacific	No
Sperm whale	(*Physeter macrocephalus*)	Bering Sea, Gulf of Alaska, SE Alaska, Aleutian Islands, N. Pacific	No
Cook Inlet DPS beluga whale	(*Delphinapterus leucas*)	Cook Inlet	Yes

Western North Pacific DPS Gray whale	(Eschrichtius robustus)	Beaufort, Chukchi and Bering Sea	No
Leatherback sea turtle	(*Dermochelys coriacea*)	Gulf of Alaska to North Pacific Coast	No
Threatened			
Spectacled eider	(*Somateria fischeri*)	Yukon Delta, Arctic Coastal Plain, St. Lawrence Island, Bering Sea, Chukchi Sea, and Beaufort Sea	Yes
Steller's eider	(*Polysticta stelleri*)	Arctic Coastal Plain, Yukon Delta, all coastal waters except southeast Alaska	Yes
Polar bear	(*Ursus maritimus*)	On sea ice and coastlines of Beaufort, Chukchi and Bering Seas	No
Northern sea otter (Southwest Alaska Population)	(*Enhydra lutris kenyoni*)	Aleutian Islands, Alaska Peninsula, Kodiak Island	Yes
Loggerhead sea turtle	(*Caretta caretta*)	Gulf of Alaska	No
Green sea turtle	(*Chelonia mydas* incl. *agassizi*)	Gulf of Alaska	No
Olive Ridley sea turtle	(Lepidochelys olivacea)	Gulf of Alaska	No
Ringed seal	(Phoca hispida hispida)	Beaufort, Chukchi and Bering Sea	Yes
Beringia DPS Bearded seal	(Erignathus barbatus nauticus)	Beaufort, Chukchi and Bering Sea	No
Candidate			
None Listed		0O	

3.1 FISH

West Coast salmon species currently listed under ESA originate in freshwater habitat in Washington, Oregon, Idaho, and California. No stocks of Pacific salmon or steelhead originating from freshwater habitat in Alaska are listed under ESA. However, some of the listed species migrate as adults into marine waters off Alaska (NMFS 2005).

ESA-listed West Coast salmon and steelhead species are summarized in Table 3.2 and are categorized by Evolutionarily Significant Units (ESUs), which are distinct population segments (DPS) that are reproductively isolated and contribute to the ecological or genetic diversity of the species (Waples 1991). The ESA defines a “species” to include any distinct population segment of any species. For Pacific salmon, NOAA considers an ESU, a “species” under the ESA.

Those ESUs that are most likely to migrate into marine waters off Alaska include Chinook salmon, sockeye salmon, or steelhead from rivers in Washington and Oregon (NMFS 2005). These may include the Chinook salmon Snake River fall run ESU; and the steelhead Upper Columbia River, Snake River Basin, and Lower Columbia River ESUs (NMFS 2005).

Table 4: Endangered Species Act Status of West Coast Salmon and Steelhead

SPECIES		EVOLUTIONARILY SIGNIFICANT UNIT	STATUS	CRITICAL HABITAT IN ALASKA
Chinook salmon	(*Oncorhynchus tshawytscha*)	Sacramento River Winter-Run	Endangered	No
		Snake River Fall	Threatened	No
		Snake River Spring/Summer	Threatened	No
		Puget Sound	Threatened	No
		Lower Columbia River	Threatened	No
		Upper Willamette River	Threatened	No
		Upper Columbia River Spring	Endangered	No
		Central Valley Spring	Threatened	No
		California coastal	Threatened	No
Chum salmon	(*O. keta*)	Hood Canal Summer-Run	Threatened	No
		Columbia River	Threatened	No
Coho salmon	(*O. kisutch*)	Central California Coast	Endangered	No
		S. Oregon/ N. California Coast	Threatened	No
		Lower Columbia River	Threatened	No
Sockeye salmon	*(O. nerka)*	**Snake River**	Endangered	No
Steelhead	(*O. mykiss*)	Southern California	Endangered	No
		South-Central California	Threatened	No
		Central California Coast	Threatened	No
		Upper Columbia River	Threatened	No
		Snake River Basin	Threatened	No
		Lower Columbia River	Threatened	No
		Central Valley California	Threatened	No
		Upper Willamette River	Threatened	No
		Middle Columbia River	Threatened	No
		Northern California	Threatened	No
		Puget Sound	Proposed Threatened	No

[1] The ESA defines "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries considers an Evolutionarily Significant Unit (ESU) a "species" under the ESA. For Pacific steelhead, NOAA Fisheries has delineated Distinct Population Segments (DPSs) for consideration as "species" under the ESA.
Bold = These species spawn on the West Coast of the Lower 48, but may occur in Alaskan waters during the marine phase of their life cycles

3.1.1 Chinook Salmon

The Snake River fall run of Chinook salmon (*Oncorhynchus tshawytscha)* has been designated as threatened since April 22, 1992 (FR 57 (78): 14653-14664).

Species range

In the U.S., Chinook salmon are found from the Bering Strait area off Alaska south to Southern California.

Critical habitat

The critical habitat for the Snake River fall Chinook salmon was listed on December 28, 1993 (FR 58 (247): 68543-68555). The designated critical habitat does not include any waters within the state of Alaska.

Life history and ecology

Adults migrate from a marine environment into the freshwater streams and rivers of their birth in order to mate (called anadromy). They spawn only once and then die (called semelparity) (NMFS 2016f). Two distinct races have evolved among Chinook salmon. The stream-type race of Chinook salmon is found most commonly in headwater streams. Stream-type Chinook salmon have a longer fresh water residency, and demonstrate extensive offshore migrations into the North Pacific before returning to their natal streams in the spring or summer months (NMFS 2016f; Healy 1991). The ocean-type Chinook are commonly found in coastal streams in North America. Ocean-type Chinook migrate to sea where they tend to spend their ocean life in coastal waters within about 1,000km from their natal river (NMFS 2016f; Healy 1991).

Ocean-type Chinook salmon return to their natal streams or rivers in spring, winter, fall, summer, and late-fall runs; however, summer and fall runs predominate. These runs have been identified on the basis of when adult Chinook salmon enter freshwater to begin their spawning migration. However, distinct runs also differ in the degree of maturation at the time of river entry, the temperature and flow characteristics of their spawning site, and their actual time of spawning. Freshwater entry and spawning timing are believed to be related to local temperature and water flow regimes (NMFS 2016f).

Adult female Chinook will prepare a redd (or nest) in a stream area with suitable gravel type composition, water depth, and velocity. The adult female Chinook may deposit eggs in 4-5 "nesting pockets" within a single redd. Spawning sites have larger gravel and more water flow up through the gravel than the sites used by other Pacific salmon. Eggs are deposited at a time to ensure that young salmon fry emerge during the following spring when the river or estuary productivity is sufficient for juvenile survival and growth. Juvenile Chinook may spend from 3 months to 2 years in freshwater before migrating to estuarine areas as smolts and then into the ocean to feed and mature. They prefer streams that are deeper and larger than those used by other Pacific salmon species. Chinook feed on insects, amphipods, and other crustaceans while young, and mainly fish when older (NMFS 2016f).

Population trends and risks

All three existing Upper Columbia River spring-run Chinook salmon populations have exhibited similar trends and patterns in abundance over the past 40 years. Analysis of data between 1996 through 2001 reported that long-term trends in abundance for upper Columbia River spring-run Chinook salmon populations were generally negative (Good, T. P., R. S. Waples, P. Adams, and (editors). 2005). This trend has continued in the Wenatchee and Methow systems, where short- and long-term trends continued downward.

Current risks to Chinook include harvesting, passage mortalities associated with mainstem hydroelectric projects, pollution, and habitat modification. The continued straying by nonnative hatchery fish into natural production areas is an additional source of risk (NMFS 2016e and Good, T. P., R. S. Waples, P. Adams, and (editors). 2005).

3.1.2 Sockeye Salmon

Sockeye salmon in the Snake River drainage were listed as endangered under ESA in 1991 (56 FR 58619).

Species range

The natural range of sockeye salmon was associated with lake systems accessible to the ocean around the northern Pacific rim from northern California to Japan (Scott and Crossman 1973). In Idaho, sockeye salmon historically spawned and reared in the large lakes accessible to the ocean (Payette and Salmon River drainages). The Payette Lake population was eliminated in the early 1900s due to dam construction on the Payette River. Currently sockeye salmon are only found in lakes in the Stanley basin of the upper Salmon River, primarily Redfish and Alturas lakes. Additionally, they migrate to and from the ocean through the Salmon, Snake and Columbia rivers.

Critical habitat

Critical habitat for Snake River Sockeye Salmon was designated on December 28, 1993 (NMFS 1993). It includes the juvenile and adult migration corridor to the Pacific Ocean: the Columbia River and its estuary, the Snake River, and the main fork of the Salmon River up to the Sawtooth Valley and the site of current spawning, Redfish Lake. Other historical nursery areas that are essential to the conservation of the species and identified as critical habitat include Alturas, ESA Recovery Plan: Snake River Sockeye Salmon | 104 June 2015| NOAA Fisheries Pettit, Stanley, and Yellowbelly Lakes and their inlet and outlet creeks, Alturas Lake Creek, and that portion of Valley Creek between Stanley Lake Creek and the Salmon River (NMFS 2015b).

Life history and ecology

Sockeye salmon in the Snake River basin are an anadromous species which have life history patterns that depend on the fresh water lakes and access to the ocean. They spawn in gravel areas in lakes, where the juveniles rear for 1 to 3 years prior to migrating to sea. There are also 2 resident life forms, 1 more closely resembles sockeye salmon life history traits in that it spawns in lakes in late fall with most juveniles remaining in the lake, maturing and spawning without rearing in the ocean. Additionally, the more common resident form known as kokanee spawns in tributary streams to the lake during late summer\early fall. While in freshwater lakes, sockeye salmon prefer temperatures near 10 C (50 F). Juvenile sockeye salmon (smolts) migrate to the ocean at ages 1–3 and sizes of 7–18 cm (3–7 in) (Wydoski and Whitney 2003). After 1–3 years in the ocean, they return as mature adults reaching the upper Salmon River lakes in mid-summer. Adults returning to Idaho weigh 1–2 kg (3–5 lbs). During their freshwater life, juveniles feed largely on zooplankton, in the ocean they feed upon marine zooplankton and small fish.

Population trends and risks

Adult returns the last six years ranged from a high of 1,579 fish in 2014 (including 453 natural-origin fish) to a low of 257 adults in 2012 (including 52 natural-origin fish). Sockeye Salmon returns to Alturas Lake ranged from one fish in 2002 to 14 fish in 2010. No fish returned to Alturas Lake in 2012, 2013, or 2014 (NMFS 2015b). The decline of the Snake River Sockeye Salmon ESU is the result of widespread habitat degradation, impaired mainstem and tributary passage, historical commercial fisheries, chemical treatment of Sawtooth Valley lakes in the 1950s and 1960s, and poor ocean conditions. These combined factors reduced the number of Sockeye Salmon to the single digits. The decline in abundance itself has become a major limiting factor, making the remaining population vulnerable to catastrophic loss and posing significant risks to genetic diversity.

3.1.3 Steelhead (Upper Columbia River DPS)

The Upper Columbia river fall run evolutionarily significant unit (ESU) of steelhead trout (*Oncorhynchus mykiss*) *was* designated as endangered on August 18, 1997 (FR 62 (159): 43937-43955), and upgraded to threatened January 5, 2006 (FR 71 (3): 834-864). The Snake River run ESU was designated as threatened August 18, 1997 (FR 62 (159): 43937-43955) and the Lower Columbia River run ESU was designated as threatened March 19, 1998 (63 FR (53) 13347-13372).

Species range

In the United States, steelhead trout are found along the entire Pacific Coast. The Upper Columbia DPS of steelhead originate below natural and manmade impassable barriers from the Columbia River and its tributaries upstream of the Yakima River to the U.S.-Canada border. Also, steelhead from six artificial propagation programs: the Wenatchee River Program; Wells Hatchery Program (in the Methow and Okanogan Rivers); Winthrop National Fish Hatchery Program; Omak Creek Program; and the Ringold Hatchery Program (70 FR 52630 – 52858).

Critical habitat

Critical habitat for the Upper Columbia River ESU, the Snake River ESU, and the Lower Columbia River ESU was designated September 2, 2005 (FR 70 (170): 52630-52860). The designated critical habitat does not include any waters within the state of Alaska.

Life history and ecology

Adults migrate from a marine environment into the freshwater streams and rivers of their birth in order to mate (called anadromy). Unlike other Pacific salmonids, they can spawn more than one time (called iteroparity). Migrations can be hundreds of miles (NMFS 2016g).

Steelhead can be divided into two basic reproductive types, stream- or ocean-maturing, based on the state of sexual maturity at the time of river entry and duration of spawning migration. The stream-maturing type (summer-run in the Pacific Northwest and northern California) enters freshwater in a sexually immature condition between May and October and requires several months to mature and spawn. The ocean-maturing type (winter-run in the Pacific Northwest and northern California) enters freshwater between November and April, with well-developed gonads and spawns shortly thereafter. Coastal streams are dominated by winter-run steelhead; whereas, inland steelhead of the Columbia River basin are almost exclusively summer-run steelhead (NMFS 2016g).

Adult female steelhead will prepare a redd (or nest) in a stream area with suitable gravel type composition, water depth, and velocity. The adult female may deposit eggs in 4-5 "nesting pockets" within a single redd. The eggs hatch in 3 to 4 weeks. Young animals feed primarily on zooplankton. Adults feed on aquatic and terrestrial insects, mollusks, crustaceans, fish eggs, minnows, and other small fishes (including other trout) (NMFS 2016g).

Population trends and risks

Spawning abundance estimates were available for most Upper Columbia DPS populations from 1999 through 2008. All population trends with available data showed no significant trend, with approximately equal growth and decline. Threats include habitat alternation and direct mortality associated with water storage, withdrawal, conveyance, and hydropower, as well as stream bed alteration, increased predator populations due the introduction of non-native species and modification in habitat (NMFS 2016g).

3.2 BIRDS

3.2.1 Short-tailed Albatross

The short-tailed albatross (Phoebastria albatrus) was originally listed in 1970, under the Endangered Species Conservation Act of 1969, prior to the passage of today’s ESA (35 FR 8495). However, as a result of an administrative error (and not from any biological evaluation of status), the species was listed as endangered throughout its range except within the United States (50 CFR 17.11). On July 31, 2000, this error was corrected when the Service published a final rule listing the short-tailed albatross as endangered throughout its range (65 FR 46643). Five-year reviews conducted by USFWS in 2009 and 2014 validate the continuation of this species' Endangered status (USFWS 2009; 2014).

<u>Species range</u>

The range of the short-tailed albatross includes most of the North Pacific Ocean, as shown in Figure 3.17. Both adult and juvenile birds extensively use areas of the western Pacific east of Japan. During most of the incubation period and all of chick rearing, adult albatrosses foraged extensively in these waters (Suryan et al., 2007). Albatrosses used the outer Bering Sea shelf most during summer and fall, with a clear pattern of moving north to the northern submarine canyons (Navarin, Pervenets, Zemchug) in late summer and fall (Zador and Fitzgerald 2008, O'Connor 2013). During winter birds moved south, but in Alaska they continued to occupy the southeastern Bering Sea, Aleutian Islands, and Gulf of Alaska (O'Connor 2013). Both adult and juvenile short-tailed make extensive use of the waters among the Kurile Islands, Aleutian Islands, and the outer Bering Sea Continental shelf (Suryan et al., 2006, Suryan and Fischer 2010, Deguchi et al., 2014; Kuletz et al., 2014).

As of 2013, approximately 78% of the known breeding short-tailed albatross use a single colony, Tsubamezaki, on Torishima Island, an active volcano located off the coast of Japan. The rest (approximately 22% breed in the Senkaku Islands in the East China Sea (USFWS 2014).

Outside of the breeding season, short-tailed albatrosses are distributed throughout most of the North Pacific (Figure 6). They have been observed most frequently along the continental shelves in Gulf of Alaska, the Aleutians, and the Bering Sea between the Alaska Peninsula and St. Matthew Island as they require nutrient rich areas of ocean upwelling for their foraging habitat (USFWS 2008).

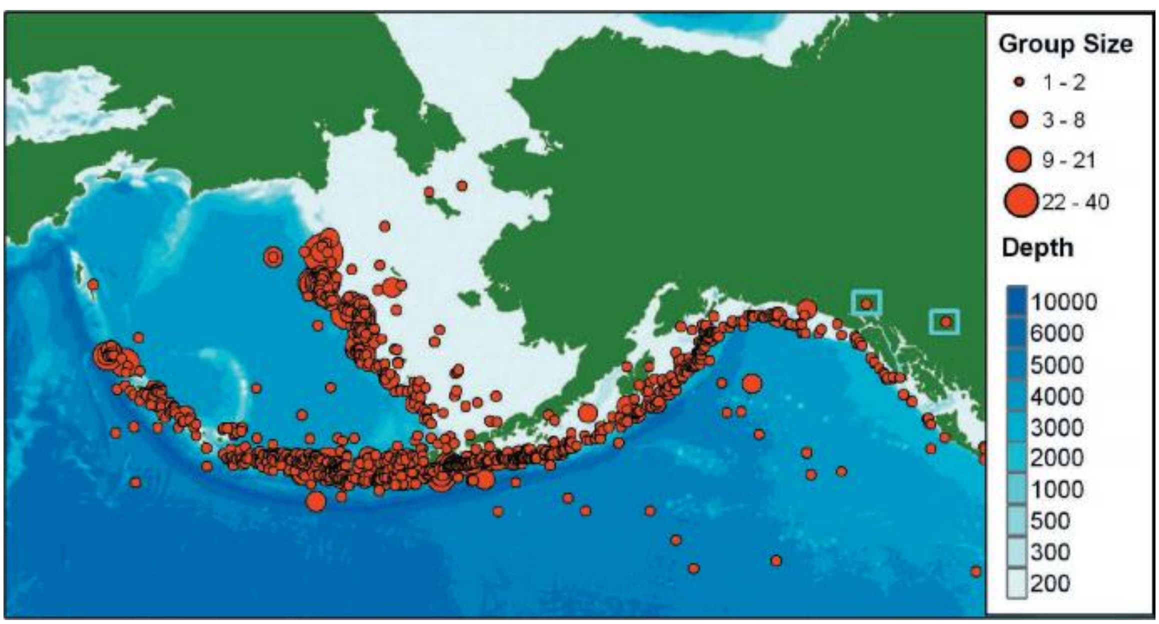

Figure 6: Sightings of short-tailed albatross in the North Pacific by Fishing Vessels (1940 – 2004)
Source: Piatt et al. 2006.

Life history and ecology

Like many seabirds, short-tailed albatrosses are slow to reproduce and are long-lived, with some known to be over 40 years old. They begin breeding at about 7 or 8 years, and mate for life. Short-tailed albatrosses nest on sloping grassy terraces on two rugged, isolated, windswept islands in Japan. Pairs lay a single egg each year in October or November. Eggs hatch in late December through early January. Chicks remain near the nest for about 5 months, fledging in June. After breeding, short-tailed albatrosses move to feeding areas in the North Pacific.

Movements of short-tailed albatross are better understood in recent years. Studies concluded that juvenile (< 1-year-old) short-tailed albatrosses travel much more broadly throughout the North Pacific than adult birds. Seasons of overlap in tracking of non-breeding adult and juvenile/sub-adult albatrosses (those individuals not having to return to the breeding colony to tend eggs or chicks) included summer and early fall (May-September). During summer and early fall, juvenile albatrosses traveled extensively in the Sea of Okhotsk, Russia, and western Bering Sea where few adults ventured. Juvenile albatrosses traveled to the west coast of North America and more extensively throughout the North Pacific transition zone between Hawaii and Alaska. Additionally, juvenile albatrosses were tracked to Arctic regions of the Bering Strait (Deguchi et al., 2014) and at least one individual was sighted from two different survey vessels in the Chukchi Sea in 2012 (Day et al., 2013; Gall et al., 2013). Multi-year tracking studies of juvenile to sub-adult birds indicate that distribution patterns and habitat use of sub-adult birds become similar to adults by age three (Suryan et al., 2013).

Knowledge of marine habitat use at various life history stages has evolved in recent years. The following is a summary of new findings taken from the USFWS latest 5-year review (USFWS 2014):

- The highest concentrations of short-tailed albatross are found in the Aleutian Islands and Bering Sea (primarily outer shelf) regions of Alaska. The waters around the Aleutian Islands are important for feeding while short-tailed albatross undergoing extensive molt.
- Post-fledging juvenile birds ranged widely throughout the North Pacific rim, and some individuals also spent time in the oceanic waters between Hawaii and Alaska (Deguchi et al., 2014).
- Juvenile short-tailed albatross have a distinct distribution from adults as juvenile and younger sub-adult birds (up to 2- years- old) range much more widely than the adult birds, inhabiting the Sea of Okhotsk, a broader region of the Bering Sea, and the west coast of North America (O'Connor 2013).
- Sub-adults appear to be distributed along the west coast of the U.S. more than has been previously reported (Guy et al., 2013). Sub-adult birds also travel great daily distances (mean = 191 km/day in first year of flight and 181 km/day in second year of flight [O'Connor 2013]). These are more extensive than for adults (133 km/day, Suryan et al., 2007).

Albatrosses feed by alighting on the ocean surface and seizing their prey. Generally, their diet consists of squid, fish, and shrimp (USFWS 2001). In an analysis of historic and current distribution of North Pacific albatrosses, Kuletz et al. (2014) speculated that the increase in albatrosses (including short-tailed albatross) and changes in their distribution over the last decade was due to possible increases in squid biomass in the in the Bering Sea/Aleutian Islands region. Overall, the much higher abundance of albatrosses in the Aleutians compared to the Bering Sea mirrored the relative density of squid, which is estimated to be approximately seven times higher in the Aleutian Islands (Ormseth 2012).

<u>Critical habitat</u>

Critical habitat has not been designated for this species. In the 2000 final rule, the Service determined that designation of critical habitat was not prudent due to the lack of habitat-related threats to the species, the lack of specific areas in U.S. jurisdiction that could be identified as meeting the definition of critical habitat, and the lack of recognition or educational benefits accruing to the American people as a result of such designation (USFWS 2008).

<u>Population trends and risks</u>

The population of short-tailed albatrosses was estimated at 2,400 birds in 2008, with about 450-500 breeding pairs (USFWS 2008). The current estimated population size for short-tailed albatross is 4,354 individuals (USFWS 2014). The population growth rate is based on annual increases in eggs laid at Torishima. The three-year running average population growth rate since 2000 ranges from 5.2-9.4%. The current population is still well below historic levels and the very rapid population growth of this species infers that the species is not currently limited by breeding or marine habitat. USFWS concluded that ecosystem conditions throughout the species range have generally remained intact. Kuletz et al. (2014) examined four decades of data from the North Pacific Pelagic Seabird Database, and showed that short-tailed albatrosses, along with Laysan and black-footed albatrosses, have increased in abundance in the Aleutians and Bering Sea between 1970s and 2000s. Further, the centers of distribution in the Bering Sea have shifted northward, most dramatically for short-tailed albatrosses, at ~ 17 km (10.5 mi)/year. For short-tailed albatross, as the numbers of observations have increased, so has their occupation of northern areas of the outer domain and shelf slope regions

Short-tailed albatross are known to be associated with the west coast groundfish fishery. Guy et al. (2013) evaluated the spatial and temporal overlap of west coast groundfish fisheries with albatross to determine which fisheries posed threats to albatrosses and where and when those threats occur. They found that distribution for the more common black-footed albatross (Phoebastria nigripes) is similar to short-tailed albatrosses, and therefore can be used as a proxy for short-tailed albatross. They found the longline fishery for sablefish and the Pacific hake (Merluccius productus) catcher-processor fisheries had the greatest degree of overlap with these two albatrosses (Guy et al., 2013).

Bycatch of short-tailed albatrosses in commercial fisheries continues to be a major conservation concern, especially for younger age classes. According to Zador and Fitzgerald (2008), the primary impact to albatrosses from seafood processing is related to attraction to the discharge, indirectly resulting in injury and/or mortality due to ship strike and cable interactions (Melvin et al., 2004, 2011) and incidental catch. Since the 2009 5-year review (USFWS 2009), progress has been made toward understanding the extent of and minimizing the impact of commercial fisheries in the U.S. Reported short-tailed albatross bycatch has remained low. Since 2009, five short-tailed albatross mortalities associated with commercial fisheries have been reported, three in the Alaskan cod fishery, one in the Pacific Coast groundfish fishery, and one during bycatch mitigation research in Japan. The reported level of mortality is below the estimated level of individuals that would trigger management concerns (USFWS 2009). As a result of the mortality off the Oregon coast in 2011 associated with a longline fishing vessel, the National Marine Fisheries Service (NMFS) consulted with the USFWS to address the impact of the Pacific Coast Groundfish Fishery on short-tailed albatross (USFWS 2012a). According to the most recent 5-year review (USFWS 2014), changes have been made to minimize risk to short-tailed albatross from the U.S. Groundfish fishery (USFWS 2014). The estimated mortality for the Pacific Coast Groundfish Fishery was estimated at two individuals over a running 2-year average. Similar to the regulations for fisheries in Alaska and Hawaii (described in the most recent 5-year review, USFWS 2009), the outcome of that consultation resulted in the numerous measures to minimize take (i.e., harm or mortality) of short-tailed albatross. Threats have been reduced in some areas through the establishment or improvement of regulations to minimize seabird bycatch, such as the area of the U.S. Pacific Coast groundfish fishery and in longline tuna fishery in Japan (USFWS 2012, Fisheries Agency of Japan 2009). The topic of risks/effects of commercial fisheries on albatross is examined in section 5.6.2.1 of the Effects Analysis.

3.2.2 Steller's Eider

The Alaska-breeding population of the Steller's eider (*Polysticta stelleri*) was listed as threatened on June 11, 1997, based on the contraction in the species' breeding range in Alaska and the resulting increased vulnerability of the remaining breeding population to extirpation (FR 62 (112): 31748-31757) (USFWS 2002a).

Species range

Three breeding populations of Steller's eiders are recognized - two in Arctic Russia and one in Alaska. The Alaska-breeding population nests primarily on the Arctic Coastal Plain, although a very small subpopulation remains on the Yukon-Kuskokwin Delta (USFWS 2002a) (Figure 3.2). Outside of nesting season Steller's eiders spend their time in shallow, nearshore marine waters. Non-listed Steller's eiders (also P. stelleri) from the Russian breeding population mix with Alaska-breeding eiders during molting and wintering periods. USFWS estimates that less than 1% of Steller's eiders molting and wintering in Alaskan waters are from the listed population (BiOp 2016).

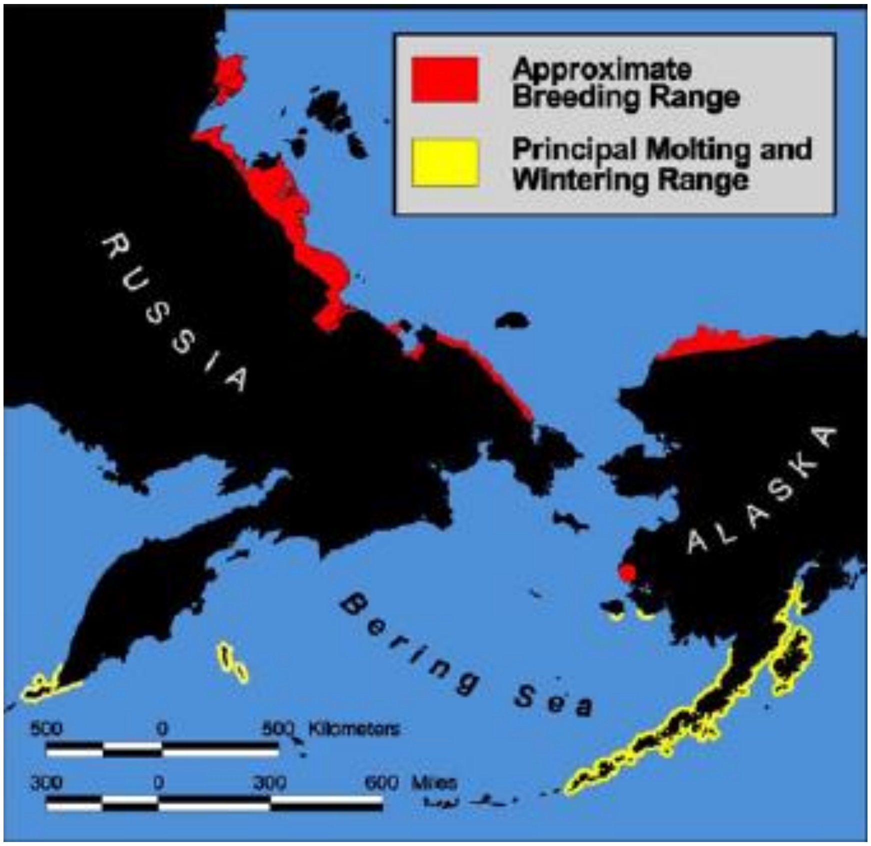

Figure 7: Distribution of the Pacific Population of Steller's Eider.
Source: USFWS 2002a.

Critical habitat

Critical habitat was designated for the Steller's eider in 2001 (FR 66 (23): 8849-8884), which includes breeding habitat on the Yukon-Kuskokwim Delta, and four units in southwest Alaska marine waters, including the Kuskokwim Shoals in northwest Kuskokwim Bay, Seal Islands, Nelson Lagoon, and Izembek Lagoon on the north side of the Alaska Peninsula. Critical Habitat in the State of Alaska for Steller's eiders is indicated in Figure 3.3

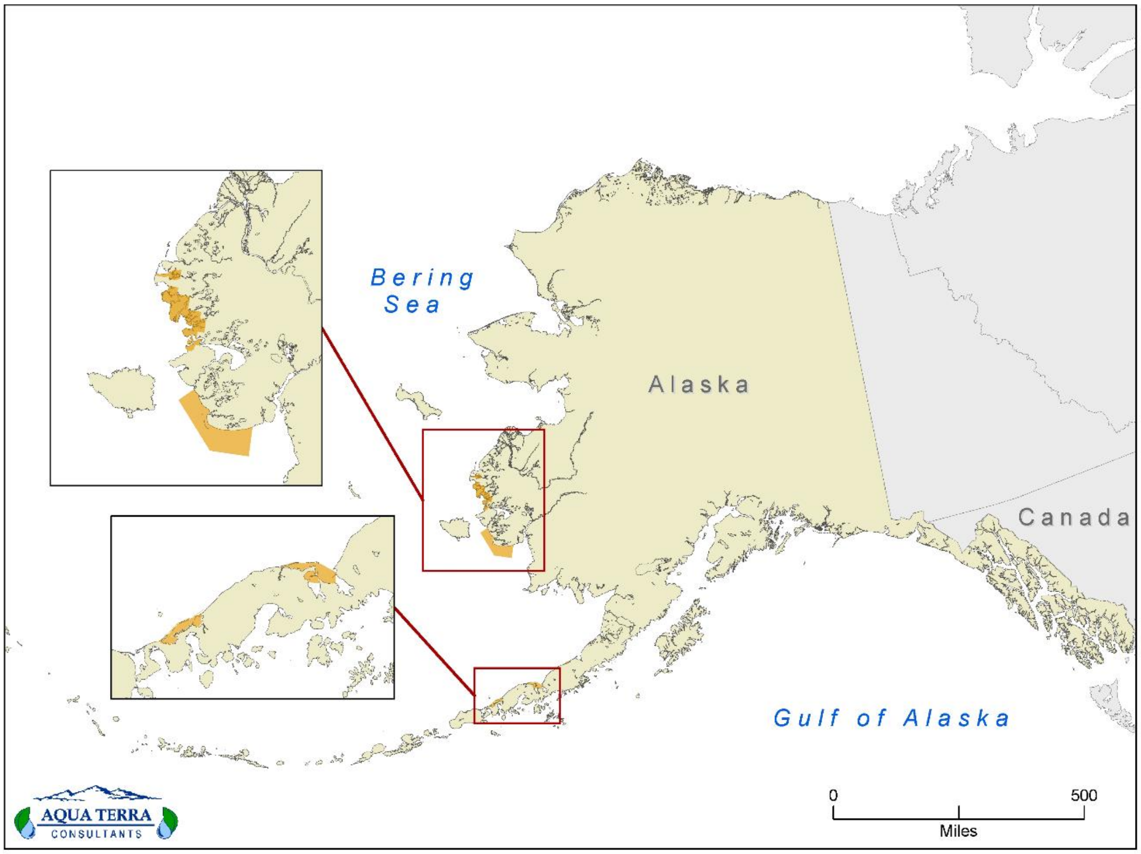

Figure 8: Critical habitat for the Steller's eider.
Sources: National Marine Fisheries Service and ESRI.

Life history and ecology

Steller's eiders nest in terrestrial environment but spend majority of the year in shallow, near-shore marine waters. After nesting, Alaska's Steller's eiders migrate south in the fall. These ducks move into the nearshore marine waters of southwest Alaska where they mix with the much more numerous Russian Pacific populations (USFWS 2002a). Adults undergo a flightless molt in autumn. Steller's eiders remain flightless for about three weeks, but the overall period of flight feather molt for the species is from late July to late October (Peterson 1981). Steller's eiders molt in a number of locations in southwest Alaska, but the largest numbers concentrate in four areas along the north side of the Alaska Peninsula - Izembek Lagoon, Nelson Lagoon, Port Heiden, and Seal Islands (Gill et al. 1981, Peterson 1981, Metzner 1993). Molting areas where large numbers concentrate tend to be characterized by extensive shallow areas with eelgrass beds, intertidal sand flats, and mudflats where Steller's eiders forage on marine invertebrates such as mollusks and crustaceans (Metzner 1993).

After molting many Steller's eiders disperse to the Aleutian Islands, the south side of the Alaska Peninsula, Kodiak Island, or as far east as Cook Inlet; however, thousands may remain in the lagoons used for molting unless freezing conditions force them to move to warmer areas (USFWS 2002a). Wintering eiders usually occur in waters less than 10m deep and are usually found within 400m of shore. Prior to spring migration, thousands to tens of thousands of Steller's eiders stage in estuaries along the north side of the Alaska Peninsula, including several areas used during molt and winter. From there, they cross Bristol Bay. It is speculated that majority of the entire Alaska-wintering adult population spends days or weeks feeding and resting in northern Kuskokwim Bay and in smaller bays along its perimeter before continuing northward to nesting areas (USFWS 2002a).

Population trends and risks

The Alaska-breeding populations of Steller's eiders occur in two disjunct regions - western and northern Alaska. The status of the subpopulations occupying these regions is inadequately understood due to lack of precise population size estimates and limited historical information for comparison with current estimates.

Aerial surveys currently provide the only available means of estimating population size and distribution. Population size point estimates, based on annual waterfowl breeding pair surveys from 1989-2000, range from 176-2,543 (Mallek 2002). The observations indicate that Steller's eiders occur over a vast area with a greater density near Barrow, the northernmost point in Alaska, which is thought to be the core of the Steller's eiders breeding distribution (USFWS 2002a).

Threats include predation, hunting, ingestion of spent lead shot in wetlands, changes in marine environment, as well as exposure to oil or contaminants near fish processing facilities in southwest Alaska (USFWS 2002a).

3.2.3 Spectacled Eider

The spectacled eider (*Somateria fascheri)* was designated as threatened on May 10, 1993 (FR 58 (88): 27474-27480) due to their rapid, continual decline on the Yukon-Kuskokwim Delta breeding grounds. Additionally, there are indications that the population is declining on Alaska's North Slope (USFWS 2012).

Species range

Historically, spectacled eiders nested along much of the coast of Alaska, from Nushagak Peninsula in the southwest, north to Barrow, and east near the Canadian border. Today, spectacled eiders breed in three primary locations - the Yukon-Kuskokwim Delta, the North Slope, and Arctic Russia. Limited nesting may also occur on St. Lawrence Island and the Seward Peninsula in Alaska (USFWS 2012).

On the Yukon-Kuskokwim Delta, spectacled eiders breed mostly within 15km of the coast from Kigigak Island north to Kokechik Bay, with smaller numbers nesting south of Kigigak Island to Kwigillingok and north of Kokechik Bay to the mouth of Uwik Slough. The coastal fringe of the Yukon-Kuskokwim Delta is the only subarctic breeding habitat where spectacled eiders occur at high density. On Alaska's North Slope, the majority of spectacled eiders breed between Icy Cape and Shaviovik River and generally at low densities (Larned and Balogh 1997). Figure 9 provides spectacled eider breeding distribution.

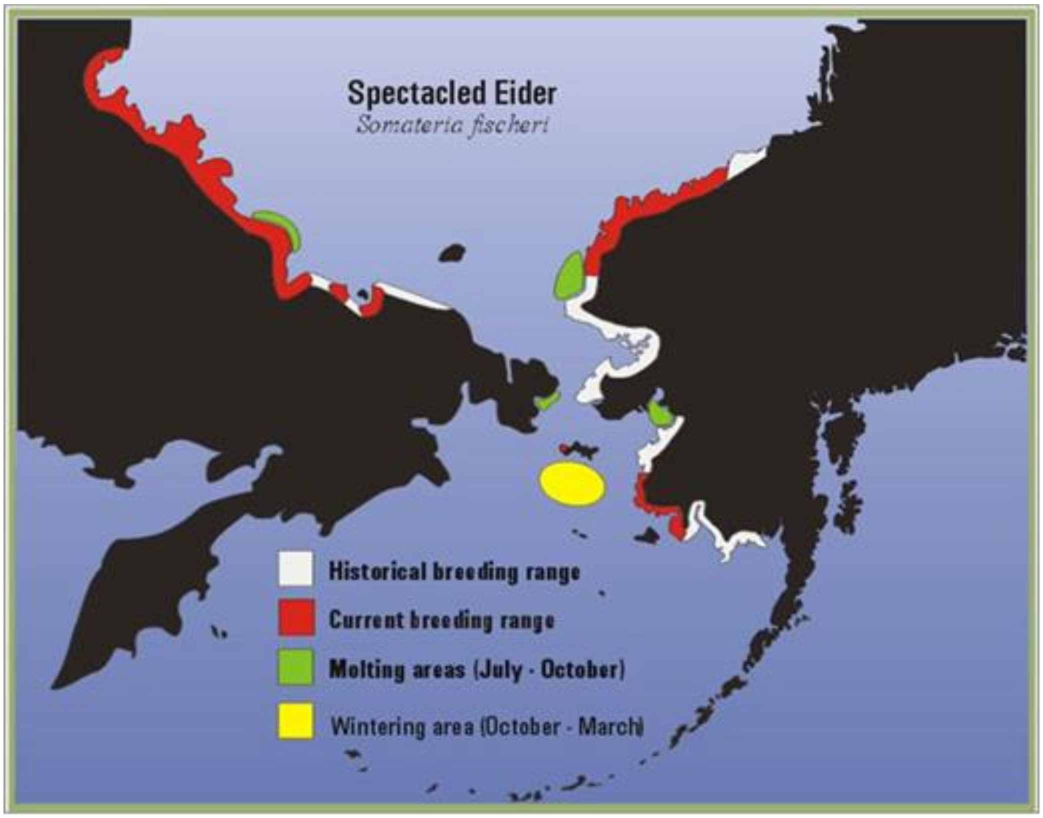

Figure 9: Distribution of breeding pairs of spectacled eiders. Current breeding range indicated areas where surveys have confirmed breeding pair occurrence. Low-density breeding may still occur outside these areas.
Source: USFWS 2006b.

Important late summer and fall molting areas have been identified in eastern Norton Sound and Ledyard Bay (USFWS 1996). Wintering flocks of spectacled eiders have been observed in the Bering Sea between St. Lawrence and St. Matthew Islands (USFWS 2012) where they congregate in large and dense flocks in pack ice openings (Larned et al. 1995).

<u>Critical habitat</u>

Critical habitat for the spectacled eider was designated in 2001(FR 66 (25): 9146-9187), and includes areas on the Yukon-Kuskokwim Delta, Norton Sound, Ledyard Bay, and the Bering Sea between St. Lawrence and St. Matthews Islands. Critical Habitat in the State of Alaska for spectacled eiders is indicated in Figure 10.

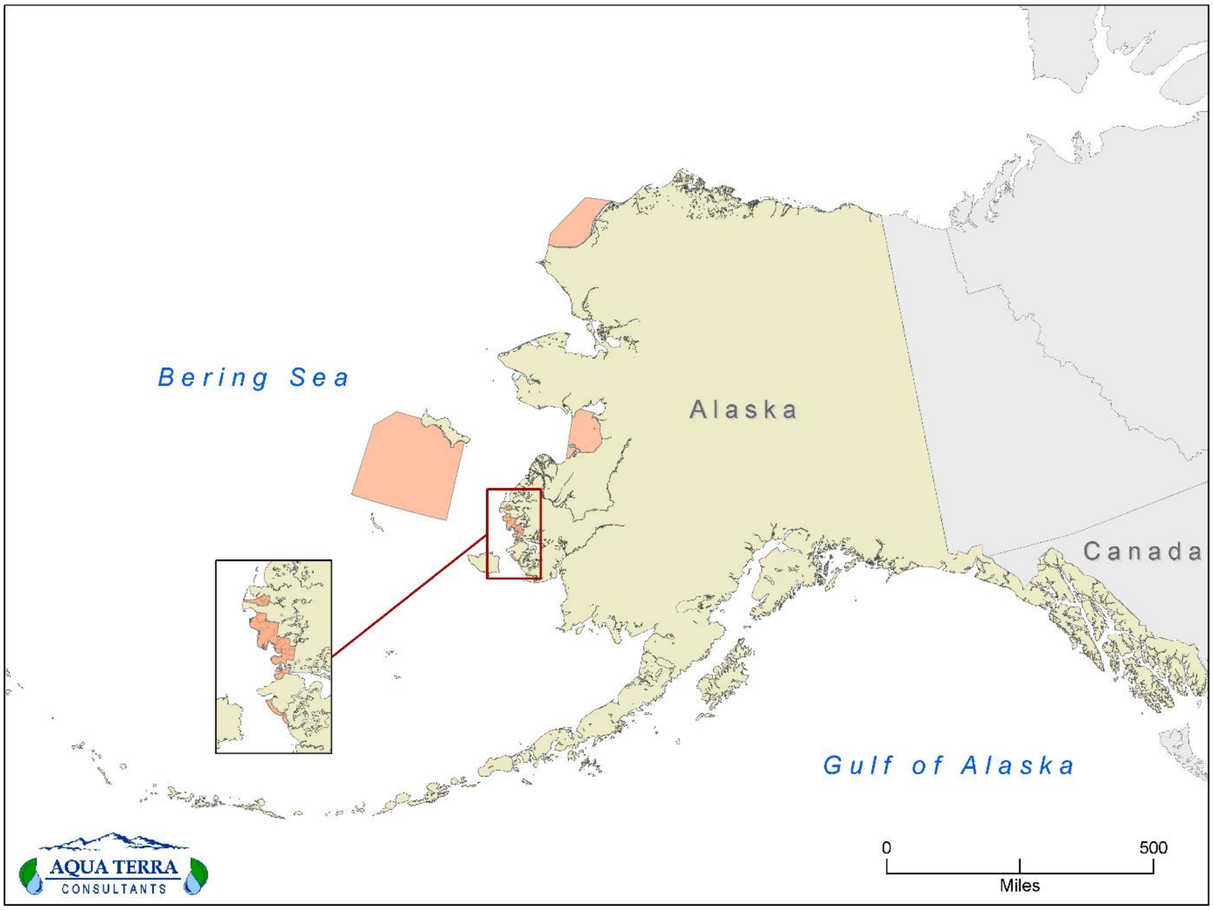

Figure 10: Critical habitat for the spectacled eider.
Sources: National Marine Fisheries Service and ESRI.

<u>Life history and ecology</u>

Spectacled eiders are diving ducks that spend most of the year in marine waters where females acquire important pre-breeding reserves by feeding on bottom-dwelling molluscs and crustaceans. Around spring break-up, breeding pairs move to nesting areas on wet coastal tundra. During this season they feed by diving and dabbling in ponds and wetlands, eating aquatic insects, crustaceans, and vegetation, though females are thought to feed little during egg-laying and incubation. Shortly after eggs are laid, males leave the nesting grounds for offshore molting areas, usually by the end of June. Females whose nests failed leave the nesting area to molt at sea by mid-August. Breeding females and their young remain on the nesting grounds until early September. Molting flocks gather in relatively shallow coastal water (less than 36m deep). While moving between nesting and molting areas, spectacled eiders travel along the coast up to 50km offshore. From October through March, they move far offshore to waters up to 65m deep where they sometimes gather in dense flocks in openings of nearly continuous sea ice (USFWS 2012). At least 65% of the benthic biomass in this area is clams, and the majority of the spectacled eider's winter diet consists of one species of clam, *Nuculana radiata* (Lovvorn et al. 2003). This represents a change from their previous primary prey species, *Macoma calcarea*, which dominated clam biomass prior to an oceanic regime shift to warmer conditions in the Bering Sea in the 1970s (Richman and Lovvorn 2003).

Population trends and risks

The spectacled eider was listed as threatened primarily because the number of nesting pairs on the Yukon-Kuskokwim Delta had declined from approximately 48,000 pairs in the early 1970s to 1,721 by 1992 (Stehn et al. 1993). Historical data for other nesting areas in scarce; it is estimated that 3000-4000 pairs currently nest on Alaska's North Slope and approximately 40,000 pairs nest in arctic Russia (USFWS 2012). Potential population threats include lead poisoning, predation, overharvest, reduced prey availability, and catastrophic events such as an oil spill or bilge pumping (USFWS 2012).

3.2.4 Kittlitz's Murrelet

Kittlitz's murrelet (*Brachyramphus brevirostris*) was designated a candidate species on May 4, 2004 (FR 69 (86): 24875-24904). On September 13, 2013, USFWS published the conclusion of 12-Month Finding indicating that the Kittlitz's murrelet is not in danger of extinction (endangered) nor likely to become endangered within the foreseeable future (threatened), throughout all or a significant portion of its range. Therefore, USFWS found that listing the Kittlitz's murrelet as an endangered or threatened species under the Act is currently not warranted (FR 78 (192): 61763-61801).

Species range

The Kittlitz's murrelet ranges in Alaska from Point Lay in the north to Glacier Bay and nearby southeast Alaska. Its centers of abundance appear to be Prince William Sound and Glacier Bay. The Kittlitz's murrelet is generally found in association with marine tidewater glaciers and glacially influenced waters, often in protected fjords or among islands. When within the range of tidewater glaciers, the species is associated with waters containing icebergs and brash ice (i.e. ice cover of 5-15%) and avoids areas that contain heavy ice cover (Day et al. 1999, Day et al. 2000). Elsewhere, Kittlitz's murrelets are found along coasts with waters influenced by glacial outwash (USFWS 2005b).

During the breeding season, Kittlitz's murrelets appear to favor waters less than 200m from shore (Day et al. 2000). During non-breeding season, the marine distribution is farther offshore. However, in winter, Kittlitz's murrelets occur in the protected waters of Prince William Sound, Kenai Fjords, Kachemak Bay, and Sitka Sound (Day et al. 1999).

Population trends and risks

Kittlitz's occur from southeast Alaska to Siberia, but are common only in a few isolated areas, and the total population may number as few as 20,000 individuals. Threats include exposure to oil contaminants, entanglement in gillnets, disturbance from commercial and recreational cruise ships, and the effect of climate change on the stability of tidewater glaciers (USFWS 2005b).

3.3 MARINE MAMMALS

3.3.1 Polar Bear

The polar bear (*Ursus maritimus*) was designated at threatened on May 15, 2008 (73FR 28212-28303). The following information is summarized from the species description provided in the final listing in the Federal Register as well as the Polar Bear Recovery Plan.

Species range

Polar bears evolved to utilize the Arctic sea ice niche and are distributed throughout most ice-covered seas of the Northern Hemisphere. The occur throughout the East Siberian, Laptev, Kara, and Barents Seas of Russia; Fram strait (the narrow strait between northern Greenland and Svalbard), Greenland Sea and Barents Sea of northern Europe (Norway and Greenland (Denmark)); Baffin Bay, which separates Canada and Greenland, through most of the Canadian Arctic archipelago and the Canadian Beaufort Sea. In Alaska, polar bears are found in the Chukchi and Beaufort Seas located west and north of Alaska (Figure 11).

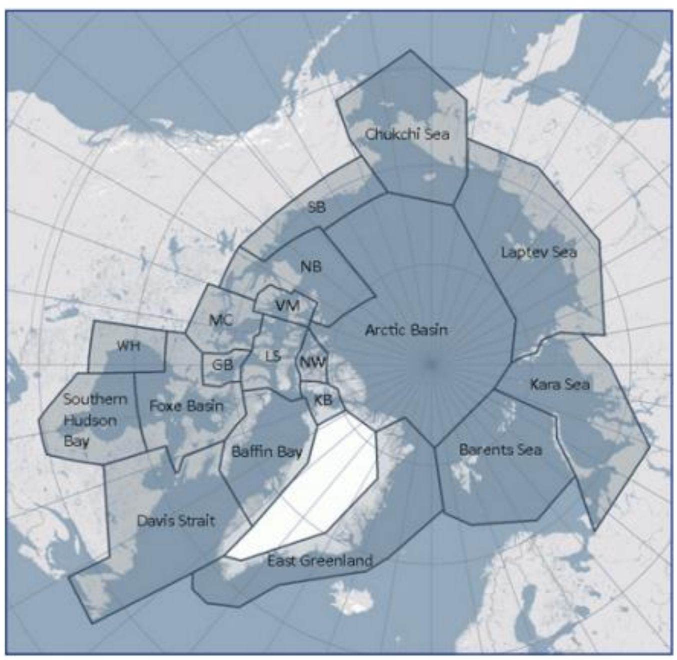

Figure 11: Map of the polar bear subpopulations.
Source: Polar Bear Specialist Group
Accessed from the Polar Bear Conservation Management Plan (USFWS 2016).

Critical habitat

Critical habitat has not been designated for the polar bear at this time. Arctic sea ice provides a platform for critical life-history functions, including hunting, feeding, travel, and nurturing cubs. That habitat is projected to be significantly reduced within the next 45 years. A careful assessment of the designation of marine areas as critical habitat will require additional time to fully evaluate physical and biological features essential to the conservation of the polar bear and how those features are likely to change over the foreseeable future. In addition, near-shore and terrestrial habitats that may qualify for designation as critical habitat will require a similar thorough assessment and evaluation in light of projected climate change and other threats. The USFWS finds that critical habitat is undeterminable at this time because they are unable to identify the physical and biological features essential to the conservation of this population segment (USFWS 2008).

Life history and ecology

Polar bears are the largest of the living bear species (DeMaster and Stirling 1980, Stirling and Derocher 1990). They are characterized by large body size, stocky form, and fur color that varies from white to yellow. Females weigh 400 to 700 pounds (lbs) and males up to 1,440 lbs. Polar bears have a longer neck a proportionally smaller head than other members of the bear family and are missing the distinct shoulder hump common to grizzly bears. The nose, lips and skin of polar bears are black (DeMaster and Stirling 1981, Amstrup 2003).

Polar bears evolved in sea ice habitats and as a result are evolutionarily adapted to this habitat. Over most of their range, polar bears remain on the sea ice year-round or spend only short periods on land. However, some polar bear populations occur in seasonally ice-free environs and use land habitats for varying portions of the year. In the Chukchi Sea and Beaufort Sea areas of Alaska and northwestern Canada, for example, less than 10 percent of the polar bear locations obtained via radio telemetry were on land (Amstrup 2000). Although polar bears are generally limited to areas where the sea is ice-covered for much of the year, they are not evenly distributed throughout their range on sea ice. They show a preference for certain sea ice characteristics, concentrations and specific sea ice features (Sterling et al. 1993; Arthur et al. 1996, Ferguson et al. 2000a, Ferguson et al. 2000b, Mauritzen et al. 2001, Durner et al. 2006, Durner et al. 2007). Polar bears show a preference for sea ice located over and near the continental shelf (Derocher et al. 2004, Durner et al. 2004, Durner et al. 2007) likely due to higher biological productivity in these areas (Dunton et al. 2005) and greater accessibility to prey in near shore zones and polynyas compared to deep-water regions in the central polar basin (Stirling 1997).

Polar bears in Alaska feed primarily on ringed seals (*Phoca hispida*) and to a lesser extent, on bearded seals (*Erignathus barbatus*) (Stirling and McEwan 1975; Stirling and Archibald 1977; Stirling and Latour 1978) and spotted seals (*Phoca largha*) (USFWS 1994). Bears may also prey on hooded seals (*Cystophora cristata*) (Stirling and Archibald 1977), walruses (*Odobenus rosmarus*) (Kiliaan and Stirling 1978), and beluga whales (*Delpinapterus leucas*) (Freeman 1973; Heyland and Hay 1976; Lowry et al. 1987). They scavenge on the carcasses of whales and walruses. They occasionally prey on other polar bears (Russell 1975; Lunn and Stenhouse 1985; Taylor et al. 1985). When other food is not available, polar bears may eat small mammals, birds, eggs and vegetation, but these foods are not an important component of the diet.

Polar bears clearly prefer the blubber of ringed seals (Stirling and Archibald 1977). The high energy demand of polar bears, associated with metabolic thermoregulation and the energy cost of walking and hunting, contributes to the selective use of seal blubber. Availability of seals varies seasonally and regionally; therefore, the replenishment of fat deposits is important to polar bears to maintain an insulating layer to reduce heat losses and provide a reserve source of energy when food is scarce. Pregnant females remain in their dens without feeding for approximately 3 months after giving birth and depend on pre-denning body condition to meet energy requirements during this period.

Female polar bears reach maturity at 4 or 5 years of age (Stirling and Smith 1975). In the Beaufort Sea, the age of first reproduction is typically 6 years of age (Stirling and Smith 1975, Lentfer et al. 1980). Polar bears typically mate on sea ice from late March through May (Lono 1970), although implantation does not occur until September (Stirling et al. 1984). Pregnant females seek out denning areas in late October and November and form maternity dens, typically in drifted snow (Harington 1968, Jonkel et al. 1972, Lentfer and Hensel 1980). Cubs are born in December and January (Lentfer 1982). Estimates of average litter size differ for different locations and vary between 1.52 and 2.0 (Lono 1970, Ramsay and Stirling 1982). In most areas, females with cubs emerge from dens in late March and early April and stay near their den sites for several days or as long as a month (Harington 1968, Stirling et al. 1984) before moving off in search of food. In most areas of the Arctic, female polar bears keep their cubs until they are about 2.5 years old (Stirling and Smith 1975, Lentfer et al. 1980, Stirling et al. 1980). For females that successfully wean litters, the average reproductive interval is about 4 years (Lentfer et al. 1980).

<u>Population trends and risks</u>

The current global polar bear population is estimated to be 22,000 to 31,000 (USFWS 2016). Polar bears are not evenly distributed throughout the Arctic, nor do they comprise a single nomadic cosmopolitan population, but rather occur across five arctic nations in 19 relatively discrete populations or distinct population segments (Aars et al. 2006 and USFWS 2016). Boundaries of the 19 polar bear populations have evolved over time and are based on intensive study of movement patterns, tag returns from harvested animals and genetic analysis (Aars et al. 2006). There is considerable overlap in areas occupied by members of these groups and boundaries separating the groups are adjusted as new data is collected (Amstrup et al. 2004, Amstrup et al. 2005). These boundaries, however, are thought to be ecologically meaningful and the 19 units they describe are managed as populations, with the exception of the Arctic Basin population where few bears are believed to be year-round residents. The Chukchi sea population is estimated to comprise 2,000 animals, based on extrapolation of aerial den surveys. Status and trend have not yet been determined for this population. The Southern Beaufort Sea population is currently comprised of 1,500 animals based on a recent population inventory which demonstrated the population declining from estimated population sizes ranging from 2,500 to 1,800 in the late 1980's (Amstrup et al. 1986, Amstrup 2000, Amstrup et al. 2001). Based on this information, the predicted trend is declining (Aars et al. 2006) and the status is designated as reduced.

Because of their specialized habitats and life history constraints (Amstrup 2003), polar bears have many qualities that make their populations susceptible to the potential negative impacts of sea ice loss resulting from climate change. The Southern Beaufort Sea population has been subject to dramatic changes in the sea ice environment, beginning in the winter of 1989-1990 (Regehr et al. 2006). Sea ice is an essential platform that allows polar bears to access prey and reductions in sea ice alters ringed seal distribution, abundance and availability for polar bears. Such reductions will, in turn, decrease polar bear body condition (Derocher et al. 2004). Declines in ringed and bearded seal numbers and productivity have resulted in marked declines in polar bear populations (Stirling 1980, Stirling and Oritsland 1995, Stirling 2002). In addition, declines in fat reserves during critical times in the polar bear life cycle detrimentally affect populations through delay in the age of first reproduction, decrease denning success, decline in litter sizes with more single cub litters and fewer cubs, and lower cub body weights and lower survival rates (Atkinson and Ramsay 1995, Derocher et al. 2004). The importance of sea ice to polar bear foraging is supported by studies documenting the relationship between the duration and extent of the sea ice and polar bear condition, reproduction and survival across decades despite likely fluctuations in ringed seal abundance during that same timeframe (Stirling et al. 1999, Regehr et al. 2007a, Regehr et al. 2007b, Rode et al. 2007).

3.3.2 Northern Sea Otter (Southwest Alaska Population)

The northern sea otter (Southwest Alaska population) (*Enhydra lutris kenyoni)* was designated threatened on September 8, 2005 (FR 70 (152): 46365-46386). This designation was due to a 55-67% decline in this population segment since the mid-1980s.

Species range

The northern sea otter has a range that extends from the Aleutian Islands, southwestern Alaska to the coast of the State of Washington and contain two subspecies (*E. l. kenyoni* and *E. l. lutris*). These species are separated by an expanse of open water that stretches approximately 200 miles between Near Islands of the U.S. and Commander Islands in Russia where wide deepwater passes serve as a barrier to sea otter movement (Kenyon 1969).

The southwest Alaska population ranges from Attu Island at the western end of Near Islands in the Aleutians and east to Kamishak Bay on the western side of lower Cook Inlet. The southwest Alaska population includes waters adjacent to the Aleutian Islands, Alaska Peninsula, Kodiak archipelago, and the Barren Islands (USFWS 2013c). Sea otters typically are located in shallow water areas near the shoreline or further offshore in areas where a shelf of shallow water extends along several miles from shore such as in Bristol Bay or along the north side of the Alaska Peninsula (USFWS 2013c).

Critical habitat

Five Units that include all of the Aleutian Islands, Bristol Bay, The Kodiak Archipelago, the Alaskan peninsula, and western Cook Inlet (5,855 square miles) are designated in Alaska (73 FR 76454). Within these five discrete units, critical habitat occurs in nearshore marine waters ranging from the mean high tide line seaward for a distance of 100 meters, or to a water depth of 20 meters (Figure 12). The essential elements of critical habitat are shallow, rocky areas; nearshore waters; kelp forests; and sufficient prey. Only areas that meet this definition of critical habitat within the five units is designated as critical habitat.

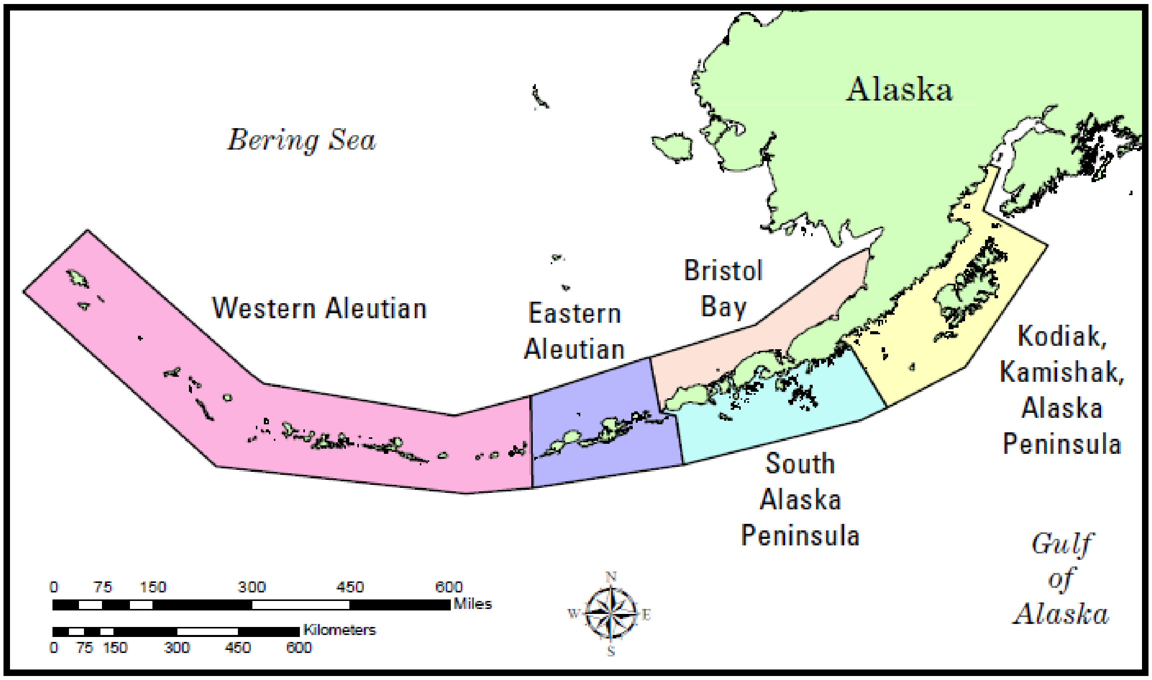

Figure 12: Location of critical habitat units for the Southwest Alaska DPS of the northern sea otter.
Source: USFWS 2013c.

<u>Life history and ecology</u>

Sea otters are considered a keystone species; strongly influencing the species composition and diversity of the nearshore marine environment they inhabit (Estes 1990). Sea otters mate at all times of the year and their young can be born in any season. However, in Alaska, most pups are born in late spring. Sea otters are not migratory and generally do not disperse over long distances (USFWS 2013c).

Sea otters have a relatively high rate of metabolism as compared to land mammals of similar size and therefore eat large amounts of food (estimated at 23-33% of their body weight per day (Estes 1990)). Sea otters are carnivores and primarily eat a wide variety of benthic invertebrates, such as sea urchins, crabs, clams, mussels, and octopuses. In some parts of Alaska, sea otters eat epibenthic fishes as well (Estes 1990).

<u>Population trends and risks</u>

Commercial harvest drastically reduced historical populations to a few hundred animals at the beginning of the 20th century. Population regrowth began following legal protection and sea otters have since recolonized much of their historic range in Alaska (USFWS 2014). By the 1980s, sea otters were present in all the island groups of the Aleutians (Estes 1990). The most recent abundance estimates for survey areas within the Southwest Alaska stock along the shorelines of the Aleutian Islands in April 2000 resulted in a count of 2,442 sea otters in the nearshore waters (Doroff et al. 2003). Although current numbers are well below historical levels, the overall population trend for the Southwest Alaska stock is believed to have stabilized. Comparison of aerial and skiff survey counts at six islands in 2000 was used to calculate an adjusted population estimate of 8,742 sea otters (USFWS 2014).

Cause of the recent decline in the southwestern population is not known with certainty, but increased predation by killer whales is likely important (USFWS 2013c). Other human-caused threats include oil spills, pollutants, disturbance from recreational and industrial activities, and entanglement in fishing nets.

3.3.3 Steller Sea Lion (Western DPS)

The Steller sea lion (Eastern and Western Stocks) (*Eumetopias jubatus*) was listed as a threatened species on April 5, 1990 (FR 55 (227): 49294-49332) due to substantial declines in the western portion of the range. In contrast, the eastern portion of the range (southeastern Alaska and Canada) was increasing at 3% annually prior to 1990. In 1997, the Steller sea lion population was split into a western distinct population segment (DPS) and an eastern DPS based on demographic and genetic dissimilarities (FR 62 (86): 24345-24356). Due to the persistent decline, the western DPS was reclassified as endangered, while the increasing eastern DPS was delisted on November 4, 2013 (78 FR 66140).

In 2014 NMFS completed the Aleutian Islands Groundfish Fishery Biological Opinion (2014 BiOp) to determine whether Alaska groundfish fisheries would jeopardize the continued existence of the western distinct population segment (WDPS) of Steller sea lions or adversely modify or destroy designated critical habitat (NMFS 2014). This evaluation is summarized in Section 5.6.3.3.

<u>Species range</u>

The WDPS of Steller sea lion inhabits an area of Alaska from Prince William Sound (144° W) west through the Aleutian Islands and in Russia on the Kamchatka peninsula, Kuril Islands and the Sea of Okhotsk. In the U.S., the WDPS ranges from 144° W longitude west through 172° E longitude (Figure 13). Steller sea lions use 38 rookeries and hundreds of haulouts within the range of the WDPS in Alaska (NMFS 2014).

The Western DPS includes Steller sea lions that reside in the central and western Gulf of Alaska, Aleutian Islands, as well as those that inhabit the coastal waters and breed in Asia (e.g., Japan and Russia). The Eastern DPS includes sea lions living in southeast Alaska, British Columbia, California, and Oregon (NMFS 2016a)

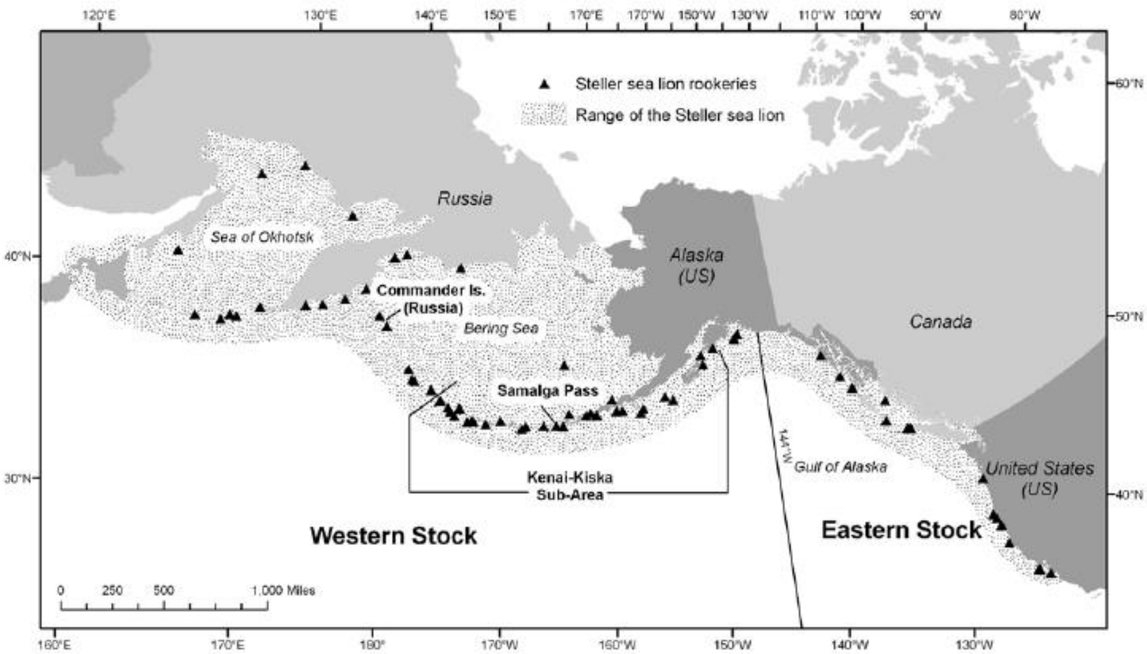

Figure 13: Steller sea lion range and breeding sites (rookeries) in the North Pacific Ocean.
Source: NMFS BiOp 2014.

<u>Critical habitat</u>

Critical habitat has been defined for the endangered WDPS Steller sea lions as a 20 nautical mile buffer around all major haul-outs and rookeries, as well as associated terrestrial, air and aquatic zones, and three large offshore foraging areas (50 CFR 226.202 on Aug. 27, 1993). For the Eastern DPS, critical habitat includes an aquatic zone that extends 3,000 ft. from major rookeries and haulouts. Habitats include marine waters, terrestrial rookeries (breeding sites) and haulouts (resting sites). Rookeries are areas used by adult males and females for pupping, nursing, and mating during the mating season (late May to early July). Haulouts are used by both males and females of all size classes but generally are not sites where reproduction occurs.

Critical habitat for Steller sea lions is indicated in Figures 14 and includes the following from FR58 45269:

(a) Alaska rookeries, haulouts, and associated areas. In Alaska, all major Steller sea lion rookeries identified in 50 CFR, part 226.202, Table 1, and major haulouts identified in 50 CFR, part 226.202, Table 2, as well as associated terrestrial, air, and aquatic zones, have been designated as critical habitat for the Steller sea lion. Critical habitat includes a terrestrial zone that extends 3,000 feet (0.9 km) landward from the baseline or base point of each major rookery and major haulout in Alaska. Critical habitat includes an air zone that extends 3,000 feet (0.9km) above the terrestrial zone of each major rookery and major haulout in Alaska, measured vertically from sea level. Critical habitat includes an aquatic zone that extends 3,000 feet (0.9km) seaward in state and federally managed waters from the baseline or basepoint of each major haulout in Alaska that is east of longitude 144ºW. Critical habitat includes an aquatic zone that extends 20nm

(37km) seaward in state and federally managed waters from the baseline or basepoint of each major rookery and major haulout in Alaska that is west of longitude 144ºW.

(b) Three special aquatic foraging areas in Alaska, including the Shelikof Strait area, the southeastern BS, and the Seguam Pass area.

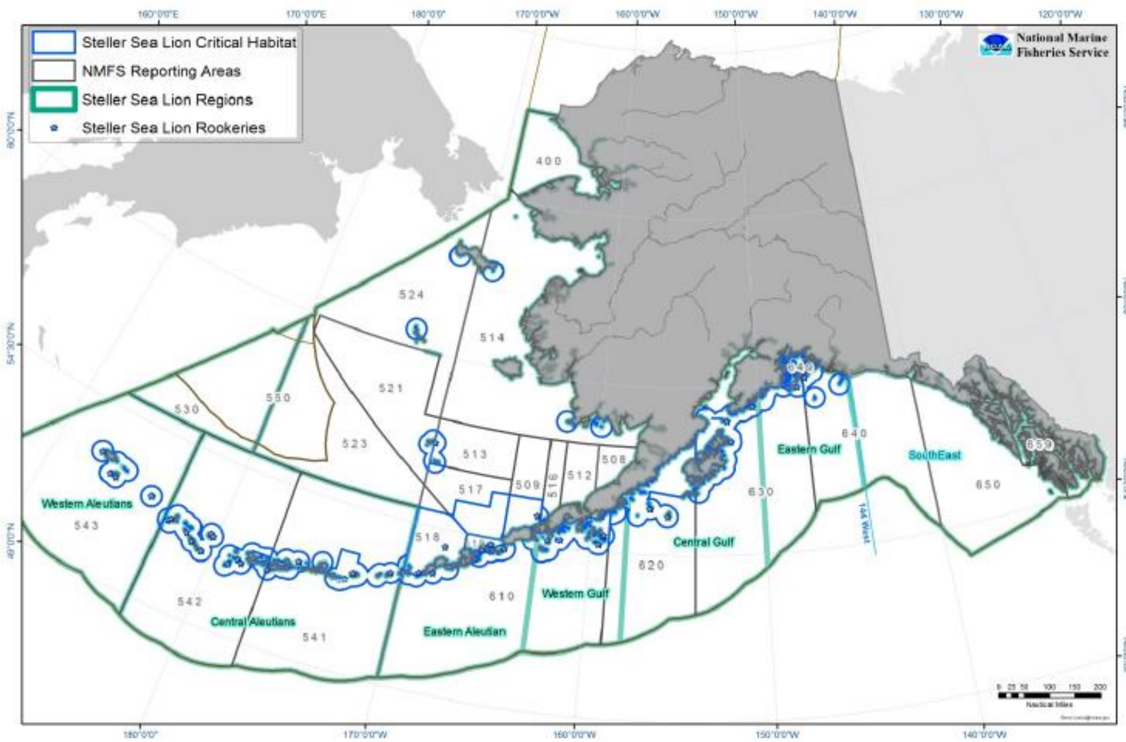

Figure 14: Sub-regions used by NMFS and Designated critical habitat for the western DPS of Steller sea lion in Alaska (50 CFR 226.202).
Source: NMFS 2014.

<u>Life history and ecology</u>

Steller sea lions spend the majority of their time at rookeries or haulouts. Habitat types that typically serve as rookeries or haulouts include rock shelves, ledges, slopes, and boulder/ cobble/gravel, and sand beaches. When foraging in marine habitats, Steller sea lions typically occupy surface and midwater ranges in coastal regions. Some animals may also follow prey into river and inlet systems. Steller sea lions gather on well defined, traditionally used rookeries to pup and breed. Males defend individual territories from approximately mid-May through mid-July. They mate with females after birth then come into estrus in their territory. Females give birth to a single pup anytime from mid-May to July (Calkins 1994).

As marine carnivores, Steller sea lions eat a wide variety of fish such as pollock, flounder, herring, capelin, Pacific cod, salmon, rockfish, sculpins, and invertebrates such as squid and octopus in the intertidal to continental shelf zone. However, the majority of Steller sea lion diet consists of pollock and mackerel. The sea lions generally leave haulouts and rookeries to feed for periods of time varying from hours to months. They often return to the same haulout or rookery even after long absences (Calkins 1994).

Population trends and risks

It is estimated that there were over 300,000 Steller sea lions in the world in the late 1970s. Since then, the Alaskan sea lion population has declined. The western population declined approximately 70% between the late 1970s and 1990. They reached a peak of approximately 15% per year decline during 1985-1989. NMFS uses six sub-regions within the WDPS in Alaska for trend and status monitoring, three (eastern, central and western) within both the Aleutian Islands and Gulf of Alaska (referenced in Figure 14). An estimate of the abundance of the entire (U.S. and Russia) WDPS of Steller sea lions (pups and nonpups) in 2012 was estimated to be 79,300 sea lions (NMFS 2014).

Several factors have been proposed as contributors to sea lion decline. Potential direct effects for the decline may include direct mortality through fisheries interactions including entanglement. Additional direct effects may include subsistence/native harvest, illegal shooting, and mortalities incidental to research. Indirect effects may include fishing for the Steller sea lion prey species, disturbance, contaminants, and climate change and ocean acidification. Natural effects include killer whale predation, shark predation, disease, environmental variability and drivers in the Bering Sea and Gulf of Alaska/North Pacific, and nutritional stress (NMFS 2014).

3.3.4 Ringed Seal (Arctic Subspecies)

NMFS listed the Arctic (Phoca hispida hispida), Okhotsk (Phoca hispida ochotenis), and Baltic (Phoca hispida botnica) subspecies of the ringed seal (Phoca hispida) as threatened and the Ladoga subspecies (Phoca hispida ladogensis) of the ringed seal as endangered under the ESA in February 2013 (FR 77 76706). Of these taxa, only the Arctic ringed seal occur in U.S. waters.

Species range

Arctic ringed seals have a circumpolar distribution. They occur in all seas of the Arctic Ocean, and range seasonally into adjacent seas including the Bering Sea. In the Chukchi and Beaufort Seas, where they are year-round residents, they are the most widespread seal species. The Alaska stock of ringed seals is considered the portion of Phoca hispida hispida that occurs within the U.S. Exclusive Economic Zone of the Beaufort, Chukchi, and Bering Seas (NMFS 2016h).

Critical habitat

Critical habitat is currently undeterminable and has not been designated for the Arctic ringed seal at this time.

Life history and ecology

The diet of Alaska ringed seals varies regionally and seasonally but typically consists of mysids, shrimp, arctic cod, and herring (NMFS 2016h). Behavior of ringed seals is poorly understood because both males and females spend much of their time in lairs built in pressure ridges or under snowdrifts for protection from predators and severe weather (NMFS 2014a). Arctic ringed seals use sea ice as a platform for resting throughout the year, and they make and maintain breathing holes in the ice from freeze-up until breakup. In the spring, as day length and temperature increase, ringed seals haulout in large numbers of the surface of the ice near breathing holes or lairs (NMFS 2016h). They are solitary animals and when hauled out on ice separate themselves from each other by hundreds of yards. During the spring breeding season, females construct lairs within the thick ice and give birth in these structures (NMFS 2016h).

Population trends and risks

The estimated population size for the Alaska stock of ringed seals is over 300,000 animals (NMFS 2016h).

Potential risks for the decline may include direct mortality through fisheries interactions including entanglement. Additional direct effects may include harvest, shipping activities, contamination, predation, parasites and diseases, and oil and gas activities. Indirect effects may include fishing for feed and prey selections, climate change and ocean acidification, and loss of sea ice and snow cover (NMFS 2016).

3.3.5 Bearded Seal (Beringia DPS)

NMFS listed the Beringia and Okhotsk DPSs of the bearded seal (*Erignathus barbatus*) as threatened under the ESA in February 2013 (77 FR 76739). Of these taxa, only the Beringia DPS of the bearded seal occur in U.S. waters.

Species range

Bearded seals have a circumpolar distribution that includes regions of the Bering and Chukchi seas that does not extend farther North than 80 degrees North (NMFS 2016h). During winter, most bearded seals in Alaskan waters are found in the Bering Sea, while smaller numbers of year-round residents remain in the Beaufort and Chukchi Seas. From mid-April to June, as the ice recedes, many bearded seals that overwinter in the Bering Sea migrate northward through the Bering Strait into the Chukchi and Beaufort Seas, where they spend the summer and early fall at the southern edge of the Chukchi and Beaufort Sea pack ice (NMFS 2016i).

Critical habitat

Critical habitat is currently undeterminable and has not been designated for the Beringia DPS of the bearded seal at this time (77 FR 76740).

Life history and ecology

Bearded seals feed on benthic prey such as Arctic cod, shrimp, clams, crabs, and octopus (NMFS 2016i). There are only a few quantitative studies concerning the activity patterns of bearded seals. Bearded seals spend a significant amount of time below the ice, where the timing of haulouts varies by season and time of day (NMFS 2014a). Females typically give birth to a single pup while hauled out on pack-ice between March and May. They are solitary animals and individual seals may be seen resting on single ice floes facing the water for an easy escape from predators (NMFS 2016h).

Population trends and risks

There is little reliable data for population estimates and trends in abundance. The Alaskan stock of bearded seals is considered greater than approximately 155,000 (77 FR 76740) and may be as large as 250,000-300,000 (NMFS 2016i).

Potential risks for the decline may include direct mortality through fisheries interactions including entanglement. Additional direct effects may include harvest, research, shipping activities, contamination, predation, parasites and diseases, and oil and gas activities. Indirect effects may include fishing for feed and prey selections, climate change and ocean acidification, and loss of sea ice and snow cover (NMFS 2016)

3.3.6 North Pacific Right Whale

The Northern North Pacific right whale (*Eubalaena japonica*) has been listed as endangered under the ESA since 1973. In 2008, NMFS listed the endangered northern right whale (Eubalaena spp.) as two separate, endangered species, North Pacific right whale (E. japonica) and North Atlantic right whale (E. glacialis) (73 FR 12024). NMFS published the Draft North Pacific Right Whale Recovery Plan in January 2013.

<u>Species range</u>

Right whales have occurred historically in all the world's oceans from temperate to subpolar latitudes. They primarily occur in coastal or shelf waters, although movements over deep waters are known. For much of the year, their distribution is strongly correlated to the distribution of their prey. During winter, right whales occur in lower latitudes and coastal waters where calving takes place. However, the whereabouts of much of the population during winter remains unknown. Right whales migrate to higher latitudes during spring and summer (NMFS 2015b).

<u>Critical habitat</u>

As of April 2008, two areas within the Gulf of Alaska and Bering Sea, that were previously designated as critical habitat in 2006 (71 FR 38277) for the "northern right whale" are now designated as critical habitat for the "North Pacific right whale" (73 FR 19000).

<u>Life history and ecology</u>

Right whales are generally migratory, with at least a portion of the population moving between summer feeding grounds in temperate or high latitudes and winter calving areas in warmer waters (NMFS 2015b). All the identified calving grounds are near the coast generally in shallow bays, but there is insufficient information to determine right whales calve exclusively in such waters.

Unlike other baleen whales, right whales are skimmers: they feed by removing prey from the water using baleen while moving with their mouth open through a patch of zooplankton. Their primary food sources are zooplankton, including copepods, euphausiids, and cyprids (NMFS 2015b).

Population trends and risks

There are no reliable estimates of current abundance or trends for right whales in the North Pacific. However, the pre-exploitation size of this stock exceeded 11,000 animals (NMFS 2015b). In general, there are no data on trends in abundance. Most sightings in the eastern North Pacific have been of single whales, though small groups have been sighted.

In the North Pacific, ship strikes and entanglements potentially pose a threat to right whales. Due to their rare occurrence and scattered distribution, it is impossible to assess the threat of ship strikes or entanglement to North Pacific right whales at this time. Thus, the estimated annual rate of human-caused mortality and serious injury appears minimal. Reasons for the apparent lack of recovery for right whales in the North Pacific are unknown (NMFS 2015b).

3.3.7 Bowhead Whale

The bowhead whale (*Balaena mysteicetus)* has been listed as endangered since June 2, 1970 (FR 35 (106): 8491-8499).

Species range

Bowhead whales are circumpolar, ranging throughout high latitudes in the Northern Hemisphere. They spend the winter associated with the southern limit of the pack ice and move north as the sea ice breaks up and recedes during spring. Five stocks of bowhead whales have been recognized. Three of these stocks occur in the North Atlantic: the Spitsbergen, Baffin Bay-Davis Straight, and Hudson Bay-Fox Basin stocks; and two in the North Pacific: the Sea of Okhotsk and Bering-Chukchi-Beaufort stocks (NMFS 2015a).

The western Arctic or Bering Sea stock, which is the only stock found in United States waters, follows a 3,600 mile (5800km) migration route. They spend most of the summer in relatively ice-free waters of seas adjacent to the Arctic Ocean. They are associated with sea ice the rest of the year (NMFS 2015a).

Critical habitat

Critical habitat has not been designated for the bowhead whale.

Life history and ecology

It is estimated that mating probably occurs during late winter and spring. The gestation period is 13-14 months. Most bowhead whales calve in April, May, or early June. After plunging from the internal body temperature of their mothers into near freezing water, the newborns must begin swimming north with the migrating herd almost immediately (Carroll 1994).

The bowhead feeding mechanism is most proficient at filtering a “thin soup” rather than gulping dense masses of prey. Instead of having grooved expandable throats similar to other baleen whales, bowheads have very large mouths to maximize the amount of water taken in and to hold captured food. Bowheads feed by swimming with their mouths open and straining zooplankton out of the water with their baleen. Bowheads feed at all depths, from the surface to the bottom. Their primary foods are copepods, euphausiids, and other invertebrates, typically 0.12-1.18 inches (3-30mm) long. Bowheads feed year-round in the Beaufort, Chukchi, and Bering Seas. They use a variety of strategies, including feeding under ice and swimming in groups in V-shaped formation, to increase feeding efficiency (Carroll 1994).

Population trends and risks

Before commercial whaling, there were over 50,000 bowhead whales worldwide. Between the 1600s and 1800s, the eastern arctic stocks of bowheads were reduced from over 50,000 animals to less than 1,000. The Bering Sea stock originally numbered about 18,000 whales and was reduced significantly in the 1800s and early 1900s. Current abundance is estimated between 7,000 and 10,000 animals. Currently, subsistence harvest is limited to nine Alaskan villages (NMFS 2015a).

3.3.8 Sei Whale

The sei whale (*Balaenoptera borealis*) has been designated as endangered since June 2, 1970 (FR 25 (106): 8491-8499).

Species range

Sei whales are located all across the temperate North Pacific north of 40ºN. In the North Pacific, the sei whale location is mainly south of the Aleutian Islands. Their southern range extends as far south as Baja California, Mexico, in the eastern Pacific, and to Japan and Korea in the west (Reeves et. al. 1998a).

Critical habitat

Critical habitat has not been designated for the sei whale.

Life history and ecology

This pelagic species generally does not inhabit inshore and coastal waters. Sei whales are members of the baleen family and mainly feed on copepods and euphausiids; however, whales in the North Pacific have also been known to eat cephalopods (NMFS 2012).

Population trends and risks

The estimated population in the Hawaiian stock is 40-80 and in the eastern north Pacific is 35-55, but there are no current estimates for the stocks in Nova Scotia and the western North Atlantic. Scientists estimate that the current worldwide population is about 80,000 individuals. After commercial whaling exhausted all known populations of this species, sei whales in the North Atlantic and North Pacific are considered to be relatively abundant by scientists, but the population in the Southern Ocean remains greatly depleted (NMFS 2002a). Although the population in the North Pacific is expected to have grown since given protected status in 1976, the possible effects of continued unauthorized take and incidental ship strikes and gill-net mortality make this uncertain (NMFS 2012). Current threats may affect sei whales, but do not result in significant takes compared with decimation caused by whaling. These threats may include collisions with ships, disturbance from vessels, entanglement in fishing gear, and aquatic pollution (Reeves et al. 1998a).

3.3.9 Blue Whale

The blue whale (*Balaenoptera musculus*) has been designated as endangered since June 2, 1970 (FR 25 (106): 8491-8499). NMFS is currently in the process of updating the recovery plan for the blue whale and issued a public notice and request for information in 2012 (77 FR 22760).

Species range

Blue whales are baleen whales and are found worldwide. Generally, blue whales prefer deeper offshore waters. They migrate seasonally between summer and winter, but some evidence suggests that individuals remain in certain areas year-round. Information about distribution and movement varies with location, and migratory routes are not well known. In general, distribution is driven largely by food requirements--they occur in waters where krill is concentrated (NMFS 2016b).

In the North Pacific Ocean, blue whales range from Kamchatka to southern Japan in the west and from the Gulf of Alaska and California south to Costa Rica in the east. They occur primarily south of the Aleutian Islands and the Bering Sea. Although blue whales are found in coastal waters, they are thought to occur generally more offshore than other whales (NMFS 2016b). Literature further assesses that blue whale prefers deeper offshore waters with preferred habitat in offshore areas encompassing the continental shelf break (Gregr and Trites 2001).

Blue whales in the North Pacific Ocean presumably migrate between sub-polar feeding grounds in spring and summer and low latitudes in winter (Perry et al. 1999); however, there is evidence that some whales remain in low latitudes year-round (Reilly and Thayer 1980). Long-term acoustic monitoring has shown that blue whales are heard along the AI westward and in GOA from late summer through winter (Watkins et al. 2000, Stafford et al. 2001). Recent acoustic monitoring recorded blue whales off the western Aleutians from June to early January and from mid-July to mid-December in GOA (Stafford 2003). Blue whale range typically does not extend north of the AI, but on occasion extends to the far southeastern corner of the EBS (Rice 1998).

Critical habitat

Critical habitat has not been designated for the blue whale.

Life history and ecology

They migrate seasonally between summer and winter, but some evidence suggests that individuals remain in certain areas year-round. Information about distribution and movement varies with location, and migratory routes are not well known. In general, distribution is driven largely by food requirements--they occur in waters where krill is concentrated (NMFS 2016b). These animals appear to practice more selective behavior in feeding than other rorquals (baleen whales that possess external throat grooves that expand during gulp- feeding) and specialize in plankton feeding, particularly swarming euphausiids in the Antarctic. They preferentially take euphausiids even with abundant shoaling fish in the area. Copepods and decapods make up a small and rarely observed portion of the blue whale's diet (Reeves et al. 1998b).

Population trends and risks

It is estimated that there were about 4,900 blue whales in the North Pacific when modern commercial whaling began in the early 1900s. Current estimates in the North Pacific are around 2,500 individuals (NMFS 2016b).

Whaling has caused the largest reductions in this species population, but other factors might also contribute to its decline or may prevent the population's recovery. These factors include collisions with ships, disturbance by commercial and recreational vessels, entanglement in fishing gear, habitat degradation, and aquatic pollution. Little evidence exists to support the conclusion that any of these factors caused a serious decline in the blue whale population, but these factors may prevent the recovery of the species (Reeves et al. 1998b).

3.3.10 Fin Whale

The fin whale (*Balaenoptera phyusalus)* has been designated as endangered since June 2, 1970, (FR 25 (106): 8491-8499).

Species range

Fin whales are migratory, moving seasonally into and out of high-latitude feeding areas, but the overall migration pattern is complex, and specific routes have not been documented (NMFS 2013). Fin whales are found in offshore waters throughout the North Pacific from Baja California to the Chukchi Sea. High concentrations of these endangered animals inhabit the northern Gulf of Alaska and southeastern Bering Sea in the summer (Reeves et al. 1998a). With a complex migratory behavior, these whales can be located in any season at many different latitudes. Acoustic detections of fin whale calls indicate that whales aggregate near the Aleutian Islands in summer (Moore et al. 1998) and near the Hawaiian Islands in winter (McDonald 1999). Some whale calls continue to be detected in northern latitudes throughout the winter with no noticeable migratory movement south (Watkins et al. 2000).

Critical habitat

Critical habitat has not been designated for the fin whale.

Life history and ecology

Where fin whales breed is unknown, but research indicates they are primarily solitary animals. They might infrequently congregate in groups of up to 15. However, the low-frequency vocalizations made by whales can travel some distance making it difficult to determine which species associate with one another (NMFS 2013). Fin whale prefer krill, small schooling fish (e.g., herring, capelin, and sand lance), and squid and then fast in the winter (NMFS 2013).

Population trends and risks

Reliable estimates of current and historical abundance of fin whales in the entire northeast Pacific are currently not available. While reliable estimates of the minimum population size and population trends are available for a portion of this area, much of the North Pacific range has not been surveyed (NMFS 2010a). Total North Pacific fin whale population before whaling was estimated at 42,000-45,000 with 8,000-11,000 being in the eastern North Pacific in the mid-1970s (Ohsumi and Wada 1974). Although the full range of the Alaska (Northeast Pacific) stock of fin whales has not been surveyed, a rough estimate of the size of the population west of the Kenai Peninsula is 5,700 (as of the 2007 stock assessment report). This is a minimum estimate for the entire Alaska stock because it was estimated from surveys which covered only a small portion of the range of this stock (NMFS 2010a).

Currently, the largest threats to fin whales include collisions with vessels, habitat destruction, entanglement in fishing gear, reduced prey abundance, and renewed interest in whaling by several countries (NMFS 2013).

3.3.11 Humpback Whale (Western North Pacific DPS)

The humpback whale (*Megaptera novaeangliae)* was initially designated as endangered since June 2, 1970 (FR 25 (106): 8491-8499). On October 11, 2016, NOAA Fisheries revised the ESA listing for the humpback whale to identify 14 Distinct Population Segments (DPS), list 1 as threatened, 4 as endangered, and identify 9 others as not warranted for listing. The western North Pacific DPFS was relisted as endangered (81 FR 62259).

<u>Species range</u>

Summer ranges of humpback whales are often relatively close to shore including major coastal embayments and channels. While in Alaska, humpback whales concentrate in Southeast Alaska, Prince William Sound and near Kodiak and the Barren Islands. The humpback whale can be observed relatively close to shore and feed preferentially over continental shelf waters (Gregr and Trites 2001). The Western North Pacific stock winters near Japan and likely migrates to waters west of the Kodiak Archipelago (the Bering Sea and Aleutian Islands) in summer/fall. There is some mixing between the Central and Western North Pacific populations, though they are still considered distinct stocks (NMFS 2017a).

<u>Critical habitat</u>

Critical habitat has not been designated for the humpback whale.

<u>Life history and ecology</u>

Humpback whales travel great distances during their seasonal migration, the farthest migration of any mammal. Humpbacks generally feed for 6 months of the year on their feeding grounds in Arctic and Antarctic waters. The animals then fast and live off their fat layer for the winter period while in the tropical breeding grounds. Humpbacks eat primarily tiny crustaceans (mostly krill), plankton, and small fish (NMFS 2017a).

<u>Population trends and risks</u>

The Aleutian Islands and Bering Sea are important foraging habitats for this population. Until recently, the Western North Pacific humpback whale population was estimated at about 400 animals; currently, results from the SPLASH project estimate a population of 6,000 to 14,000 humpbacks in the Bering Sea and Aleutians, and 100 to 700 in Russian waters (NMFS, 2010). Previous estimates around the turn of the century indicated the population size of the North Pacific stock was approximately 4,005 animals (NMFS 2001). The greatest threats to their survival are entanglement in fishing gear, collisions with ship traffic, and pollution of their coastal habitat by human settlements (NMFS 2017a).

3.3.12 Sperm Whale

The sperm whale (*Physeter macrocephalus)* was listed as endangered throughout its range on June 2, 1970 under the Endangered Species Conservation Act of 1969 (35 FR 8495). Sperm whales are also protected under the Marine Mammal Protection Act of 1972.

<u>Species range</u>

Sperm whales are widely distributed in the North Pacific Ocean and seasonally present throughout the Gulf of Alaska. Sperm whales are found throughout the world's oceans in deep waters between about 60° N and 60° S latitudes. Their distribution is dependent on their food source and suitable conditions for breeding, and varies with the sex and age composition of the group (NMFS 2017b).

Sperm whales rarely enter semi-enclosed areas and prefer oceanic habitat, rarely occurring in waters less than 300 feet deep. The diet of the sperm whale consists of mostly cephalopods (squid and octopuses), but can also include fish (NMFS 2017b). Female sperm whales are generally found in deep waters (at least 3280 feet or 1000m) of low latitudes (less than 40°, except in the North Pacific where they are found as high as 50°). Immature males will stay with female sperm whales in tropical and subtropical waters until they begin to slowly migrate towards the poles, anywhere between ages 4 and 21 years old. Older, larger males are generally found near the edge of pack ice in both hemispheres. On occasion, however, these males will return to the warm water breeding area. (NMFS 2017b).

<u>Critical habitat</u>

Critical habitat has not been designated for the sperm whale.

<u>Life history and ecology</u>

Sperm whales feed almost exclusively on cephalopods (squid and octopuses), but in Alaska and a few other places fish are a staple of the sperm whales' diet. Some fish species consumed are rays, sharks, lanternfish, cod, and redfish. Feeding occurs year round, usually at depths below 120m (approximately 400 feet) (NMFS 2017b). Male sperm whales have been known to take sablefish directly from longline gear in the GOA (NMFS, 2010).

<u>Population trends and risks</u>

Currently, there is no good estimate for the total number of sperm whales worldwide. Despite the high level of take, the sperm whale remains the most abundant of the large whale species. Currently, the best estimates for whales in Alaska, which is based on extrapolations from few areas that have useful estimates, is between 100,000 and 200,000 (NMFS, 2010). Potential threats include collisions with ships and entanglement in fishing gear (NMFS 2017b).

3.3.13 Beluga Whale (Cook Inlet Stock)

In Alaska, Beluga whales (*Delphinapterus leucas*) are divided into five stocks: Cook Inlet, Bristol Bay, eastern Bearing Sea, eastern Chukchi Sea, and Beaufort Sea (NMFS 2017c). The Cook Inlet population is numerically the smallest of these, and is the only one of the five Alaskan stocks occurring south of the Alaska Peninsula in waters of the Gulf of Alaska. The Cook Inlet Beluga (CIB) whale stock was listed under the ESA as endangered in 2008 (73 FR 62919). The stock was also determined to be depleted under the Marine Mammal Protection Act. On April 11,2011, NMFS published the final rule designating the two areas (minus and exclusion zone) of Cook Inlet as critical habitat for the Cook Inlet beluga whales (76 FR 20180; 50 CFR part 226.220). On May 15th, 2015, NMFS published a draft recovery plan for the CIB whales under the ESA (NMFS 2017c).

Species range

As a species, beluga whales are circumpolar in distribution and inhabiting Arctic and subarctic regions including Russia, Greenland, and North America. In Alaska, the known range of beluga extends from Yakutat to the Alaska/Canada border in the Beaufort Sea. Beluga whales are generally found in shallow coastal waters, often in water barely deep enough to cover their bodies, but have also been seen in deep waters. They seem well adapted to both a cold ocean habitat and a warmer freshwater habitat and tolerant of salinity changes. Belugas can be found swimming among icebergs and ice floes in the waters of the Arctic and subarctic, where water temperatures may be as low as 32° F (0° C). They can also be found in estuaries and river basins (NMFS 2017c). Some beluga whale populations make long range seasonal migrations (Richard et al. 2001; Suydam et al. 2001), while others remain in relatively small areas year round. The Cook Inlet beluga whale is geographically isolated and a genetically differentiated population of beluga whales.

Multiple data sources indicate that belugas exhibit seasonal shifts in distribution and habitat use within Cook Inlet, however, belugas in Cook Inlet remain year-round (Hobbs et al. 2005). The known seasonal shifts in distribution of CIB appear to be related to seasonal changes in the physical environment (e.g., ice and currents) and to shifts in food sources, specifically the timing of fish runs (NMFS 2016e). In the fall, as anadromous fish runs begin to decline, belugas consume the fish species found in nearshore bays and estuaries. More data is currently available regarding the distribution, habitats, and abundance of Belugas in the 2016 Final Recovery Plan (NMFS 2016e).

Critical habitat

Effective May 11,2011, a final rule designated two areas comprising 7,800 square kilometers (3,013 square miles) of marine habitat in the of Cook Inlet as critical habitat for the CIB whales (76 FR 20180; 50 CFR part 226.220).

Life history and ecology

Belugas have low reproductive potential; that is, females have a single calf only every two or more years, and devote considerable time to caring for their young. Age at sexual maturity, length of gestation, and calving interval are unknown for Cook Inlet belugas. Data are not available for Cook Inlet belugas to precisely determine the generation time; however, when we consider available information regarding the age at first reproduction and age at senescence for belugas, NMFS estimates a generation time of approximately 25 years NMFS 2016e).

Belugas are social and are frequently observed in groups ranging in size from two to five to pods of more than 100 individuals. They are known to vocalize using grunts, clicks, chirps, and whistles to navigate, find prey and communicate. During summer months, they are often found in shallow waters and feed on schooling and anadromous fish including herring, capelin, eulachon, salmon and sculpins (NMFS 2017c). They are also known to eat octopus, squid, crabs, shrimp clams, mussels and sandworms (NMFS 2017c).

Population trends and risks

The Cook Inlet stock has been severely reduced in numbers over the last several decades. We estimate this population numbered as many as 1,300 in the late 1970s. The 2014 estimate is about 340 beluga whales in the Cook Inlet (NMFS 2016e).

3.3.14 Gray Whale (Western North Pacific DPS)

The Gray whale (Eschrichtius robustus) was listed as endangered throughout its range on June 2, 1970 under the Endangered Species Conservation Act of 1969 (35 FR 31094). Gray whales are also protected under the Marine Mammal Protection Act of 1972.

Species range

Two Pacific Ocean populations of gray whales exist: the Western North Pacific (WNP) stock and the Eastern North Pacific Stock (ENP). The ENP stock was delisted from the endangered list in 1994 due to recovery. Gray whales are found mainly in shallow coastal waters in the North Pacific Ocean. In the fall, gray whales migrate from their summer feeding grounds off Russia, and head towards wintering areas in the western and eastern Pacific (NMFS 2013b and NMFS 2015a).

Critical habitat

Critical habitat has not been designated for the gray whale.

Life history and ecology

Gray whales are frequently observed traveling alone or in small, unstable groups, although large aggregations may be seen on feeding and breeding grounds. Gray whales are bottom feeders and known to filter food through baleen plates while rolling on their sides and swimming (NMFS 2013b). Gray whales become sexually mature between 6-12 years, at an average of 8 years old. After 12-13 months of gestation, females give birth to a single calf (NMFS 2013b).

Population trends and risks

The Western North Pacific population remains highly depleted and its continued survival is questionable (NMFS 2013b). According to the 2014 stock assessment (NMFS 2015a), the population is estimated to include approximately 100 individuals. Given that some WNP gray whales occur in U.S. waters, there is some probability of WNP gray whales being killed or injured by ship strikes or entangled in fishing gear within U.S. waters. Additional concerns include shipping vessel congestion in migratory corridors, oil and gas projects, and ocean acidification (NMFS 2015).

3.4 REPTILES

3.4.1 Leatherback Sea Turtle

The leatherback sea turtle (*Dermochelys coriacea)* has been designated as endangered since June 2, 1970 (FR 25 (106): 8491-8499).

Species range

Leatherback turtles are widely distributed throughout the world's oceans. In the Pacific Ocean, they range as far north as Alaska and as far south as Chile and New Zealand. In Alaska, leatherback turtles are found in the Copper River Delta (60°34'N, 145°38'W) and as far west as the Aleutian Islands (Hodge 1979, Stinson 1984). Leatherbacks are commonly known as pelagic animals that forage in coastal waters and the most migratory and wide ranging of sea turtle species (NMFS 2016c).

Critical habitat

NMFS designated critical habitat to provide protection for endangered leatherback sea turtles along the U.S. West Coast in January 2012 (77 FR 4170). This critical habitat does not include their Alaska range.

Life history and ecology

Adult leatherback turtles are the largest sea turtles in the world. They have a shell length of 1.6m and a mass of 700kg, and females reach sexual maturity at an estimated age of 13-14 years of age. They live for more than 30 years (Zug and Parham 1996). Leatherbacks must surface to breathe and can stay submerged for two hours and dive to 1,000m. Males do not leave the ocean, but females come ashore on open, sandy beaches to dig nests and lay eggs. Nestlings emerge from the sand at night and attempt to make their way to the sea. Minimal information is known about the distribution and natural history of these young turtles after they leave their natal beaches (NMFS 2016c).

Population trends and risks

Western pacific and Eastern Pacific leatherbacks continue to decline. Western Pacific leatherbacks have declined more than 80% over the last three generations. Due to adult female leatherbacks frequently nesting on different beaches, nesting population estimates and trends are difficult to monitor (NMFS 2016c).

Leatherback turtles face threats on nesting beaches and in the marine environment. The greatest causes of decline and the continuing primary threats to leatherbacks worldwide are long-term harvest and incidental capture in fishing gear (NMFS 2016c).

3.4.2 Loggerhead Sea Turtle (North Pacific Ocean DPS)

The loggerhead sea turtle (*Caretta caretta)* was initially designated as threatened on July 28, 1978 (FR 43 (146): 32800-32812). On September 22, 2011, a rule listing 9 DPSs of Loggerhead Sea Turtles Under the ESA was finalized, including the North Pacific Ocean DPS (76 FR 58868).

Species range

Loggerheads occupy three different ecosystems during their lives; beaches (terrestrial zone), water (oceanic zone), and nearshore coastal areas ("neritic" zone) (NMFS 2014b). Loggerhead sea turtles are widely located throughout the world's oceans, inhabiting continental shelves, bays, estuaries, and lagoons in temperate, subtropical, and tropical waters (Dodd 1990). While they range as far north as Alaska and as far south as Chile in the Pacific, loggerheads are rarely encountered in U.S. Pacific waters (EPA 2014b).

Critical habitat

NMFS and the U.S. Fish and Wildlife Service designated critical habitat for the Northwest Atlantic DPS for loggerhead sea turtles in waters and beach habitat of the Gulf of Mexico and along the coast of the U.S. Atlantic Ocean. This critical habitat does not include the Alaska range.

Life history and ecology

Adult loggerhead sea turtles normally weigh approximately 250 pounds and have a shell length of approximately 3 feet. Females reach sexual maturity around 35 years of age. Males do not leave the ocean, but females come ashore on open, sandy beaches to dig nests and lay eggs. Nestlings emerge from the sand at night and attempt to make their way to the sea. The only known nesting areas for loggerheads in the North Pacific are found in southern Japan (EPA 2014b).

3.4.3 Green Sea Turtle

The green sea turtle (*Chelonia mydas))* was designated as threatened on July 28, 1978 (FR 43 (146): 32800-32812). On April 6, 2016, a rule to list 11 DPSs of green sea turtles as threatened or endangered under the ESA was finalized, listing the Central North Pacific DPS as threatened (81 FR 20057).

Species range

Green sea turtles are found in warm seas worldwide. Individual sightings of green sea turtles have been reported from Ucluelet Inlet, British Columbia, and Homer, Alaska (NMFS and USFWS 1998). In 1996, a live, cold-stunned east Pacific green sea turtle was recovered from Prince William Sound, Alaska (NMFS 2016d). No nesting is known to occur in U.S. Pacific waters.

Critical habitat

Critical habitat for green sea turtles does not include their Alaska range.

Life history and ecology

Green sea turtles primarily use three types of habitat: oceanic beaches (for nesting), convergence zones in the open ocean, and benthic feeding grounds in coastal areas. Adult females migrate from foraging areas to mainland or island nesting beaches and may travel hundreds or thousands of kilometers each way. After emerging from the nest, hatchlings swim to offshore areas, where it is believed they live for several years, feeding close to the surface on a variety of pelagic plants and animals. Once the juveniles reach a certain age/size range, they leave the pelagic habitat and travel to nearshore foraging grounds. Once they move to these nearshore benthic habitats, adult green sea turtles are predominantly herbivores feeding on sea grasses and algae (NMFS 2016d).

Population trends and risks

The principal cause of the historical, worldwide decline of green sea turtles is long-term harvest of eggs and adults on nesting beaches as well as juveniles and adults on feeding grounds. These harvests continue in some areas of the world and compromise efforts to recover this species. Incidental capture in fishing gear and disease are ongoing sources of mortality affecting the species' recovery (NMFS 2016d).

4.0 ENVIRONMENTAL BASELINE

This section describes the relevant resources and baseline conditions present in the project area that would be affected by or might affect the proposed action (reissuance of a NPDES general permit). The environmental baseline describes the habitat that exists within the action area and the amount of degradation that has occurred to date.

4.1 Water Quality

Because of Alaska's size, sparse population, and its remote character, the vast majority of Alaska's water resources are in pristine condition. More than 99.9% of Alaska's waters are considered unimpaired. With more than 3 million lakes, 714,000 miles of streams and rivers, 36,000 miles of coastline, and approximately 176,863,900 acres of freshwater and tidal wetlands, less than 0.1% of Alaska's vast water resources have been identified as impaired (ADEC 2012).

This permit covers seafood processor facilities within federal waters 3nm or more from shore. These vessels will be discharging into waters at least 60 feet deep (MLLW) with adequate flushing in areas of high tidal activity. Since these waters are not listed as impaired, there will be no facilities discharging into impaired waters.

5.0. EFFECTS ANALYSIS

This section describes the potential impacts of discharges from offshore seafood processing in Federal Waters off the coast of Alaska as per the Draft Permit. Figure 15 illustrates the general components considered as part of the effects analysis. The focus is on water quality and impacts to threatened and endangered species (TES) and their critical habitat because these resources are among the most vulnerable in the action area.

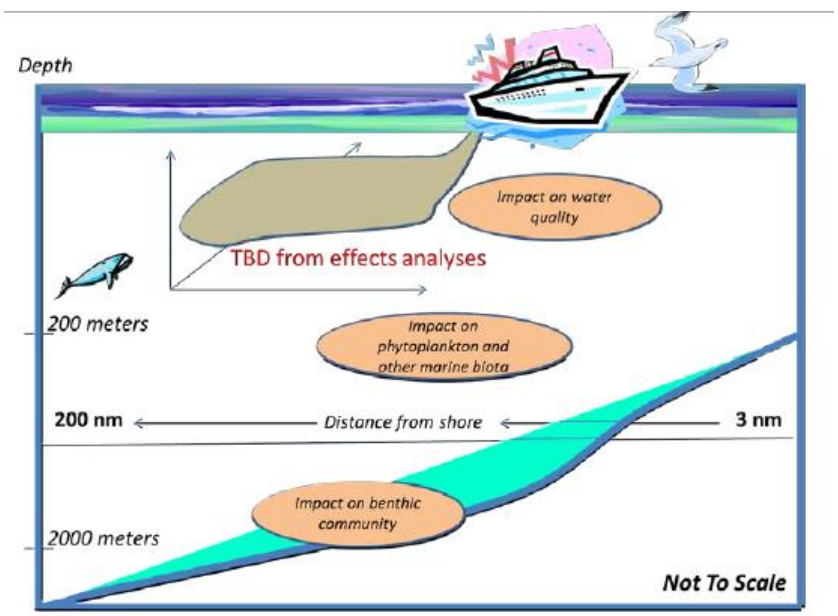

Figure 15. Schematic of Components of Effects Analysis

The major components of seafood processing wastes are blood, tissue, liquids, meat, viscera, oil and grease, shells, and bones. Except for the bones and shells, which are highly biodegradable, the wastes are primarily organic matter. Major pollutants consist of biochemical oxygen demand (BOD), solids (sediments and residues), oil and grease, and nutrients. These major pollutants are all considered conventional and of a non-toxic nature.

Potential adverse impacts on receiving water quality resulting from seafood processor wastes include (1) reduction in water column dissolved oxygen due to the decay of particulate and soluble waste matter; (2) the release of toxic levels of sulfide and ammonia from decaying waste; (3) nutrient enrichment and stimulation of phytoplankton growth and alteration of the phytoplankton community; and (4) the accumulation of waste solids and fish oils on the water surface, and the bottom. All of these potential water quality impacts may subsequently affect the biological communities present in the area of the discharge.

In general, impacts of seafood processing wastes on receiving water quality are inversely related to the assimilative properties of the receiving waters. In areas with strong currents and high tidal ranges, assimilation is high, waste materials disperse rapidly, and there is little impact on water quality. In areas of quieter waters, assimilation is lower, and waste materials can accumulate, resulting in solid waste piles, dissolved oxygen depressions, and associated aesthetic problems (EPA 1994a).
Based on the analysis of the impact of BOD and sediments (the primary pollutants in seafood processing discharge) discussed in the following sections, EPA finds that offshore seafood processing discharge, occurring in waters more than 3 nm from shore, is unlikely to cause significant adverse effects to water quality in Alaska. The water quality impacts of individual pollutants from seafood processor wastes are discussed below.

5.1 Impacts Associated with Solid Seafood Process Wastes

During discharge of seafood processing waste, biological impacts are most likely to occur as a result of the discharge of seafood waste particulates (both direct and indirect effects). The following discussion briefly presents the different potential effects of discharges on biota including burial and habitat modification, the alteration of sediment composition, and the chemistry associated with the decomposition of the waste solids.

5.1.1 Burial and Habitat Modification

Settling of seafood discharges on the seafloor occurs at varying rates according to the size of the particles. Once settled, these particles can form organic mats or thick waste piles that can smother the underlying substrate and benthic communities within it. Some waste piles have been recorded to rise 40 feet or more above the seafloor (ADEC, 1998). The degradation of this organic material occurs at varying rates according to different characteristics of the discharge area (i.e. biological, physical, and chemical factors).

Depending on the depth of burial, deposits can make the substrate inhospitable, or influence the species composition favoring opportunistic organisms that may out-compete the normal fauna. Algal blooms caused by high nitrogen concentrations can also alter habitat by smothering benthic substrates when they die, and by reducing the available water column or surface aquatic habitat for visual predators. Deposition could potentially reduce and possibly eliminate abundances of infaunal benthos such as polychaetes, mollusks, and crustaceans, and may affect demersal eggs of various benthic species including fish. Seafood processing waste solids are highly organic material and the decomposition of this material may lead to other impacts on benthos related to localized depression of dissolved oxygen.

In one study where salmon waste was widely distributed, the waste was completely absent within 33 days following discharge and no adverse effects on dissolved oxygen concentrations were noted (Stevens and Haaga 1994). The accumulation of these deposits in some areas indicates that the rate of discharge exceeds the assimilation capacity of some water bodies and more specifically, the assimilation capacity of the benthic community and other aquatic life that metabolize this material. Discharges covered under the proposed permit are for mobile offshore vessels in areas of good flushing which should limit the accumulation of seafood discharges on the seafloor.

ADEC has assumed that if discharge limits are adhered to, the effects on aquatic biota should be minimal.

Facilities discharging under the Draft Permit should not create piles nor mats of organic waste, and any potential accumulation should be less than 0.2 in (0.5 cm), according to the numerical analysis calculated in the Ocean Discharge Criteria Evaluation (USEPA, 2018). Discharges covered under the Draft Permit are for offshore vessels that are constantly moving and discharging in depths usually greater than 210 ft. In addition, permittees will be required to be underway while discharging, unless doing so will compromise vessel safety. Flushing in the action area is high, which will disperse seafood processing wastes. Discharges in compliance with the Draft Permit should have minimal effects on aquatic biota and benthic communities. Therefore, it is expected that deposition of seafood deposits on the seafloor should be minimal and result in temporary effects to the aquatic biota.

5.1.2 Altered Sediment

Alteration of sediment characteristics is expected to impact the benthic community structure more subtly, but at greater distances from the point of discharge, than smothering. Benthos would be the group of organisms most affected by changes in the sediment, but other organisms may be affected as well; impacts to benthic communities could also conceivably affect epibenthic and pelagic invertebrates, fish, birds, and mammals that rely on benthic invertebrates for food.

The general changes in benthic community structure and function that occur under conditions of increasing organic enrichment of the sediments (such as occurs as a result of seafood waste discharges or municipal sewage effluent discharges) have been well documented (see Pearson and Rosenberg 1978 and Germano & Associates 2004). Slight to moderate enrichment results in slight increases in numbers of individuals and biomass of benthic communities, while species composition remains essentially unchanged. As enrichment increases, the overall abundance of benthic organisms increases however, there is a corresponding decrease in the number of species as the less tolerant species are eliminated. In more extreme cases and those near the center of deposition areas associated with active stationary seafood processing waste discharges, only a relatively small number of species adapted to disturbed environments and/or high organic content may colonize the location. When the enrichment levels are optimal for those few species, they become extremely abundant, and overwhelmingly dominate the benthic community. Biomass generally decreases however, because many of these opportunistic species are very small.

These changes in benthic community variables are accompanied by a progressive reduction in the depth of the oxygenated surficial sediment layer, and changes in the predominant trophic groups of benthic organisms. Mixed assemblages, or assemblages dominated by suspension feeders, are first replaced by assemblages dominated by surface deposit feeders, and then replaced by assemblages dominated by subsurface deposit feeders. Under very highly enriched conditions, such as those that exist within active waste piles generated by seafood waste discharges, the sediments become anoxic and macrobenthic organisms may be entirely absent.

The absence of benthic organisms has been documented by divers on several seafood waste piles in Alaskan coastal waters during compliance diver surveys conducted by USEPA and others. In a study of a major seafood processor in Akutan, Alaska, USEPA (1984b) documented those anoxic conditions in the sediments producing severe impacts to benthic infaunal communities that were confined to areas under seafood waste piles. These results were mirrored in later studies conducted by Germano & Associates (2004). It is typical for areas extending outward around the actual waste pile deposits ranging from approximately five to a few hundred meters from the edge of the pile to experience lesser impacts. These results were based on sediment chemical composition, visual inspection, and sampling of the benthic infauna communities. Characteristics of the benthic community around the discharge pile included low species richness, and dominance by polychaetes typically associated with high organic inputs and bottom disturbance (USEPA 1984b and Germano & Associates, 2004).

Discharges covered under the Draft Permit are for offshore processing vessels discharging in areas of good flushing, which will rapidly disperse seafood processing wastes and significantly limit any accumulation of solids on the seafloor, according to the numerical analysis calculated in the Ocean Discharge Criteria Evaluation (USEPA. 2015). Discharges covered under the Draft Permit are for offshore discharging in depths usually greater than 210 ft. In addition, permittees will be required to be moving while discharging, unless doing so will compromise vessel safety. Discharges in compliance with the Draft Permit should have minimal effects on aquatic biota and benthic communities. Therefore, waste piles should not accumulate and sediment alterations should be minimal.

5.1.3 Decay of Process Waste

As noted above, the decay of organic matter accumulations can effect chemical changes within the sediments and may lead to anoxic conditions within the waste pile. The decay of solid waste accumulations may also result in depletion of dissolved oxygen in the overlying water column and releases of potentially toxic decay byproducts like unionized ammonia and undissociated hydrogen sulfide. Again, benthic communities and demersal eggs would be directly adversely affected by anoxic conditions within the waste pile. Most infauna would either migrate out of the area or be killed as a result of the lack of oxygen. Anoxic conditions are expected to destroy any demersal eggs that might be present. A few species may be able to survive within the thin upper sediment layer of the waste pile (e.g., *Capirella* spp.).

Since ambient waters containing abundant dissolved oxygen rapidly mix with the affected waters, reductions of dissolved oxygen concentrations throughout the overlaying water column are not expected, nor are significant impacts to mobile marine organisms. Any areas of reduced dissolved oxygen above a waste pile would be expected to be small and would be avoided or quickly passed through by mobile organisms.

Indirect impacts could also occur with respect to ecosystem interrelationships resulting from behavioral changes, but these would be difficult to observe and correlate with seafood waste disposal. For example, altered sediment composition may inhibit larval recruitment or feeding and survival of individual benthic species in some areas, resulting in subtle changes in species composition.

Discharges covered under the Draft Permit are for offshore vessels discharging in depths usually greater than 210 ft. In addition, permittees will be required to be moving while discharging, unless doing so will compromise vessel safety. Flushing in the action area is high, which will disperse seafood processing wastes. Discharges in compliance with the Draft Permit should not create waste piles and should have minimal effects on aquatic biota and benthic communities.

5.1.4 Cumulative Impacts of Solids Deposition

The quantity of benthic organisms preyed upon by other species could be reduced in the area of the discharge if benthic organisms migrate from the area, or experience increased mortality or decreased recruitment, through smothering, toxicity, or alteration of sediment grain size characteristics. Issues affecting temporal or spatial extent of such impacts are discussed by Muellenhoff (1985). Processors covered by the Draft Permit discharge wastes in areas that are usually at least 210 feet deep with rapid dispersion and high flushing to minimize accumulation of seafood processing wastes on the seafloor, minimizing the potential for smothering or toxicity to benthos. In addition, Permittees will provide seafood nutrients back into the ecosystem in the form of their discharge. Thus, the degree of food supply reduction caused by discharges of seafood processing waste should be minimal. Impacts from any individual seafood processing facility discharging in compliance with the requirements of the proposed permit are likely to be localized. Although benthic organisms may be smothered or community composition altered in localized areas, these potential effects should be minimal as the permit requires that the seafood processor facilities be located in waters at least 60 feet deep (MLLW) with adequate flushing for dispersion of the seafood wastes.

Therefore, the benthic communities in Alaskan coastal waters would not be expected to be substantially impacted. Additionally, this permit does not allow for ZODs. To further address the potential for cumulative impacts from numerous facilities, specific general permits have been developed for facilities operating in the Pribilof Islands and Kodiak Island.

Impacts from toxicity due to anoxic conditions and changes in community structure could occur but should be limited as disposal of seafood wastes in areas of good flushing should disperse wastes and minimize the potential for large waste piles. Although more complete knowledge would be of value in assessing the magnitude and significance of cumulative environmental impact, available data indicate that unreasonable degradation is not likely to occur in areas of adequate dispersion and dilution (e.g., USEPA 1984a and Germano & Associates, 2004). As stated previously, the mobile offshore processors covered in the proposed permit would be expected to be in high tidal areas with adequate dispersion and dilution where the seafood discharges are not expected to significantly accumulate and effects should be minimal.

5.1.5 Indirect Effects through Food Supply Reduction

The quantity of benthic organisms preyed upon by other species could be reduced in the area of the discharge if benthic organisms migrate from the area, or experience increased mortality or decreased recruitment, through smothering, toxicity, or alteration of sediment grain size characteristics. Issues affecting temporal or spatial extent of such impacts are discussed by Muellenhoff (1985). Processors covered by the Draft Permit discharge wastes in areas that are usually at least 210 feet deep with rapid dispersion and high flushing to minimize accumulation of seafood processing wastes on the seafloor, minimizing the potential for smothering or toxicity to benthos. In addition, Permittees will provide seafood nutrients back into the ecosystem in the form of their discharge. Thus, the degree of food supply/nutrient reduction caused by this biomass reduction resulting from these fishing activities should be minimal.

5.2 Exposure to Suspended Solids

Within this region, zooplankton and fish larvae near the discharge may experience temporary effects including altered respiratory or feeding ability due to stress, or clogging of gills and feeding apparatus. Phytoplankton entrained in the discharge plume may have reduced productivity due to decreased light availability. However, such potential impacts may be offset in the farfield by increases in nutrient concentrations. These impacts should result in negligible impacts to populations in the region, as impacts should be restricted to the immediate vicinity of the discharge. Mobile invertebrates, fish, birds, and mammals presumably will avoid the discharge plume if conditions become stressful. However, biota may also be attracted to the discharge plume to feed on the discharged particulates. Secondary impacts associated with attraction are discussed in Section 5.4. Infaunal or sessile organisms near the discharge are not likely to be impacted by the suspended solids since the vessels will be moving while discharging.

In addition to potential chemical and physical alterations of the water column and benthos, seafood processing residues can cause some aesthetic and physical effects on the water surface that could impair existing or designated uses. For example, depending on water currents, presence and severity of storms, and other factors, residue material, may wash up on nearby shorelines impairing aesthetic quality as well as creating an undesirable attraction of nuisance species and predators. In addition, seafood processing residues can form a surface layer of scum, foam, or fine particles that could present a physical barrier preventing dissolved oxygen re-aeration, block light to the water column, deter avian feeding, and create an aesthetically undesirable condition. Such effects could also attract nuisance species and unwanted predators that would impair beneficial uses.

The Draft Permit proposes to prohibit seafood processors from discharging waste within 1 nm of critical habitat of the listed eider species and 3 nm from rookeries or haulouts of Steller sea lions. Discharging wastes in areas away from critical habitat as well as in areas of high tidal activity to disperse the wastes and should minimize the potential for accumulation of seafood waste to become an attractant to listed species as well as minimize the potential for residues from seafood wastes to wash up on shore. The Draft Permit proposes to prohibit facilities from discharging wastewaters that contain substances that float as debris, scum, oil, or other matter to form nuisances. The Draft Permit also prohibits the discharge of seafood processing wastes that create an attractive nuisance situation whereby fish or wildlife are attracted to waste disposal or storage areas in a manner that creates a threat to fish or wildlife or to human health and safety. See Section 2.3.9 for a discussion of Draft Permit provisions to avoid impacts to seabirds. If an operator complies with the Draft Permit conditions, these prohibitions would limit such concerns under normal operating conditions.

5.3 Liquid Seafood Process Wastes

Liquid seafood processing discharges includes two waste streams, one directly associated with the seafood waste and the other associated with ancillary operations whose wastewaters do not come in contact with seafood waste. Liquid seafood processing wastes contain soluble materials that include soluble oxygen demanding substances (i.e., BOD), nutrients and oil and grease. These discharges may also contain disinfectants, including ammonia and chlorine which may produce direct toxic effects. Liquid discharges that are not directly associated with seafood processing activity and that do not come into direct contact with seafood waste (e.g., bailwater, cooling water, boiler water, etc.) are generally not expected to impact marine organisms because they are considered to be non-toxic, do not contain significant amounts of oxygen demanding substances and nutrients, or in the case of soluble sanitary wastes, are treated prior to discharge. The potential impacts to marine organisms due to the discharge of substances with elevated BOD, nutrients, disinfectants, and total metals are discussed below. Chemicals that are considered bioaccumulative or persistent are not known to be present in seafood processing waste discharges.

5.3.1 Biochemical Oxygen Demand/Dissolved Oxygen

DO is a key element in water that is necessary to support aquatic life. DO is depleted during the breakdown of "oxygen-demanding" substances such as organic matter and ammonia. These substances are usually destroyed or converted to other compounds by bacteria if there is sufficient oxygen present in the water; however, DO needed to sustain fish life may be consumed in this breakdown process.

DO depletion caused by decomposition of organic matter or nitrification of ammonia is sometimes measured as BOD. BOD is a measure of the amount of oxygen consumed by the respiration of microorganisms while feeding on decomposing organic material. Organic seafood wastes can exert a large BOD in receiving waters. The impact of BOD on water quality is particularly influenced by the dispersive capacities of the receiving water. In areas of low flushing, BOD from seafood processing effluent may depress DO to unacceptable levels (Ahumada et al. 2004). Conversely, studies have found little impact of BOD in areas with highly dynamic water regimes (Gates et al. 1985).

In areas of high BOD loads and low flushing, it is possible to reach conditions where DO in the water is totally exhausted, resulting in anaerobic conditions and the production of undesirable gases such as hydrogen sulfide and methane (Ahumada et al. 2004). Emission of these gases has been observed in seafood processing centers (e.g., Dutch Harbor) in sufficient quantities to form bubbles and cause skin and eye irritation to divers (EPA 2005b). Water with high BOD also has the potential for increased bacterial concentrations that degrade water quality (EPA 2005b). High BOD loads coupled with low dispersive capability may cause low DO concentrations or the complete absence of DO, which can be lethal to marine organisms.

The proposed permit does not allow discharge in areas of low flushing and since offshore processor vessels are expected to be in highly dynamic water, it is expected the discharges covered under the proposed permit would have little impact on BOD. In general, the coastal waters of Alaska are well oxygenated and provide a considerable buffer for the assimilation of soluble organic wastes. In areas of restricted circulation or relatively low ambient dissolved oxygen concentrations resulting from natural processes, the potential for adverse effects on marine organisms from depletion of dissolved oxygen is increased. Nonetheless, modeling studies presented in the ODCE indicate that typical seafood discharges to well-oxygenated open coastal waters or semi-enclosed embayments will not likely result in impairment due to dissolved oxygen except as noted above at the interface of the sediment and the water column.

5.3.2 Nutrients and Dissolved Oxygen

Excessive nutrients can cause a multitude of problems in coastal areas including eutrophication, harmful algal blooms, fish kills, shellfish poisonings, loss of seagrass and kelp beds, coral reef destruction, and reduced DO. As stated above, nitrogen is a common pollutant found in seafood processing waste. Nitrogen is known to be particularly damaging to bays and coastal seas by boosting primary production (the production of algae). With excessive amounts of nitrogen, the growth of algae and denitrifying bacteria increases making the water more turbid. As the algae die and decompose, dissolved oxygen is depleted from the surrounding water if there is insufficient mixing or other re-aeration mechanisms present (Howarth et al., 2000; Novatec, 1994). High levels of living algae can also lead to depletions in oxygen over the nighttime hours due to their oxygen consumption during this time period. Low dissolved oxygen levels can cause direct mortality of organisms, or reduced efficiency of physiological processes (e.g. food processing, growth). These changes in nutrients, light, and oxygen, favor some species over others causing shifts in phytoplankton, zooplankton, and benthic communities (Howarth et al. 2000). In particular, animals that rely directly or indirectly on seagrass beds could be affected by algal blooms caused by excessive nutrients.

Unlike solid residues, nutrients are water soluble and can therefore be transported beyond areas of heavy deposition unless assimilated by aquatic life, sorbed to sediments, or released to the atmosphere (denitrification and volatilization of nitrogen). Insufficient dilution or mixing of transported nutrients could conceivably affect other locations.

There have been no analyses of nutrient enrichment impacts in Alaska and it is unknown what nutrient-related effects have occurred from seafood processing discharges. Seafood discharges from offshore vessels are expected to occur in areas adequate dispersion and dilution so that nutrient-related effects from seafood processing discharges should be minimal.

5.3.3 Total Metals

The 2009 General Permit required each Permittee to conduct, at a minimum, quarterly influent and effluent monitoring for total metals (including arsenic and selenium – both metalloids) for two years. The monitoring requirement was established to evaluate: effluent impacts on the receiving water in contrast to ambient levels, to ensure marine water quality criteria are being met, and/or to determine if additional effluent limitations are required in the future.

The 2009 General Permit required each Permittee to conduct, at a minimum, quarterly influent and effluent metals monitoring for at least two years. The monitoring requirement was established to evaluate effluent impacts on the receiving water in contrast to ambient levels, to ensure marine water quality criteria are being met, and/or to determine if additional effluent limitations are required in the future. The pollutants analyzed included total concentrations of arsenic, cadmium, copper, lead, mercury, selenium, silver, and zinc.

Section 3.2.3 of the ODCE describes in detail the results and analysis of the total metals monitoring (USEPA, 2018). The results indicate that soluble wastes from seafood processing and ancillary operations may contain concentrations of total metals which exceed marine 304(a) water quality criteria. However, due to the strong dispersion potential of the receiving water, total metals from the effluent are expected to rapidly decrease to concentrations below the safe limits set by marine water quality standards. EPA evaluated the expected concentrations after dilution by comparing the metals results to the dilution calculations made for TSS and BOD (Sections 3.2.1 and 3.2.2 of the ODCE). This analysis indicates that the available dilution is greater than 10 times what would be required to dilute the 95th percentile concentration to the 304(a) criteria. Therefore, after dilution, concentrations of metals are expected to be below the water quality standards. The discharge of metals in the effluent is not expected to cause deleterious effects to the marine environment. Section 10.1 of the ODCE briefly summarizes information pertinent to the determination of unreasonable degradation with respect to the ten criteria of 40 CFR 125.122.

The General Permit does not authorize the discharge of seafood processing by-product within 3 nm of Stellar sea lion rookeries and haul-outs, within 1 nm of designated critical habitat for the Steller's eider or spectacled eider, including nesting, molting and wintering units, with the exception of seasonally permitted dishcharge within 1 NM of spectacled eider critical habitat Wintering Area, Unit 5 from June 10 through December 31, and not within 1 nm of marine sanctuaries and refuges, parks, national and historic monuments, national seashores, and wilderness areas. This provision is in place to mitigate incidental take of ESA species and should hinder direct contact with the discharge.

5.3.4 Enhanced Productivity

Because phytoplankton form the base of the food chain, impacts to the phytoplankton community could have significant effects on the marine ecosystem (Legendre 1990). Although enhanced phytoplankton growth would not necessarily be an adverse effect since phytoplankton form the base of the marine food chain, a large increase in phytoplankton standing crop or changes in species composition, particularly to toxic species, could have adverse effects on dissolved oxygen concentrations, aesthetic water quality, other marine organisms, and humans.

Several factors control the rate of phytoplankton productivity and the accumulation of algal biomass. These include temperature, light intensity, mixing depth, and the supply of other nutrients such as nitrogen, phosphorus, silica, and a number of other essential elements (e.g., iron, manganese, zinc, copper, and cobalt). Other factors influencing phytoplankton productivity and biomass that are still poorly understood include inhibitory and stimulatory substances such as vitamin B12 and chelating agents (Aubert 1990; United Nations 1990). Factors influencing changes in phytoplankton community composition are also poorly understood, but are generally related to adaptations of certain species to specific combinations of the factors identified above. For example, diatoms (a group of marine and freshwater algae) appear to be favored when available nutrient concentrations (especially silica) are high and turbulent water column mixing is adequate to maintain these algae in the upper water column layer where light is available. An additional factor that controls the biomass and species composition of phytoplankton is the grazing activity of zooplankton that may feed selectively on certain species of phytoplankton.

The potential for adverse impacts of nutrient discharges from seafood processing facilities would necessarily depend on whether the amount of nitrogen or phosphorus available limit phytoplankton growth in the vicinity of the discharge or if other influencing factors contained in the waste discharge could significantly influence phytoplankton production. Other relevant factors to consider include water exchange, mixing depth, zooplankton grazing activity, and the depth of light penetration in the water column. These variables make it difficult to predict the potential impact of nutrient rich waste discharges from seafood processors on Alaskan marine phytoplankton communities. However, impacts are most likely to occur in relatively shallow areas of restricted water circulation where nitrogen or phosphorus limitation of phytoplankton growth occurs.

Therefore, discharges to relatively well-flushed offshore areas, as required in this permit, have a lower potential to cause enhanced phytoplankton growth and biomass.

5.3.5 Alterations in Phytoplankton Species Composition/Toxic Phytoplankton

Alterations in phytoplankton species composition is another potential impact of nutrient rich discharges on marine phytoplankton. Concerns regarding alterations in phytoplankton community composition are related to indirect effects resulting from increasing the populations of phytoplankton species that may produce adverse effects on marine organisms and humans. Effects produced by some phytoplankton species include physical damage to marine organisms (e.g., diatom species of *Chaetoceros* that have caused mortality of penned salmon), toxic effects to marine organisms (e.g., a raphidophyte flagellate species of *Hererosigma*), and toxic effects to humans due to the concentration of algal toxins in marine fish and shellfish [e.g., Paralytic Shellfish Poisoning (PSP), Diarrheic Shellfish Poisoning (DSP), Neurotoxic Shellfish Poisoning (NSP), Amnesic Shellfish Poisoning (ASP), and ciguatera] (Taylor 1990; Haigh and Taylor 1990). Concerns regarding toxic phytoplankton have been heightened in recent years due to suspicions that the frequency of toxic phytoplankton blooms has increased due to human activities, especially due to agricultural runoff and the discharge of municipal and industrial wastewater to marine coastal areas (Smayda 1990; Smayda and White 1990; United Nations 1990; Anderson 1989).

Although there have been several reports linking mortalities of relatively large numbers of marine mammals (e.g., O'Shea et al. 1991; Anderson and White 1989; Geraci 1989; Geraci et al. 1989; Gilmartin et al. 1980), fish and shellfish (e.g., Cosper et al. 1990; Harper and Guillen 1989; Smayda and Fofonoff 1989), and aquatic plants (e.g., Cosper et al. 1990) to the occurrence of toxic phytoplankton in other parts of the U.S., no such episodes have been reported for the coastal waters of Alaska. The occurrence of human intoxication due to PSP has been recorded at locations in southeast Alaska (Sundstrom et al. 1990). PSP is caused by the consumption of shellfish that have concentrated toxins from an algae of the species *Protogonyaulax* (Shimizu 1989); however, direct links between the occurrence of PSP and eutrophication have not been established (Anderson 1989). Therefore, the linkage between PSP and seafood processing discharges, while possible, is tenuous.

Although there is a potential for the discharge of seafood processing waste to cause localized changes in phytoplankton species composition, there are no known studies to verify that discharges of seafood processing wastes have produced toxic or harmful phytoplankton blooms. Similarly, while Paralytic Shellfish Poisoning has been documented in Southeast Alaska, there is currently no evidence suggesting a linkage with seafood processing discharges. Since this permit requires discharge of seafood wastes at least 3 nm from shore in areas with adequate flushing, the eutrophication which could potential lead to phytoplankton blooms should be minimal.

5.3.6 Impacts of Disinfectants/Residual Chlorine

Soluble wastes from seafood processing discharges may contain residual concentrations of chlorine-based disinfectants. Residual chlorine and chlorine-produced oxidants have been shown to be toxic to marine organisms at relatively low concentrations (USEPA, 2002; Thatcher, 1978). Thatcher (1978) conducted 96-hr LC50 continuous-flow bioassays on a number of species of fishes and invertebrates typical of the Pacific Northwest and determined that juvenile species of salmon were particularly sensitive. The lowest LC50 determined for coho salmon was 32 μg/L.

The Draft Permit does not include a chlorine limit, but does require the development of a best management practice (BMP) Plan. The BMP Plan specifically requires that Permittees include measures to minimize the use of toxic disinfectants where applicable. Chlorine dissipates rapidly and would not be expected to degrade the receiving water quality in the open ocean.

5.4 Secondary Impacts Due to Seafood Processing Wastes

Potential secondary impacts of seafood waste discharges involve effects on marine mammals and birds due to their attraction to seafood waste discharges as well as the fishing activity. Although a number of potential secondary impacts to marine organisms are outlined below, supporting studies to fully understand these impacts are limited. Bacteria associated with the decaying seafood waste may also adversely impact marine mammals and birds. The potential indirect impacts resulting from eutrophication of marine waters have been previously discussed in Section 5.3.4.

5.4.1 Attraction of Organisms to the Discharge

The attraction of marine mammals to seafood processing waste discharges can create several potential issues for marine fauna. Attraction to waste can influence predator/prey relationships. The attraction of marine mammals to seafood waste discharges may make them more susceptible to predation. Loughlin and York (2000) cited that discharges from offshore seafood processing facilities attract both Steller sea lions and killer whales, resulting in increased predation above natural levels, although actual increases in mortality has not been accurately quantified.

The attraction of birds to fish waste from fishing vessels is well known in Alaskan waters (Bluhm and Bechtel 2003, USFWS 2005). Seafood waste discharges can increase localized populations of gulls and parasitic birds, which may adversely affect the breeding success of some bird species. Similarly, Reed and Flint (2007) cite the correlation of eiders attracted to an area with seafood processing with increased predation by eagles. Another potential secondary impact involves the development of dependence on an anthropogenic food supply that may result in the concentration and growth of populations of marine mammal and birds that could be adversely affected with a reduction or elimination of this food supply.

Birds that are attracted to surface plumes of seafood waste (especially floating particulates) may potentially become oiled or their feathers fouled if there is an accumulation of waste fish oils on the water surface. Unless the volume of floating oils was significant and the birds were constantly diving through it, it is unlikely that fouling of the feathers would occur, especially in light of the Draft Permit requirement to be moving during discharge (in order to increase dilution). No literature was found that documents/describes this negative outcome for birds interacting with seafood wastes.

A significant issue with bird attraction to commercial fishing operations is encounters with the fishing gear. Seabirds can be killed in trawl fisheries when they become entangled in cables and nets (Bird Life International 2008). The frequency and severity of cable strikes is a function of a variety of operational and physical factors (Sullivan et al., 2006a, b). The FWS states in their first 5-year review (USFWS 2009) that seabirds attracted to offal and discards from trawl vessels may strike cables while they fly about, presumably in search of offal. They may also get pinned against any wire or cable by hydrostatic pressure and forced underwater if the cable comes upon them as they sit on the water. Third wire cable strikes can occur at particularly high rates when the third wire enters the water within or near the offal plume emanating from a vessel. This is especially likely to occur when a vessel changes course while towing gear or when cables are towed through plumes of offal. A short-tailed albatross was killed in the longline fisheries of the Oregon coast in 2011 (Fish and Wildlife Service 2014).

Although it is the actual fishing process and gear that can injure or kill birds, the discharge of offal, even minced offal, has been shown to act as an attractant. The offal draws birds to the area where they both exposed to the fishing gear, or where they are further attracted to the fishing activity, which can also result in injury from the gear. The influence of offal as an attractant has been recognized in trawl fishing around the world for some time. In an Antarctic scientific trawling study, Santora et al. (2009) found that the presence of discards coincided with an increase in numbers of Black-browed albatrosses and cape petrels. Vessel trawl activity alone (no discharge) was not correlated to seabird attendance. A seabird observational study of the Falkland Islands demersal trawl fishery found significant mortalities associated with trawler operation (Sullivan et al., 2006b). This extensive study (157 operation days) found that all bird mortalities occurred during times of offal discharge. In a study of seabird attendance in the Alaskan groundfish fishery, bird observations occurred only during times when offal was being discharged (i.e., when potential food was available) (Zador and Fitzgerald 2008). Wienecke and Robertson (2002) found wildlife-fisheries interactions with the Australian patagonian toothfish trawler operations were rare. Minimal interactions were attributed to fisheries management requirements including controls on discharge (i.e., meal plant discharge only, discharging at night, and leaving the fishing grounds to discharge). Similar conclusions on seabird attraction to discards and that the form of discards influences attraction have been reached by other researchers (Furness et al., 2007, Pierre et al., 2010).

As stated in the USFWS BiOp for the Alaskan fishery (2015), in the pelagic trawl fleet, discards vary greatly with the largest of catcher processor operating fish meal plants that result in little discard, to other vessels that discard whole fish or a macerated offal (Zador and Fitzgerald 2008, Melvin et al., 2011). Seabird attraction to vessels varies based on the many factors, including the type, form, and amount of discard as well as other environmental factors such as time of year (Zador and Fitzgerald 2008). Abrahams et al. (2009) compared three treatments of New Zealand trawler offal discharge to assess effectiveness of reducing seabird attraction (attendance): 1) ‘unprocessed’ waste (fish offal and whole discards), (2) minced small particle size, and 3) fishmeal processing waste discharged as sump water. They found mince discharge reduced the numbers of large albatrosses (Diomedea spp.) but had no significant effect on other groups of seabirds. In contrast, reducing discharge to sump water resulted in a significant reduction attendance numbers of all groups of seabirds, including the small albatross group (mostly Thalassarche spp.). Melvin et al. (2011) compared two catcher-processors in the Bering Sea walleye pollock fishery, one that processed fish oil and meal (minimal discharge) and one that discharged minced offal. Bird attendance was significantly higher at the vessel that discharged minced offal. Their findings were consistent with Abrahams et al. (2009), in that mincing of the offal had no effect but discharge of rendering offal reduced the number of individuals of all seabird species including ones that are similar in size to the North Pacific albatrosses.

5.5 Summary of Effects Analysis

The potential adverse effects of seafood processing waste include direct and indirect impacts of the solid and liquid waste discharges to marine organisms. Potential direct impacts of solid waste discharges, including burial of benthic communities, alteration of the sediment texture, and chemical changes within the sediments as a result of decaying organic matter accumulations, are expected to be minimal due to the movement of vessels and limits of discharges to beyond 3 nautical miles from shore. The decay of accumulated solid waste may reduce concentrations of dissolved oxygen in the overlying water column and release potentially toxic decay byproducts like unionized ammonia and undissociated hydrogen sulfide. A recent study has shown that anoxic conditions in the sediment extend out several acres further than the known boundaries of the waste piles and can cause impacts to benthos outside of this area. Permitted discharges of seafood waste to oxygenated well-flushed areas at rates consistent with permit limitations for the proposed permit are not generally expected to result in waste piles or cause levels of dissolved oxygen or toxic substances that could have an adverse effect on marine organisms.

Eutrophication of coastal marine waters is not expected to occur in locations where water exchange is adequate to dilute nutrient inputs from seafood processing waste discharges. However, the degree of eutrophication is not known in areas where there is low flushing. Residual concentrations of chlorine disinfectants in the liquid waste stream, and additional oxidants produced by the reactions of chlorine with other compounds, should not accumulate to levels of concern for these species in areas of good flushing.

Residual concentrations of chlorine disinfectants in the liquid waste stream, and additional oxidants produced by the reactions of chlorine with other compounds, are expected to be low due to the nature of the treated discharge, amount of dilution, and rapid dispersion. Each vessel must address disinfectant use as a part their BMP plans to minimize disinfectant use to extent practicable.

The attraction of marine mammals and birds to seafood processing waste discharges has the potential to create indirect impacts. It is anticipated that restrictions and limitations included in the Draft Permit will diminish these types of potential impacts. As explained above, in order to reduce seabird interaction with the discharge, the EPA took the initiative to work with the USFWS and with seabird/short-tailed albatross experts, and developed provisions described in Section 2.3.9.

Eutrophication of marine waters may also indirectly result in enhancement of phytoplankton species that are toxic to marine organisms and humans. Although toxic phytoplankton species occur in marine waters of Alaska, there is no known evidence to date to establish a link between the occurrence of toxic phytoplankton and seafood processing waste discharges.

5.6 Threatened and Endangered Species Effects Analysis

As discussed in Section 5.1, discharges of seafood processing wastes can have an adverse effect on water quality. These water quality impacts can, in turn, impact biological communities including threatened and endangered species. Potential effects to threatened and endangered species and effects to critical habitat are discussed in the following sections to assist in determining the effect for each listed species.

In accordance with Section 7 of the ESA, the EPA engaged NMFS and USFWS to understand the impact of removing the grinding requirement on ESA-listed species. Literature and subject matter experts at NMFS expressed concern to listed species if the grinding requirement were removed. NMFS believed that larger pieces of seafood waste are more attractive to the Steller sea lion. NMFS suspected that Steller sea lion foraging behavior would be disrupted if large pieces of its primary prey species were discharged by vessels. In contrast, USFWS expressed that the larger pieces of seafood waste may be less attractive to the short-tailed albatross, in other words, removing the grinding requirement may lessen the impact of the discharge on the short-tailed albatross.

For this permit cycle, the EPA is proposing to remove the effluent grinding requirement, except in cases when vessels that discharge greater than 10 million pounds per annual report year across all Alaska waters where discharges are authorized by the Permit discharge into Steller sea lion critical habitat areas designated by NMFS in 50 CFR § 226.202 and Tables 1 and 2 to Part 226. NMFS provided the EPA with suggested mitigation measures for vessels exempt from grinding in Steller sea lion critical habitat to help quantify and reduce the effects of the action. EPA provided these suggested mitigation measures in the Fact Sheet that accompanied the draft General Permit. EPA requested comment on these mitigation measures as part of the public comment period.

Additional effects analyses for threatened and endangered species in the project area is continued in detail, below.

5.6.1 Fish

West Coast salmon species currently listed under the ESA originate in freshwater habitat in Washington, Oregon, Idaho and California, although they may migrate into Alaskan waters for a significant portion of their adult lives. No stocks originating in Alaska are listed under ESA, and none of the listed Evolutionarily Significant Units (ESUs), have critical habitat delineated in Alaskan waters. The species that originate in freshwater habitats in Washington, Oregon, Idaho and California may have the potential to migrate to Alaska waters but the sightings of these species are rare in Alaska. It is expected that offshore seafood processor discharge will have insignificant and discountable effects on west coast salmon species. Therefore, EPA has determined that approval of the offshore seafood processor general permit is **not likely to adversely affect** any of the listed west coast salmon species.

5.6.2 Birds

5.6.2.1 Short-tailed albatross

Short-tailed albatross are found throughout the North Pacific Ocean, including the action area of the Draft Permit. No critical habitat has been designated, as the short-tailed albatross breeds primarily on islands in Japan. Short-tailed albatross life history and threats are discussed in Section 3.2.1.

<u>Direct Effects</u>

Potential impacts from seafood processing discharge to short-tailed albatross are, in part, related to floating wastes. The Draft Permit prohibits the occurrence of substances that float as debris, scum, oil, or other matter to form nuisances on the surface. It also requires surface waters to be virtually free from floating nonpetroleum oils of vegetable or animal origin, as well as petroleum-derived oils. These protections should ensure that short-tailed albatross are not likely to be directly harmed by oil or other floating substances.

Short-tailed albatross may be attracted to discharge plumes as a food source and, therefore, be at increased risk of ship strikes, incidental catch or predation (Melvin et al., 2004, 2011). Short-tailed albatross visit and follow commercial fishing vessels in Alaska that target sablefish, Pacific cod, Pacific halibut, and pollock (USFWS 2008; Suryan et al. 2007). Since 1995, 11 short-tailed albatross mortalities have been recorded in the Alaska groundfish fisheries. Most of the short-tailed albatross mortality documented in the hook-and-line groundfish fisheries has occurred in the fall with immature birds in the Bering Sea. (BiOp 2015).

Seabirds could also be indirectly affected by seafood processing waste if abundance of fish and other prey is disrupted due to eutrophication and related effects. The EPA is proposing a requirement that vessels be underway during discharge, in order to aid dispersion. Seafood processing waste discharges are localized and limited to well-mixed waters in order to allow for dispersion and dilution of pollutants, and the Draft Permit prohibits the occurrence of substances that float as debris, scum, oil, or other matter to form nuisances on the surface, therefore, potential impacts to short-tailed albatross are likely to be minimal.

There could be risk of injury or mortality from issuance of this Permit to short-tailed albatross, especially if discharge is not managed in a manner that minimizes interactions with the ship, trawl cables, or nets. In response, the EPA has incorporated some new conditions regarding short-tailed albatross interactions.

<u>Interrelated and interdependent actions</u>

Albatross, like many seabirds, can attack baited hooks of both pelagic and demersal longlines after the hooks are deployed; and if they get hooked or snagged, they are likely to be injured or pulled underwater with the rest of the gear and drowned (USFWS 2008). Interactions with trawls may occur when seabirds fly behind vessels or float in offal plumes that trail behind vessels. Individuals can strike the trawl cables (warp cables) or the sonar cable (third wire) attached to the net or become entangled on the outside of nets towed at or near the surface; the former in particular are unlikely to be detected as they do not show up on the vessels' deck to be sampled (USFWS 2008).

<u>Reasonable and Prudent Measures (RMP)</u>

USFWS drafted a 2015 Biological Opinion (BiOp) addressing NMFS's Fishery Management Plans for the Gulf of Alaska and Bering Sea/Aleutian Islands Groundfish Fisheries and the State of Alaska Parallel Groundfish Fisheries (USFWS 2015). This BiOp included four reasonable and prudent measures (RPMs) NMFS must implement in order to receive concurrence on the relevant FMP. The RPMs are discussed below with context for their applicability to this General Permit and the protection of the short-tailed albatross and Steller's eider.

- RPM 1: The NMFS shall minimize the risk of short-tailed albatross interacting with the hook and-line fishery. Because short-tailed albatross are caught and killed by baited hooks in the hook-and-line fishery, minimization measures shall be employed to reduce the likelihood that they will attack the baited hooks.

- RPM2: The NMFS shall establish a multi-stakeholder, Alaska Groundfish and Short-tailed Albatross Working Group as an advisory body to the NMFS and the USFWS for the purposes of reducing fishery interactions with short-tailed albatross and seabirds. This group will work toward facilitating adaptive management to minimize and avoid take of short-tailed albatross and other seabirds.

- RPM3: The NMFS shall monitor the groundfish fisheries for interactions with short-tailed albatross and report all observed, reported and estimated takes, of short-tailed albatross to the Service, and report on the efficacy of avoidance and minimization measures.

- RPM4: The NMFS shall facilitate the salvage of short-tailed albatross carcasses taken by longline or trawl fishing vessels. Every effort should be made to retain short-tailed albatross carcasses for scientific and educational purposes.

RPM2 and RMP3 are not applicable to this permit action. RPM1 has been implemented by regulation since 1996 by 50 CFR 679.24. This regulation specifies that vessels using hook-and-line gear in the BSAI and GOA groundfish fishery must employ bird avoidance techniques, such as using buoy or streamer lines with performance standards specified in 50 CFR § 679.24(e)(2) and 74 FR 13358, March 27, 2009; Table 20 to 50 CFR part 679). Additional details on the efficacy of streamer lines are detailed below:

Streamer Lines

Controlled and large scale field studies have demonstrated that properly deployed paired streamer lines are effective at reducing seabird attacks on the gear by 85 - 100% (Melvin et al. 2001). Dietrich et al. (2009) found seabird bycatch rates have decreased in Alaska by 78 % since the implementation of streamer lines. Further analyses found a small number of vessels were responsible for the majority of seabird bycatch (Dietrich and Fitzgerald 2010). The effectiveness of streamer lines is documented in the bycatch data, which shows continued reduction in bycatch rate since fishermen began using the lines in 1999 (NMFS 2015a). Single streamer lines are slightly less effective than paired lines, reducing seabird bycatch by 96% and 71% for the sablefish and Pacific cod fisheries respectively (Melvin et al. 2001). The use of integrated weight longlines, used simultaneously with paired streamers, reduces seabird mortality almost completely (Dietrich et al. 2008). Tools and techniques continue to improve; Melvin et al. (2011) compared a third wire snatch block, warp boom, and paired streamer lines on two trawlers in the eastern Bering Sea. They determined that bird strikes could be diminished by deploying streamer lines at least a meter above the third-wire block and by minimizing the aerial extent of the third wire.

A final rule effective December 18, 2015, requires larger non-tribal longline vessels that are 55 feet or longer to use streamer lines to keep seabirds away from their bait (80 FR 71975 and 50 CFR Part 660). Specifications vary for vessels setting fixed gear and snap-on gear. Longline vessels under 55 feet and tribal vessels are encouraged but not required to use streamer lines.

Up to date guidance and information on Albatross Bycatch Avoidance Rules can be found at the link below:

http://seabirdbycatch.washington.edu/current-rules-for-longliners

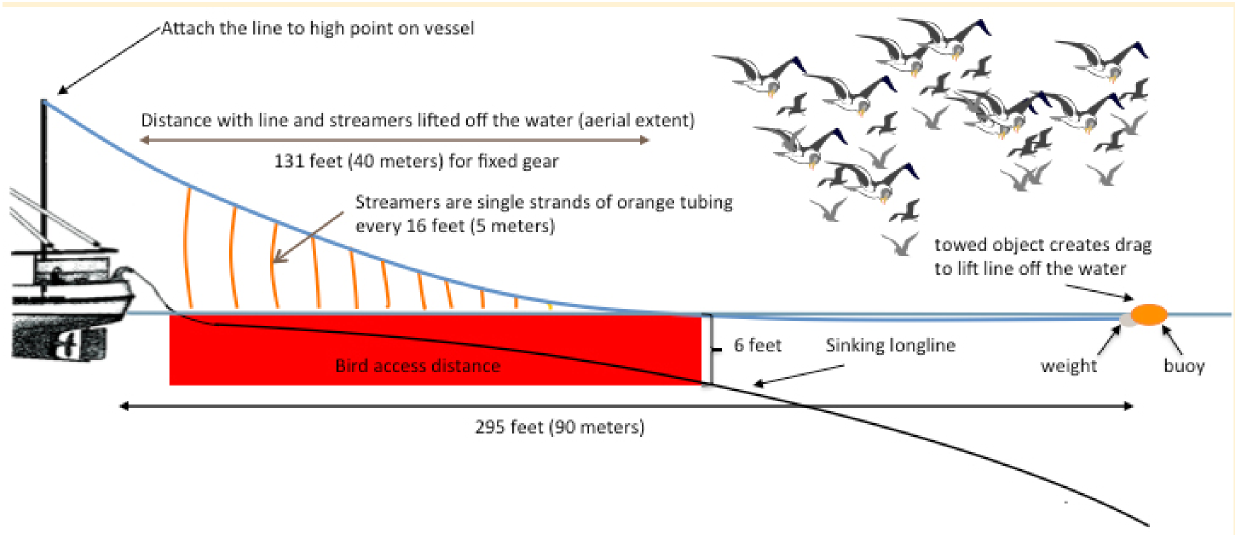

Figure 16: Illustration of Streamer Lines for Hook and Line Groundfish Fishery (Federal Regulations 50 CFR 679)
(Washington SeaGrant, 2015)

<u>Mitigation Measures Implemented in this Proposed General Permit</u>

All permittees should be in compliance with the above federal regulations. It is out of the scope of this General Permit to apply these regulations through the CWA and a NPDES permit. The EPA is requiring daily visual monitoring in order to monitor ESA-species interactions with the discharge. The daily visual monitoring will require Permittees to estimate the occurrence of ESA-listed species (Section 2.3.8).

<u>Summary</u>

The impacts from offshore seafood processor discharges should result in insignificant and discountable effects to the short-tailed albatross. Therefore, EPA has determined that approval of the offshore seafood processor permit is **not likely to adversely affect** the short-tailed albatross.

5.6.2.2 Steller's Eider

<u>Direct Effects</u>

Seafood processing discharge is not expected to impact Steller's eider breeding grounds, as the Alaska breeding population nests primarily on the Arctic Coastal Plain where there is currently no seafood processing activity. While there is a smaller sub-population nesting in the Yukon-Kuskokwin Delta, offshore seafood processing activities there are currently limited and small in magnitude (USFWS 2002a). Additionally, the General Permit prohibits seafood processor discharge within one nautical mile of critical habitat for Steller's eiders.

During the rest of the year, Steller's eiders move south and prefer shallow, nearshore marine waters. Most Steller's eiders observed during southwestern Alaska shore-based surveys in the winter of 1999/2000 were foraging within 100 yards of the shore (LGL

2000 a,b). Eiders may be attracted to processing waste discharges from offshore seafood processing outfalls. Potential effects on Steller's eider from the discharge of seafood process wastes include possible increases in exposure to predatory or scavenger species or exposure to fish oil or nonpetroleum oils and other byproducts of seafood processing that may adversely affect Steller's eiders. Seafood wastes may attract scavengers, such as gulls, which prey on Steller's eiders. However, because gulls primarily prey on Steller's eiders' eggs and young rather than adults, and because Steller's eiders do not breed in areas of high seafood processing activity, the potential effects on eider populations from increased predation by gulls would be negligible. As the offshore seafood processors will be located 3 nm or further from shore and eiders are known to stay in the nearshore areas, the seafood processor waste should be minimal in areas that Steller's eiders are known to inhabit. Adverse effects may occur due to the release of organic waste within foraging habitat that results in disruption of the benthic community and therefore the prey base of Steller's eiders. However, habitat that may undergo adverse modification due to direct effects of the offshore seafood processor permit due to organic waste discharge potentially altering the benthic community, used as a prey resource for the Steller's eiders, should be minimal as discharges are expected to occur further than 1 nm from critical habitat areas.

Indirect Effects

Indirect effects may occur as Steller's eiders may congregate near offshore seafood processor vessels and be harmed by vessels associated with the processor through disturbance or accidental release of petroleum products Regulation of fuel-related activities at sea is not covered under this permit as fueling activities fall under the jurisdiction of the U.S. Coast Guard. Spilled petroleum can have adverse effects on Steller's eiders including impairment of a bird's ability to maintain homeostatic temperature mechanisms as well as potential exposure to toxic chemicals in petroleum through potential ingestion. Release of petroleum in Steller's eiders habitat also has the potential to contaminate prey and reduce its availability. The proposed permit requires offshore processors to be at least 1 nm from any area designated as Steller's eider critical habitat. This exclusion should minimize potential adverse effects from petroleum spills associated with seafood processors.

Interrelated and interdependent actions

Another concern with Steller's eiders is potential Steller's eider strikes from communication facilities towers and associated guy wires. As stated in 50 CFR Part 402 if the activity in question would occur regardless of the proposed action under consultation, then the activity is not interdependent or interrelated and would not be analyzed with the effects of the action under consultation. Therefore, since the communication towers may be used by the offshore seafood processing vessels, but the towers would exist whether used by the processor vessels or not, the effects from communication facilities are not analyzed further in the effects analysis.

Recovery tasks and high priority issues regarding the spectacled eider have been compiled by the USFWS Steller's Eider Recovery Team, of which evaluating the impacts of commercial fishing on spectacled eiders in the Bering Sea was not listed as a priority task or issue (USFWS 2007a).

Critical habitat

Critical habitat for Steller's eiders was designated to include breeding habitat on the Yukon-Kiskokwim Delta and four units in southwest Alaska marine waters, including the Kuskokwim shoals, Seal Islands, Nelson Lagoon and Izembek Lagoon (65 FR 13262). Habitat may undergo adverse modification due to direct effects of the offshore seafood processor permit due to organic waste discharge potentially altering the benthic community, which is a prey resource for the Steller's eiders. However, effects should be minimal as discharges are expected to occur further than 3 nm from shore. In addition, these discharges should occur in areas of high tidal activity which allows for dilution and dispersion of the seafood discharges so that waste piles which can smother benthic invertebrates should not occur. Habitat may also undergo adverse modification through accidental petroleum releases. Regulation of fuel-related activities at sea is not covered under this permit as this activity falls under the jurisdiction of the U.S. Coast Guard. The potential for accidental petroleum releases are impossible to predict or determine, however, they are not expected to adversely impact a significant proportion of Steller's eider critical habitat as the proposed general permit prohibits seafood processor discharge within one (1) nm of any critical habitat for Steller's eiders.

Mitigation Measures Implemented in this proposed General Permit

The EPA is requiring daily visual monitoring in order to monitor ESA-species interactions with the discharge. The daily visual monitoring will require Permittees to estimate the occurrence of ESA-listed species (Section 2.3.8).

Summary

Based on the above information, discharges from offshore seafood processors would likely have insignificant and discountable effects on Steller's eiders. Therefore, EPA has determined that approval of the offshore seafood processor permit is **not likely to adversely affect** Steller's eider.

5.6.2.3 Spectacled Eider

EPA has revised sections of this BE relevant to the spectacled eider. In response to a proposed permit modification, EPA has conducted new effects analyses for spectacled eider and their wintering habitat (Unit 5) during the period between June 1 and December 31, which is found below in the new subsection titled *Previous Consultations with USFWS and Proposed Modification of the Permit.* Other entries within Section 5.6.2.3 have only been revised if content conflicted with implications of the proposed modification.

Direct Effects

The primary spectacled eider breeding ground is the Yukon-Kuskokwim Delta, with lower densities of breeding eiders occuring on the North Slope (USFWS 2007). Seafood processing activity is currently limited in the Yukon-Kuskokwim Delta, and both the current in-effect general permit and the proposed modified permit prohibit discharge within 1 NM of breeding critical habitat for spectacled eiders. Therefore, seafood processing wastes are not expected to negatively impact spectacled eiders during breeding season.

While moving between nesting and molting areas, spectacled eiders travel along the coast up to 50 km offshore. From October through March, they move far offshore to waters up to 65 m deep where they sometimes gather in dense flocks in openings of sea ice (USFWS 2006b). Therefore, spectacled eiders occur within the action area of the offshore seafood processor permit. Spectacled eiders may be attracted to processing waste discharges from offshore seafood processing vessels. Potential effects on spectacled eiders from the discharge of seafood process wastes include possible increases in exposure to predatory or scavenger species or exposure to fish and non-petroleum oils and other byproducts of seafood processing that may adversely affect spectacled eiders. Seafood wastes may attract scavengers, such as gulls, which prey on spectacled eiders. However, because gulls primarily prey on spectacled eiders' eggs and young rather than adults, and because spectacled eiders do not breed in areas of high seafood processing activity, the potential effects on eider populations from increased predation by gulls would be negligible. The majority of offshore seafood processors will be located 3 NM or further from shore and have the potential to adversely affect spectacled eiders which are located in offshore areas. Adverse effects may occur due to the release of organic waste within foraging habitat that results in disruption of the benthic community and therefore the prey base of spectacled eiders. However, the location of offshore seafood processor vessels 3 NM or more from shore in high tidal areas should dilute and disperse the seafood processing waste quickly, creating less of an attraction for spectacled eiders. Habitat that may undergo adverse modification due to impacts of organic waste discharges on the benthic community should be minimal, as discharges are expected to occur further than 1 NM from critical habitat areas, except in the case of seasonal discharges within 1 NM of wintering habitat permitted under the proposed modification. Additionally, the proposed permit does not allow ZODs, which should further minimize potential impacts to spectacled eiders prey from potential accumulation of wastes.

<u>Indirect Effects</u>

Indirect effects may occur as spectacled eiders may congregate near offshore seafood processors and be harmed by vessels associated with the processor through disturbance or accidental release of petroleum products. Regulation of fuel-related activities at sea is not covered under this permit as this activity falls under the jurisdiction of the U.S. Coast Guard. Spilled petroleum can have adverse effects on spectacled eiders including impairment of a bird's ability to maintain homeostatic temperature mechanisms as well as potential exposure to toxic chemicals in petroleum through potential ingestion. Release of petroleum in spectacled eiders habitat also has the potential to contaminate prey and reduce its availability. The proposed permit requires offshore processors to be at least 1 NM from any area designated as spectacled eider critical habitat, with the exception of Unit 5 (the Wintering Unit) from June 1 through December 31. For all critical habitat areas, except for Unit 5 from June 1 through December 31, these exclusions should minimize potential adverse effects from petroleum spills associated with seafood processors. Additional analyses of indirect effects associated with the proposed modification are below.

<u>Interrelated and interdependent actions</u>

Another concern with spectacled eiders is potential spectacled eider strikes from communication facility towers and associated guy wires. As stated in 50 CFR Part 402, if the activity in question would occur regardless of the proposed action under consultation, then the activity is not interdependent or interrelated and would not be analyzed with the effects of the action under consultation. Therefore, since the communication towers may be used by the offshore seafood processing vessels, but the towers would exist whether used by the processor vessels or not, the effects from communication facilities are not analyzed further in the effects analysis.

<u>Critical Habitat</u>

Critical Habitat for the spectacled eider includes areas on the Yukon-Kuskokwim Delta, in Norton Sound, Ledyard Bay and the Bering Sea between St. Lawrence and St. Matthew Islands. Critical habitat may experience adverse direct effects due to permit-authorized organic waste discharges, which can alter the benthic community that eiders rely on as a prey resource. Such impacts are expected to be minimal because, with the exception of wintering critical habitat between St. Lawrence and St. Matthew Islands, eiders primarily utilize near-shore habitat. Under EPA's permit, vessels are only authorized to discharge in Federal Waters beyond 3 NM from shore. In addition, the vessels are required to move while discharging and discharge to areas of high tidal activity will allows for dilution and dispersion of the seafood discharges so that accumulation of waste piles which can smother benthic invertebrates should not occur. Habitat may also undergo adverse modification through accidental petroleum releases. Regulation of fuel-related activities at sea is not covered under this permit as this activity falls under the jurisdiction of the U.S. Coast Guard. The potential for accidental petroleum releases are impossible to predict or determine, however, they are not expected to adversely impact a significant proportion of spectacled eider critical habitat as the current general permit prohibits seafood processor discharge within 1 NM of critical habitat for the spectacled eiders, with the seasonal exception within 1 NM of Unit 5 noted in the new analysis below. Recovery tasks and high priority issues regarding the spectacled eider have been compiled by the USFWS Spectacled Eider Recovery Team, of which evaluating the impacts of commercial fishing on spectacled eiders in the Bering Sea were listed as high and low priorities (USFWS 2007b).

<u>Mitigation Measures Implemented in this proposed General Permit</u>

The EPA is requiring daily visual monitoring in order to monitor ESA-species interactions with the discharge. The daily visual monitoring will require Permittees to estimate the occurrence of ESA-listed species (Section 2.3.8).

<u>Previous Consultations with USFWS and Proposed Modification of the Permit</u>

On September 21, 2018, USFWS concurred with EPA's determination that the proposed reissuance of the permit may affect, but is not likely to adversely affect, spectacled eider or their designated critical habitat. USFWS cited the following reasons (USFWS 2018) as a basis for concurrence: eiders prefer nearshore areas where interactions with commercial fishing vessels and their gear are unlikely; and the proposed permit included a condition prohibiting discharge within 1 NM of spectacled eider critical habitat. Subsequently, EPA revised draft permit conditions after a re-evaluation of the grinding requirement as discussed in Section 2.3.5 of the BE. EPA reinitiated consultation with USFWS, and on June 4, 2019, USFWS similarly concurred with EPA's not likely to adversely affect determination for spectacled eider and their critical habitat.

EPA published issuance of the permit in the Federal Register on June 17, 2019, and the permit became effective on July 17, 2019. On September 12, 2019, EPA received a letter from the Freezer Longline Coalition (FLC) requesting clarification on the discharge prohibition within 1 NM of spectacled eider critical habitat and providing information related to fish migration in the Bering Sea. EPA subsequently met with FLC on October 3, 2019. FLC reported that within the past two fishing seasons, sea ice in the Bering Sea was not reaching as far south, forming later in the year, and persisting for a shorter duration, and that a large percentage of the Pacific cod population in the Bering Sea have migrated further north than previously found/harvested, including areas near and within spectacled eider wintering habitat (Unit 5). On March 30, 2020, Pursuant to 40 CFR 124.5, FLC requested that EPA modify the permit to allow for seasonal discharge within 1 NM of Unit 5 between June 10 through December 31. This timing corresponds with the fleet's "B Season". According to FLC, a permit modification is "necessary to ensure the continued commercial viability of its members in the face of changing fish migration patterns and ice coverage in the Bering Sea." (FLC 2020)

Under 40 CFR 122.62(a)(2), EPA has tentatively decided to modify the permit to allow for discharge within 1 NM of Unit 5 during the fleet's B season. In accordance with 124.5(c)(1), the EPA has prepared a new draft permit, and plans to make the new draft available for public review and comment in accordance with 40 CFR 124.10. Under 40 CFR 124.5(c)(2), only those conditions to be modified shall be reopened when a new draft permit is prepared. Under 50 CFR 402, EPA is reopening consultation with USFWS and has revised the previously-submitted BE to account for the proposed permit modification allowing for seasonal discharge within 1 NM of spectacled eider wintering habitat Unit 5. The revisions to the BE include updated analyses of potential effects of EPA's action (discharges from seafood processing facilities) on spectacled eiders and their critical habitat. The analyses are limited to those impacts that may occur if vessels are seasonally permitted to discharge within 1 NM of the 28,436.3 mi^2 Wintering Area (Unit 5). Discharge prohibition buffers of 1 NM would remain in effect for all other designated spectacled eider critical habitat areas described in 50 CFR Part 17, 66 FR 9145 (02/06/2001), and from January 1 through June 9 within 1 NM of Unit 5.

While FLC raised the issue of Pacific cod migrating into more northern reaches of the Bering Sea (and a desire to harvest those cod) as their primary motivation for their permit modification request, a permit modification allowing seasonal discharge within 1 NM of Unit 5 would apply to all vessels covered under EPA's general permit, which include both hook and line and trawl catcher processors, and would not be conditioned upon targeted species. (i.e., any vessel covered under the permit could, depending on their allowances under the BSAI FMP, target cod or non-cod species within 1 NM of Unit 5). However, based on the BSAI FMP, hook and line catcher processor vessels (i.e., freezer longliners) have been allocated the greatest percentage of the total allowable catch (TAC) (minus the Community Development Quote (CDQ) program quota) for Pacific cod across the entire BSAI Management Area, 48.7 % of TAC-CDQ, or 61,667[3] metric tons. Further, according to the Freezer Longline Coalition, "The longline fishery is primarily a Pacific cod single-species directed fishery" (FLC 2010). Also, according to Section 3.5.2.1.11 and Figure 3-12 in the BSAI FMP, and as described in 50 CFR 679, the area between St. Matthew and St. Lawrence Islands is designated as the Northern Bering Sea Research Area. Bottom trawl operations (such as those that target Pacific cod) are "prohibited, except as allowed through exempted fishing permits under 50 CFR 679.6 that are consistent with a Council approved research plan to examine the effects of nonpelagic trawling on the management of crab species, marine mammals, ESA-listed species, and subsistence needs for Western Alaska communities." (NPFMC 2018,

[3] Tonnage is live fish weight, not solids discharged.

p. 38). As shown in Section 3.5.2.1.9 and Figure 3-10 of the FMP, and described in 50 CRF 679, the area surrounding St. Lawrence Island is designated as the St. Lawrence Island Habitat Conservation Area, in which the use of nonpelagic trawl gear is also prohibited. However, it is possible that pelagic trawl vessels would target non-cod species with 1 NM of Unit 5, most likely pollock. The At Sea Processors Association, which represents trawl catcher processor vessels, has indicated that up to 12 pelagic trawlers a) would be allowed under the BSAI FMP to target pelagic species within 1 NM of Unit 5 assuming EPA's permit is modified and b) have not historically targeted pollock in the more northern reaches of the Bering Sea, however, could depending on pollock migration patterns. The At Sea Processors Association further indicated that their members' "B season" spans June 10th to November 1st, however, vessels are usually off fishing grounds by mid-October, which coincides with the timeframe eiders are expected to move into Unit 5 at the earliest. For these reasons, the following analyses of effects of the permitted discharge on spectacled eider and their critical habitat assume that the majority of discharged fish waste within 1 NM of Unit 5 seasonally would be from freezer longline catcher processor vessels targeting and processing Pacific cod specifically.

This analysis acknowledges a March 26, 2020 NMFS-reported incident of spectacled eider take (NMFS 2020). On October 10, 2019, 22 spectacled eiders were killed as the result of striking a vessel in the hook-and-line groundfish fishery of the BSAI Management Area, near 64° N and several miles westward of 170° W, just north of St. Lawrence Island in NMFS reporting area 524. The event occurred when a vessel was transiting and not during fishing activities. EPA further acknowledges a parallel consultation between USFWS and NMFS regarding the Groundfish BSAI FMP, by which NOAA manages the BSAI fishery within the U.S. exclusive economic zone. However, EPA has only re-opened consultation with USFWS, the agency with primary responsibility for terrestrial and freshwater organisms, including spectacled eider.

<u>Longline Fishing Mechanics</u>
Per the proposed permit modification, longline catcher processor vessels will be seasonally authorized to discharge seafood processing waste within 1 NM of Unit 5 of the critical habitat. During this time, the fleet of about 20 vessels is spread across the Bering Sea, and 4-5 are expected in the critical habitat area at any one time. Vessels will remain in the area until ice develops, typically in November or December, at which time the area becomes inaccessible. A single vessel will operate in particular fishing grounds to avoid entanglement of nets, thereby limiting the number of vessels that can be within an area. Vessels typically fish in water ranging from 180 to 300 ft in depth. Lines are up to 10 miles in length, and a period of about 4-6 hours will generally pass between setting and hauling the line. Vessels are active for most of the day (20+ hours) and are always moving while fishing and processing, at a speed ranging from 2.5 to 10 knots. Vessels that produce less than 10 million pounds of waste annually (practically, all freezer longline catcher processors) are not required to grind their waste. All vessels discharge in a location and manner that promotes dispersion and reduces accumulation of processing waste.

<u>Spectacled Eider Critical Habitat - Wintering Unit 5</u>
Unit 5 of the critical habitat (the wintering unit) falls between St. Lawrence and St. Matthew Islands, as shown in Figure 10. Primary physical and biological features (PBFs) for Unit 5 are marine waters that are less than or equal to 75 m (246.1 ft) deep at MLLW and presence of associated aquatic flora and fauna in the water column and underlying benthic community. According to NOAA Nautical Chart 16006, the maximum depth in

the area that falls within the external designated boundary for Wintering Unit 5 is 37 fathoms (222 ft), so the entire area meets the depth PBF. The entire global population of spectacled eiders winter among cracks in the sea ice in this area, arriving as early as October, according to conversation with USFWS. The eiders feed on benthic prey during this time, diving to the sea floor for primarily one species of clam, *Nuculana radiata* (Lovvorn et al. 2003).

Effects Analysis for the Proposed Permit Modification

Allowing for fishing and processing near and within this area raises concerns for additional direct and indirect effects on the spectacled eiders and effects on their critical habitat. The first concern is that seafood processing waste could lead to behavioral changes among spectacled eiders, attracting birds to vessels and leading to reliance on discharge as food, vessel strikes, or interaction with fishing gear (see Direct Effects above). However, eiders prey on exclusively benthic organisms in the wintering unit and aren't known to be attracted to discharge, and observers have not reported eiders feeding on discharge. Vessel strikes are most likely to occur at night when eiders are attracted to bright lights on vessels (Funk 2008). FLC reported attraction to lights as the cause of the October 2019 take incident. In response, FLC reports that vessels in the fleet have adopted a practice of turning off bright high-density sodium lights following this take incident. Further, during the summer months when the most vessels are active, the periods of darkness are very brief in the Bering Sea. Lastly, the overlap period when eiders and vessels may both be present in the critical habitat is most likely no more than two to three months before ice forms (approximately October through December).

Indirect effects as a result of the permit modification include increased potential for negative impacts resulting from accidental petroleum spill(s). See details about this concern above in Indirect Effects. With the inclusion of the wintering unit in the allowable area for fishing and discharge, the chance of damage to critical habitat from accidental petroleum release are greater.

Discharge of seafood process waste has the potential to impact the water column and the benthic environment in the critical habitat (i.e., PBFs aside from water depth). Discharge and accumulation of solids on the sea floor can depress dissolved oxygen concentrations, lead to turbidity, and impact light penetration, potentially smothering marine flora and fauna. However, as noted in Section 2.3.5, the offshore waters of the Bering Sea provide for highly turbulent and rapid mixing of the effluent. The combination of wind, tide and water depth greatly increases mixing and dispersion of discharges both whole and ground. This also minimizes concentrated oxygen consumption, sedimentation of solids, and potential impact on sea life and water quality. Further, as stipulated in the permit, vessels are always moving while discharging, minimizing the potential for fish waste piles to develop, which have the greatest potential to damage the benthos, as noted in Section 5.1.2. Research in Prince William Sound has demonstrated that whole heads and carcasses disperse rapidly and are efficiently incorporated into the food chain rather than accumulated on the sea floor (Thorne et al. 2008).

Based on the above analyses, the potential impacts to eiders and their critical habitat from the permitted discharge under the proposed modification associated with: behavior modification; attraction to seafood; and benthic impacts associated with the discharge of seafood solids are anticipated to be insignificant and discountable. Because non-pelagic trawl access to Unit 5 is restricted, and because few if any pelagic trawl catcher processors are expected to target non-cod species within 1 NM of Unit 5, the risk of birds striking trawl net cables or data cables (3^{rd} wire) and impacts to PBFs associated with bottom trawling gear are mitigated. For these reasons, EPA expects few adverse impacts to PBFs within 1 NM of Unit 5.

While previous consultation between EPA and USFWS and anecdotal evidence from vessel operators generally points towards a low likelihood of spectacled eider-vessel encounters and direct bird-vessel interactions/strikes, the October 2019 take incident reveals that the potential exists. While it is not the permitted discharge itself that results in such interactions (the October take incident occurred when the vessel was not actively fishing or discharging), vessels may not otherwise be in the area *but for* EPA's discharge permit and NMFS' FMP. Further, while turning off lights at night may reduce the chances of bird-vessel strike, EPA's permit does not compel vessel operators to dim lights. As such, the EPA has determined that the potential direct impacts to eiders associated with vessel strike, especially during October through December and when daylight hours are few, are measurable and tangible. Despite the lack of expected serious impacts to spectacled eiders and their critical habitat resulting from the proposed modification, because of the increased potential for take from June 1 through December 31, the EPA has determined that EPA's proposed action is **likely to adversely affect spectacled eiders**.

5.6.3 Marine Mammals

5.6.3.1 Polar Bear

In Alaska, polar bears are found in the Chukchi and Beaufort Seas located west and north of Alaska. Critical habitat has not been designated for the polar bear at this time. Arctic sea ice provides a platform for critical life-history functions, including hunting, feeding, travel, and nurturing cubs.

At present, polar bear stocks in Alaska have no direct interaction with commercial fisheries activities (73 FR 28312). Therefore, the offshore seafood processors permit should have **no effect** on polar bears.

5.6.3.2 Northern Sea Otter (SW Alaska Population)

<u>Direct Effects</u>

The range of the southwest Alaska population of the northern sea otter extends from the Aleutian Islands through southcentral and southwestern Alaska coasts. Numerous fisheries exist within the range of the Southwest Alaska stock of northern sea otters, with the only one identified as interacting with this stock being the Kodiak salmon set gillnet fishery, with an estimated 188 vessels and/or persons participating (USFWS 2014). The northern sea otter populations generally occur in shallow water areas near the shoreline, and the offshore seafood processor vessels occur more than 3 nm from shore, so it is unlikely that they would have significant contact with seafood processing wastes from offshore seafood processors.

However, northern sea otters could potentially be attracted to the offshore seafood processor waste which could be used as a food source for this species. A study by Ballachey et al. (2002) looked at sea otter mortality in Orca Inlet, Alaska during the winter of 1995-1996. These sea otters were in poor body condition and had significant helminth parasite loads. Some fish species including salmon and herring are known to serve as intermediate host to these parasites and it was postulated that consumption of fish parts and seafood processor waste by sea otters could be serving as a source of these parasites. It should be noted, that the industry covered by this report does not generally process salmon or herring. There are many speculated causes of death of these sea otters including unusually cold temperatures that winter and high population numbers leading to depleted prey resources which may have led to starvation and made the fish parts a more attractive food source. The report did not definitively state the cause of the higher mortality rates of sea otters in Orca Inlet during the winter of 1995-1996 and there was no report of a continuing high mortality rate the following winter.

The current permit covers only those seafood processor facilities at distances greater than 3 nm from shore. The location of the offshore seafood discharges are in areas of high tidal activity and good flushing and should disperse the seafood discharge so that it is less of an attractant to northern sea otters. In areas with lower population densities, it is expected that abundant natural food sources would minimize the northern sea otter's attraction and dependence on seafood discharges. These factors should further reduce any potential for net entanglement or vessel disturbance.

Seafood processing wastes have the potential to lead to adverse effects by altering the habitat for and potentially burying benthic prey species of the northern sea otter and potentially reducing the prey availability of these species. Offshore seafood processing wastes are required to be discharged in areas of high tidal activity from vessels that are moving which will allow for the dilution and dispersion of these wastes preventing large waste piles that have the potential to bury or alter habitat for prey species of the northern sea otter. Therefore, effects to prey of the northern sea otter should be minimal.

Indirect Effects

Indirect effects may occur as Northern sea otters may congregate near offshore seafood processors and be harmed by vessels associated with the processor through disturbance or accidental release of petroleum products Regulation of fuel-related activities at sea is not covered under this permit as this activity falls under the jurisdiction of the U.S. Coast Guard. Spilled petroleum can have adverse effects on Northern sea otters including impairment of a sea otter's ability to maintain homeostatic temperature mechanisms as well as potential exposure to toxic chemicals in petroleum through potential ingestion. Release of petroleum in Northern sea otter habitat also has the potential to contaminate prey and reduce its availability (USFWS 2014).

Critical Habitat

Five Units that include all of the Aleutian Islands, Bristol Bay, The Kodiak Archipelago, the Alaskan peninsula, and western Cook Inlet (5,855 square miles) are designated in Alaska. The essential elements of critical habitat are shallow, rocky areas; nearshore waters; kelp forests; and sufficient prey (USFWS 2013c).

Mitigation Measures Implemented in this proposed General Permit

The EPA is requiring daily visual monitoring in order to monitor ESA-species interactions with the discharge. The daily visual monitoring will require Permittees to estimate the occurrence of ESA-listed species (Section 2.3.8).

Summary

Based on the above discussion, the adverse long-term impacts to northern sea otter populations from seafood processing discharges should be insignificant and discountable. Therefore, EPA has determined that the offshore seafood processor permit is **not likely to adversely affect** the Northern sea otter.

5.6.3.3 Steller Sea Lion (Western DPS)

Several factors have been proposed as contributors to sea lion decline. Potential direct effects for the decline may include direct mortality through fisheries interactions including entanglement, subsistence/native harvest, illegal shooting, and mortalities incidental to research. Indirect effects may include fishing for the Steller sea lion prey species, disturbance, contaminants, and climate change and ocean acidification. Natural effects include killer whale predation, shark predation, disease, environmental variability and drivers in the Bering Sea and Gulf of Alaska/North Pacific, and nutritional stress (NMFS 2014). Effects related to the proposed General Permit are discussed below.

Direct Effects

Fisheries Interactions Including Entanglement

The minimum average annual mortality and serious injury rate for all fisheries, based on observer data and stranding data (31 sea lions) for U.S. commercial fisheries and stranding data (1.4 sea lions) for unknown (commercial, recreational, or subsistence) fisheries, is 32 western Steller sea lions (NMFS 2018).

Steller sea lions have an extensive foraging range and haulout in many coastal areas. There is some evidence that sea lions are attracted to seafood discharges, particularly unground fish wastes and livers (EPA 2005b). This may affect both the behavior of individual animals in proximity of the discharge outfalls and the overall Steller sea lion population.

Also, the discharge of process wastes near sea lion foraging grounds could reduce visibility and individual foraging success. Offshore seafood processor vessels would be located 3 nm or more from shore in areas of high tidal activity and good flushing which should allow for dispersion and dilution of seafood discharges and minimize attraction of Steller sea lions to the discharges. In addition, the permit prohibits discharge within three (3) nautical miles of a rookery or major haulout of the Steller sea lion as designated by the NMFS as critical habitat, which should help to minimize direct effects to Steller sea lions from offshore seafood processor discharges.

Seafood processing wastes have the potential to lead to adverse effects by altering the habitat for and potentially burying benthic prey species of the Steller sea lion and potentially reducing the prey availability of these species. Offshore seafood processing wastes are required to be discharged in areas of high tidal activity from vessels that are moving which will allow for the dilution and dispersion of these wastes preventing large waste piles that have the potential to bury or alter habitat for prey species of the northern sea otter. The proposed permit does not allow ZODs. The permit prohibits discharge within three (3) nautical miles of major rookeries and haulouts of the Steller sea lion. These areas overlap with areas designated by the National Marine Fisheries Service as critical habitat, which should help to minimize direct effects to Steller sea lions from offshore seafood processor discharges.

In the 2014 BiOp, NMFS concluded that the proposed fisheries in Areas 541, 542, and 543 are **not likely** to reduce the survival or recovery of the WDPS of Steller sea lions. In addition, the proposed fisheries (Atka mackerel, Pacific cod, and pollock) are **not likely** to reduce the conservation value of designated critical habitat for the WDPS of Steller sea lions.

The modified catch limits and closures specified in Table 2-3 of the 2014 BiOp describe actions outside of the enforceable scope of this General Permit.

Indirect Effects

Fishing for the Steller Sea Lion Prey Species

The Steller Sea Lion Recovery Plan (NMFS 2008) ranked competition with fisheries for prey as a potentially high threat to recovery of the WDPS. Substantial scientific debate surrounds the question about the impact of potential competition between fisheries and sea lions. It is generally well accepted that fisheries target several important Steller sea lion prey species (NRC 2003). The primary issue of contention is whether fisheries reduce sea lion prey biomass and quality at regional and/or local spatial and temporal scales such that sea lion survival and reproduction are reduced (NMFS 2014). The groundfish fisheries are regulated in the critical habitat areas of the WDPS of Steller sea lions as they were found to be likely to affect the habitat (NMFS 2010). Chapter 4 of the 2014 Aleutian Islands Groundfish Fishery Biological Opinion explains the amount and location of catch of Steller sea lion prey species in the federal and parallel groundfish fisheries off Alaska and the Alaska state groundfish, salmon, and herring fisheries (NMFS 2014).

Contaminants

Indirect effects may also occur as Steller sea lions may congregate near offshore seafood processors and be harmed by vessels associated with the processor through accidental release of petroleum products Regulation of fuel-related activities at sea is not approved under this permit as this activity falls under the jurisdiction of the U.S. Coast Guard. Spilled petroleum can have adverse effects on Steller sea lions including impairment of a sea lion's ability to maintain homeostatic temperature mechanisms as well as potential exposure to toxic chemicals in petroleum through potential ingestion. Release of petroleum in Steller sea lion habitat also has the potential to contaminate prey and reduce its availability. However, the permit prohibits discharge within three (3) nautical miles of a rookery or major haulout of the Steller sea lion, which should minimize indirect effects to Steller sea lions from offshore seafood processor discharges.

Critical Habitat

Critical habitat for eastern stock of Steller sea lion was designated as 3,000 ft. around each major rookery and major haulout whereas critical habitat for the western stock of Steller sea lions was designated as 20 nm around each major rookery and major haulout area west of longitude 144°W. The proposed permit prohibits discharge within three (3) nautical miles of a rookery or major haulout of the Steller sea lion. This exclusion outlined in the proposed permit should minimize effects to Steller sea lion critical habitat.

Mitigation Measures Implemented in this proposed General Permit

In the consultation process for the Draft Permit, NMFS raised concerns about the potential impacts that discharges of whole (unground) seafood waste could have on Steller sea lion foraging behavior in the permit coverage area. In response, the EPA included a provision that would require permittees that discharge greater than ten million pounds per reporting year to grind seafood waste if discharge occurs in Steller sea lion critical habitat areas. NMFS also provided the EPA with suggested mitigation measures for vessels exempted from grinding in Steller sea lion critical habitat to help quantify and reduce the effects of the action. The EPA took public comment on those mitigation measures.

Also, as described above, the EPA is requiring daily visual monitoring in order to monitor ESA-species interactions with the discharge. The daily visual monitoring will require Permittees to estimate the occurrence ESA-listed species (Section 2.3.8).

Summary

Based on the previous discussions and prudent measures, the offshore seafood processing facilities should have insignificant and discountable effects on Steller sea lions. Therefore, the EPA has determined that the offshore seafood processing general permit is **not likely to adversely affect** the WDPS of Steller sea lions.

5.6.3.4 Ringed Seal (Arctic Subspecies)

Threats to the Arctic ringed seal are described in detail in the 2014 biological opinion issued by NMFS (NMFS 2014a) and the proposed listing rule (77 FR 76714). General summaries of risks and effects are discussed below.

The primary concern for this population is the ongoing and anticipated loss of sea ice and snow cover stemming from climate change (NMFS 2016h). Additional habitat concerns include the potential effects from increased shipping (particularly in the Bering Strait) and oil and gas exploration activities (particularly in the outer continental shelf leasing areas), such as disturbance from vessel traffic, seismic exploration noise, or the potential for oil spills. Ringed seals are also an important resource for Alaska Native subsistence hunters. Approximately 64 Alaska Native communities in western and northern Alaska, from Bristol Bay to Kaktovik, regularly harvest ice seals (Ice Seal Committee 2014).

Current threats to the Arctic ringed seal from offshore fisheries include ship collisions, fisheries and fishery gear, and vessel disturbance. Some indirect effects related to reduced prey availability (cod) or foraging success may be possible. However, there are only approximately 91 offshore seafood processor vessels and while the vessels could adversely impact the whales, the potential aggregate area of all offshore seafood processors in Alaska coastal waters in the action area is unlikely to occupy more than a small portion of the ringed seal’s habitat.

Based on data from 2007 to 2011, the average annual rate of mortality and serious injury incidental to BSAI pollock and Pacific cod trawl and longline operations is 1.52 ringed seals (NMFS 2014a).

Summary:

In 2014, NMFS completed a biological opinion regarding the effects of testing a salmon excluder device by the Alaska parallel groundfish fisheries on the ringed (Arctic subspecies) and bearded (Beringia DPS) seals (NMFS 2014a). In the report, NMFS analyzed adverse effects from the action and determined that the Alaska groundfish fisheries **are not likely to adversely** affect both species. While this determination is not conclusive for the Alaska parallel groundfish fisheries, the risks analyzed in the biological opinion include many of those to be proposed in the General Permit reissuance including ship strikes, the risks of capture in trawl gear and response to the removal of prey species.

Based on the above information, offshore seafood processors will most likely result in insignificant effects to this species. EPA has determined that the draft General Permit for offshore seafood processors is **not likely to adversely affect** the Arctic Subspecies of the ringed seal.

5.6.3.5 Bearded Seal (Beringia DPS)

Threats to the Beringia DPS of the bearded seal are described in detail in the 2014 biological opinion issued by NMFS (NMFS 2014a) and the proposed listing rule (77 FR 76747). General summaries of risks and effects are discussed below.

The primary concern for this population is the ongoing and anticipated loss of sea ice and snow cover stemming from climate change (NMFS 2016h). Additional habitat concerns include the potential effects from increased shipping (particularly in the Bering Strait) and oil and gas exploration activities (particularly in the outer continental shelf leasing areas), such as disturbance from vessel traffic, seismic exploration noise, or the potential for oil spills. Bearded seals are also hunted commercially in Russia (2016h).

Current threats to the bearded seal from offshore fisheries include ship collisions, fisheries and fishery gear, and vessel disturbance. Some indirect effects related to reduced prey availability (cod) or foraging success may be possible. However, there are only approximately 91 offshore seafood processor vessels and while the vessels could adversely impact the seals, the potential aggregate area of all offshore seafood processors in Alaska coastal waters in the action area is unlikely to occupy more than a small portion of the bearded seal's habitat.

Based on data from 2007 to 2011, the mean annual rate of mortality and serious injury incidental to the BSAI Pollock trawl is 1.4 bearded seals (NMFS 2014a).

Summary:

In 2014, NMFS completed a biological opinion regarding the effects of testing a salmon excluder device by the Alaska parallel groundfish fisheries on the ringed (Arctic subspecies) and bearded (Beringia DPS) seals (NMFS 2014a). the report, NMFS analyzed adverse effects from the action and determined that the Alaska groundfish fisheries are **not likely to adversely affect** both species. While this determination is not conclusive for the Alaska parallel groundfish fisheries, the risks analyzed in the biological opinion include many of those to be proposed in the General Permit reissuance including ship strikes, the risks of capture in trawl gear and response to the removal of prey species.

Based on the above information, offshore seafood processors will most likely result in insignificant effects to this species. EPA has determined that the draft General Permit for offshore seafood processors is **not likely to adversely affect** the Beringia DPS of the bearded seal.

5.6.3.6 North Pacific Right Whale

The North Pacific right whale inhabit the Pacific Ocean between 20° and 60° latitude, including the action area of the Draft Permit. North Pacific right whale are currently believed to prefer coastlines and sometimes large bays, spending the summer feeding in the north then migrating south to breed in the winter. Designated critical habitat for the North Pacific right whale include (1) a portion of the Bering Sea and (2) a portion of the Gulf of Alaska, both of which are within the action area of the Draft Permit.

Since North Pacific right whale are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The North Pacific right whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. If zooplankton abundance is affected indirectly by changes in the phytoplankton community or directly by the discharge itself, North Pacific right whale which feed on zooplankton could be indirectly affected.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants.

Based on the above information, effects from offshore seafood processing discharges are expected to be insignificant and discountable. Therefore, the EPA has determined that the Draft Permit is **not likely to adversely affect** the North Pacific Right whale.

5.6.3.7 Bowhead whale

Bowhead whales winter in the Bering Sea and migrate to the Chukchi and Beaufort Seas in the spring and summer. As the pack ice breaks up in the spring, bowhead whales migrate from the Bering Sea through the Bering Strait into the Chukchi Sea, and then follow the nearshore lead around Point Barrow to the Beaufort Sea. In the Alaskan Beaufort Sea, bowheads select for outer continental shelf and slope habitats (200-2000 m) during summer but in fall can shift to shallower inner/outer shelf habitat (<200m) with light ice conditions (Moore 2000). The diet of the bowhead whale consists of mostly smaller crustaceans including copepods and euphausiids (NMFS 2015a).

Historically, threats including commercial harvest by whaling, recreational hunting and subsistence. Current threats to Bowhead whale include ship strikes, entanglement in fishing gear, contaminants, and anthropogenic noise, especially from offshore drilling (2015a). The potential aggregate area of all offshore seafood processors in Alaska coastal waters in the action area is unlikely to occupy more than a small portion of the Bowhead whale's habitat used for feeding and migration.

NMFS completed the report, Biological Assessment of the Alaska Groundfish Fisheries and NMFS Managed Endangered Species Act Listed Marine Mammals and Sea Turtles in 2006, in which NMFS analyzed adverse effect determinations for several species including the Western Arctic bowhead whale DPS (NMFS 2006). In the assessment NMFS determined that the Alaska groundfish fisheries are **not likely to adversely affect** the Western Arctic bowhead whale.

EPA believes that the potential for adverse effects to bowhead whales from EPA's draft General Permit will most likely result in insignificant effects to the species. Therefore, EPA has determined that the approval of the proposed permit for offshore seafood processors is **not likely to adversely affect** the bowhead whale.

5.6.3.8 Sei whale

The sei whale is a pelagic species, usually observed in deeper waters far from the coastline, near the continental shelf edge, including the action area of the Draft Permit. No critical habitat has been designated.

Since sei whales are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The sei whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. If zooplankton abundance is affected indirectly by changes in the phytoplankton community or directly by the discharge itself, sei whales which feed on zooplankton could be indirectly affected.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants.

Although the population in the North Pacific is expected to have grown since given protected status in 1976, the possible effects of continued unauthorized take and incidental ship strikes and gill-net mortality make this uncertain (NMFS 2012). Current threats may affect sei whales, but do not result in significant takes compared with decimation caused by whaling. These threats may include collisions with ships, disturbance from vessels, entanglement in fishing gear, and aquatic pollution (Reeves et al. 1998a).

NMFS completed the report, Biological Assessment of the Alaska Groundfish Fisheries and NMFS Managed Endangered Species Act Listed Marine Mammals and Sea Turtles in 2006, in which NMFS analyzed adverse effect determinations for several species including the North Pacific sei whale (NMFS 2006). In the assessment NMFS determined that the Alaska groundfish fisheries are **not likely to adversely affect** the North Pacific sei whale.

EPA believes that the potential for adverse effects to sei whales from EPA's draft General Permit will most likely result in insignificant effects to the species. Therefore, EPA has determined that the approval of the proposed permit for offshore seafood processors is **not likely to adversely affect** the sei whale.

5.6.3.9 Blue whale

Blue Whales are found in offshore waters throughout oceans worldwide, including the action area, however, no critical habitat is designated.

Since blue whale are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The blue whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. If zooplankton abundance is affected indirectly by changes in the phytoplankton community or directly by the discharge itself, blue whale which feed on zooplankton could be indirectly affected.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants.

NMFS completed the report, Biological Assessment of the Alaska Groundfish Fisheries and NMFS Managed Endangered Species Act Listed Marine Mammals and Sea Turtles in 2006, in which NMFS analyzed adverse effect determinations for several species including the North Pacific blue whale (NMFS 2006). In the assessment NMFS determined that the Alaska groundfish fisheries are **not likely to adversely affect** the North Pacific blue whale.

EPA believes that the potential for adverse effects to blue whales from EPA's draft General Permit will most likely result in insignificant effects to the species. Therefore, EPA has determined that the approval of the proposed permit for offshore seafood processors is **not likely to adversely affect** the blue whale.

5.6.3.10 Fin whale

Fin whales are found in deep, offshore waters of all major oceans, primarily in temperate to polar latitudes, including the action area of the Draft Permit. No critical habitat has been designated.

Since fin whale are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The fin whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. If zooplankton abundance is affected indirectly by changes in the phytoplankton community or directly by the discharge itself, fin whale which feed on zooplankton could be indirectly affected.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants. Additionally, no critical habitat has been designated for this species; therefore, none will be affected.

Based on the above information, effects from offshore seafood processing discharges are expected to be insignificant and discountable. Therefore, the EPA has determined that the Draft Permit is **not likely to adversely affect** the fin whale.

5.6.3.11 Humpback whale (Western North Pacific DPS)

Summer and fall ranges for the California/Oregon/Washington stock of humpback whales include the action area of the Draft Permit. No critical habitat has been designated.

Since humpback whale are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The humpback whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. If zooplankton abundance is affected indirectly by changes in the phytoplankton community or directly by the discharge itself, humpback whale which feed on zooplankton could be indirectly affected.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants.

Additional threats include entanglement in fishing gear, ship strikes, whale watch harassment, habitat impacts, and harvest. Humpbacks in Hawaii have been observed entangled in longline gear, crab pots, and other non-fishery-related lines (2017a). Over 100 entanglement incidents have been reported to the NMFS Alaska stranding program over the last 30 years, many involving pot gear or gill net gear from fisheries in the inside waters of southeast Alaska and in areas around Kodiak, Homer, and Seward (NMFS, 2010). Japan has issued scientific permits in the Antarctic and in the western North Pacific in recent years where annual sample sizes for the full-scale research (lethal sampling) are set at 50 humpback whales (2017a). Some indirect effects to whales related to reduced prey availability or foraging success may be possible. Overall, offshore seafood processor vessels should occupy a small percentage of the habitat of humpback whales and it is expected that humpback whales would be able to avoid areas where offshore seafood processors are located. The incidence of ship strikes leading to death or serious injury from vessels involved in the groundfish fisheries also appears to be negligible and unlikely to have population-level consequences for these whales (NMFS, 2010).

In 2010, NMFS issued the North Pacific Groundfish Fishery Biological Opinion (NMFS, 2010) in which a jeopardy and species analysis was conducted for the humpback whale and interactions with the BSAI and GOA groundfish fisheries and the parallel fisheries, as authorized under the FMPs. Based on the analysis in the report, NMFS concluded that the fisheries were **not likely** to jeopardize the continued existence of the Western North Pacific DPS of the humpback whale. Additionally, no critical habitat has been designated for this species; therefore, none will be affected.

EPA believes that the potential for adverse effects to humpback whales from EPA's draft General Permit will most likely result in insignificant effects to the species. Therefore, EPA has determined that the approval of the proposed permit for offshore seafood processors is **not likely to adversely affect** the humpback whale.

5.6.3.12 Sperm whales

The sperm whale inhabits all of the world's oceans in deep waters between 60o N and 60o S latitudes, including the action area of the Draft Permit. No critical habitat has been designated for the sperm whale.

Since sperm whales are highly mobile and, therefore, able to avoid discharge areas, direct impacts from localized seafood processing discharge plumes, or potential ship strikes on individual animals is greatly reduced. However, because sperm whales have a primarily fish diet, they might be attracted to discharge as a food source. This would put them at increased risk of vessel strike. This attraction could also create dependence on an anthropogenic food supply which might run out, and could habituate the animals to humans, potentially increasing danger to them if they are perceived as a nuisance. The Draft Permit requires that the discharge of seafood processing wastes must not create an attractive nuisance situation whereby fish or wildlife are attracted to waste disposal or storage areas in a manner that creates a threat to fish or wildlife or to human health and safety. Some temporary disturbance of whale activities may occur, due to increases in vessel traffic and noise.

The sperm whale does not rely on phytoplankton as a food source. Therefore, the effects of seafood processing waste discharge on phytoplankton community abundance and structure, would only have indirect impacts on these marine mammals. Since sperm whale feed at higher trophic levels, they are very unlikely to be impacted.

Habitat degradation, depletion of prey, and aquatic pollution are considered to be threats to all threatened and endangered marine mammals. Impacts due to seafood processing waste are limited to the immediate vicinity of the discharge, and the receiving waters are sufficiently oxygenated and well-mixed to allow for rapid dispersion and dilution of pollutants.

NMFS has reported in the 2010 North Pacific Groundfish Fishery Biological Opinion that the whales are known to take fish off of longline fishing gear in Alaskan waters, mainly the GOA, increasing the potential for ship strikes and entanglement in fishing lines. But the incidence of sperm whale entanglement in Alaska appears to be low, and would not be expected to reach a level that would have population-level consequences. The potential for ship strikes, too, seems minimal and unlikely to result in an adverse population level effect for sperm whales in Alaska (NMFS, 2010).

In 2010, NMFS issued the North Pacific Groundfish Fishery Biological Opinion (NMFS, 2010) in which a jeopardy and species analysis was conducted for the sperm whale and interactions with the BSAI and GOA groundfish fisheries and the parallel fisheries, as authorized under the FMPs. Based on the analysis in the report, NMFS concluded that the fisheries were **not likely to adversely affect** the North Pacific sperm whale. Additionally, no critical habitat has been designated for this species; therefore, none will be affected.

EPA believes that the potential for adverse effects to sperm whales from EPA’s draft General Permit will most likely result in insignificant effects to the species. Therefore, EPA has determined that the approval of the proposed permit for offshore seafood processors is not likely to adversely affect the sperm whale.

5.6.3.13. Beluga Whale (Cook Inlet Stock)

For Cook Inlet Beluga (CIB) whales, potential threats identified in the recovery plan (NMFS 2016e) include:

- Threats of high concern include catastrophic events (e.g., natural disasters; spills; mass strandings); cumulative and synergistic effects of multiple stressors; and noise.
- Threats of medium concern include disease agents (e.g., pathogens, parasites, and harmful algal blooms); habitat loss or degradation; reduction is prey; and unauthorized take.
- Threats of low concern include subsistence hunting; pollution; and predation.

Reported subsistence harvests of CIB whales between 1994 and 1998 can account for the 14 percent annual rate of decline in the population during that time period. Between 1999 and 2015, only five CIB whales have been taken through a subsistence harvest.

In the last decade, NMFS has only documented one CIB whale mortality associated with personal use, subsistence, or recreational fisheries. This instance took place in 2012 and included entanglement in a net south of the Kenai River (NMFS 2016e). The most likely impacts from personal use, subsistence, recreational, and commercial fisheries include disturbance from the operation of watercraft in stream mouths and shallow waters, ship strikes, displacement from important feeding areas, harassment, and prey competition.

Vessel interactions resulting from the draft General Permit are unlikely to occur. Based on vessel locations provided to EPA, no vessels providing report in 2014 or 2015 were located in Cook Inlet. Some indirect effects to whales related to reduced prey availability or foraging success may be possible. Some temporary disturbance of whale activities may also occur due to increases in vessel traffic and noise. Offshore seafood processor vessels will be restricted from discharging within 3 nm of the Alaskan shoreline, so it is expected that beluga whales would be able to avoid areas where offshore seafood processors are located.

In 2009, the Sustainable Fisheries Division consulted with NMFS on Amendment 91 to the BSAI groundfish FMP for CIB whales. NMFS determined that due to the behavior of CIB, the location and harvest amounts of potential prey species in the groundfish fisheries, and the minimizing of Chinook salmon bycatch under Amendment 91, Alaska groundfish fisheries may affect, but are not likely to adversely affect, CIB either directly through vessel interactions or indirectly through prey competition (NMFS, 2010).

EPA believes that potential adverse effects to beluga whales from EPA's approval of the draft General Permit are insignificant and discountable. Therefore, EPA has determined that the approval of the proposed offshore seafood permit is **not likely to adversely affect** the CIB whale.

5.6.3.14. Gray Whale (Western North Pacific Stock)

Two Pacific Ocean populations of gray whales exist: the western north Pacific (WNP) stock, with a migratory route that is unknown, but presumed to be between the Sea of Okhotsk and southern Korea; and the eastern Pacific stock that travels from the Bering, Chukchi and Beaufort Seas to the southern Gulf of California and Baja (NMFS 2016).

According to the 2015 stock assessment report (NMFS 2015), "The decline of gray whales in the WNP is attributable to commercial hunting off Korea and Japan between the 1890s and 1960s." The assessment states, "Given that some WNP gray whales occur in U.S. waters, there is some probability of WNP gray whales being killed or injured by ship strikes or entangled in fishing gear within U.S. waters." This probability is based on precedent of gray whale takes in Russia and Northeast Asia.

In addition, the report listed habitat concerns including seismic surveys, increased shipping traffic, habitat modification, and ocean acidification (NMFS 2015). For subsistence purposes, Alaska Eskimos have harvested an average of two gray whales annually (range 0–6) in recent years (NMFS, 2016).

Some indirect effects to whales related to reduced prey availability or foraging success may be possible. Some temporary disturbance of whale activities may also occur due to increases in vessel traffic and noise. Offshore seafood processor vessels may cause adverse effects to cetaceans through ship strikes. However, there are only approximately 98 offshore seafood processor vessels and while the vessels could adversely impact the gray whale, the potential aggregate area of all offshore seafood processors in Alaska coastal waters in the action area is unlikely to occupy more than a small portion of the whale's habitat used for feeding and migration. As offshore seafood processor vessels should occupy a small percentage of the habitat of gray whales, it is expected that gray whales would be able to avoid areas where offshore seafood processors are located.

Based on the above information, effects from offshore seafood processors are expected to be insignificant and discountable. Therefore, EPA has determined that EPA's proposed approval of the proposed permit for offshore seafood processors is **not likely to adversely affect** the gray whale.

5.6.4. Reptiles

While the endangered leatherback, the loggerhead, Olive Ridley, and the green sea turtle may occasionally venture into Alaskan waters, neither their center of abundance nor their critical habitat occurs in Alaskan waters. While fishing does pose threats to turtles through incidental capture and vessel strikes, offshore seafood processor discharges are not expected to add to this risk. They are also very mobile and would be able to easily avoid the areas of discharge. Discharges will take place in high tidal activity areas which should allow for dispersion and dilution, minimizing effects on the three species' habitats. Since it is expected these species of sea turtles would have little overlap with offshore seafood processors, EPA has determined that the Draft Permit is **not likely to adversely affect** the leatherback, loggerhead, Olive Ridley, or green sea turtle.

This determination is concurrent with the 2006 Biological Assessment in which NMFS determined that the Alaska groundfish fisheries are **not likely to adversely affect** the Olive Ridley turtle, Loggerhead turtle, Green turtle, or Leatherback sea turtle (NMFS, 2006).

5.8 Effect of the Proposed Action on Tribal Resources

"Subsistence fishing" is defined by Alaska state law as: "taking of fish, shellfish, or other fisheries resources by Alaska residents for subsistence uses" (AS 16.05.940[30]).

"Subsistence uses" of wild resources are defined as "noncommercial, customary, and traditional uses" for a variety of purposes. This includes direct personal or family consumption of wild resources as food, shelter, fuel, clothing, tools, or transportation for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources are taken for personal or family consumption, and for the customary trade, barter, or sharing of wild resources for personal or family consumption (AS 16.05.940[32]).

Under Alaska's subsistence statute, the Alaska Board of Fisheries must identify fish stocks that support subsistence fisheries and if there is a harvestable surplus of these stocks, adopt regulations that provide reasonable opportunities for these subsistence uses to take place. When harvests have to be restricted, subsistence fisheries have a preference over other uses of the stock (AS 16.05.258).

Tribal fisheries harvests are used for commercial, personal-use and cultural purposes. Authorities to plan, conduct and regulate fisheries, manage natural resources and enter into cooperative relationships with state and federal entities are held independently by each of the Tribes based on their own codes of law, policies and regulations (PFMC, 2011a).

Most rural families in Alaska depend on subsistence fishing and hunting. According to State of Alaska's Department of Commerce Division of Community Advocacy, 92-100% of households use fish and 79-92% use wildlife. In general, harvest and use levels increase in communities that function a distance from urban population centers. (Alaska 2006a).

Subsistence fishing and hunting provide a significant part of the food supply in rural Alaska. The subsistence food harvest by Alaska residents (approximately 33.8 million pounds usable weight excluding wild plants) represents approximately 0.9% of the fish and game harvested annually in Alaska. Most of the wild food harvested is composed of fish (about 53%) along with land mammals (about 22%), marine mammals (14%), birds and eggs (3%), shellfish (3%), and wild plants (4%) as depicted in Figure 15 (Fall and ADFG 2016). Fish varieties include salmon, halibut, herring, and whitefish. Marine mammals comprise of seals, sea lion, walrus, beluga, and bowhead whale. Land mammals comprise of moose, caribou, deer, bear, Dall sheep, mountain goat, and beaver (Wolfe 2000).

Although subsistence harvests produce a major portion of the food supply, they represent a small portion of the annual harvest of wild resources in Alaska. Commercial fisheries comprise 98.5% of the wild resource harvest and sport fisheries and hunts comprise approximately 0.5% (Fall and ADFG 2016).

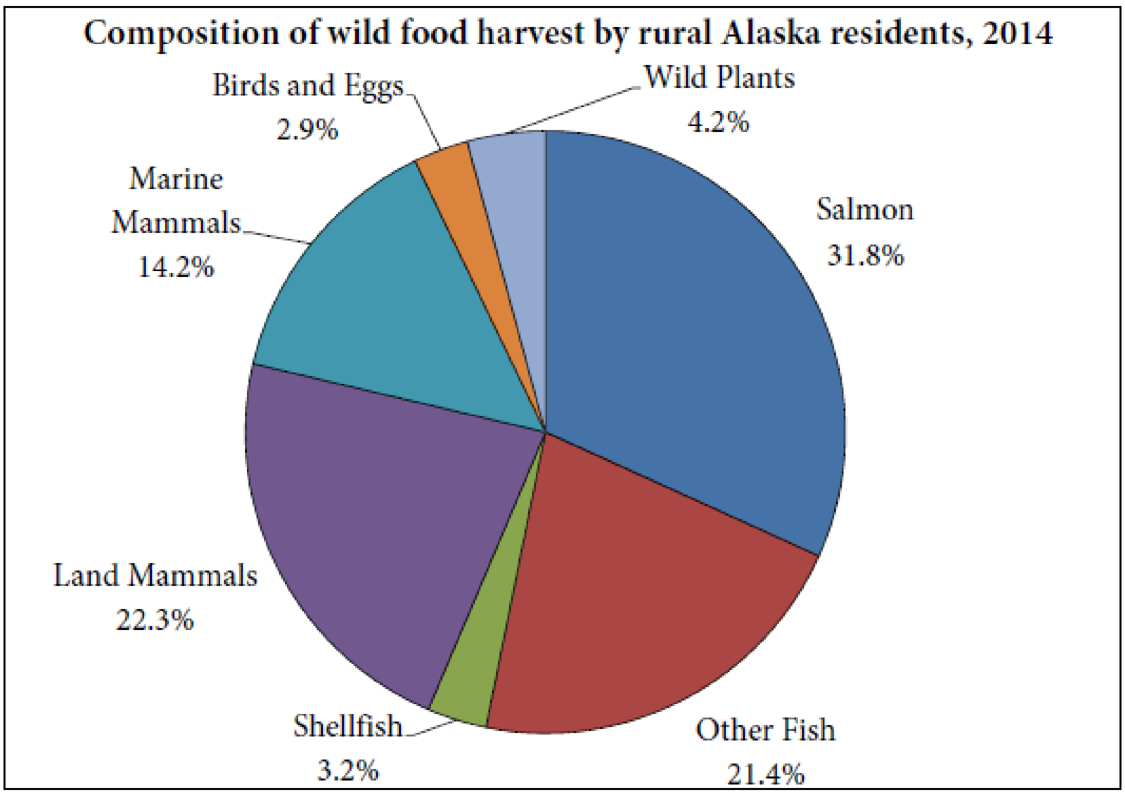

Figure 17: Composition of subsistence harvest by rural Alaska residents.
Source: Division of Subsistence, Fall and ADFG 2016.

6.0 CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological evaluation. Future Federal actions that are unrelated to the proposed action are not considered in this action because they require separate consultation pursuant to Section 7 of ESA. The purpose of the cumulative effects section is to weigh the significance of other actions before determining whether the effects of the proposed action, when added to the effects of non-federal actions, will result in jeopardy to the federally listed species occurring in the action area, or adversely modify or destroy their designated critical habitat.

Some of the future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological evaluation include State-managed commercial fisheries, subsistence harvest, vessel traffic and construction of man-made structures. As climate change alters the location of fish stocks, seafood processing vessels may approach the North Slope area of spectacled eider habitat. While this is a potential future action, at this time the potential for these vessels to move north is not reasonably certain to occur.

No additional future State, tribal, local or private actions are reasonably certain to occur in the action area of this biological evaluation.

6.1 Effect Conclusions for ESA Species

Section 7(a)2 of the ESA states that Federal agencies must ensure that their activities are not likely to:

- Jeopardize the continued existence of any listed species, or
- Result in the destruction or adverse modification of designated critical habitat.

The following table indicates the effect conclusions for ESA species made by the EPA on behalf of the proposed action discussed in Section 2.

Table 5: Effect Conclusions for ESA species.

Species	Summary of Effect Analysis Conclusion
Fish	
Chinook salmon	Not likely to adversely affect
Sockeye - Snake River ESU	Not likely to adversely affect
Steelhead	Not likely to adversely affect
Birds	
Short-tailed Albatross	Not likely to adversely affect
Steller's Eider	Not likely to adversely affect
Spectacled Eider	Likely to adversely affect
Marine Mammals	
Polar Bear	No Effect
Steller Sea Lion	Not likely to adversely affect
Ringed Seal	Not likely to adversely affect
Bearded Seal	Not likely to adversely affect
Northern Sea Otter	Not likely to adversely affect
Northern Right Whale	Not likely to adversely affect
Bowhead Whale	Not likely to adversely affect
Sei Whale	Not likely to adversely affect
Blue Whale	Not likely to adversely affect
Fin Whale	Not likely to adversely affect

Humpback Whale	Not likely to adversely affect
Sperm Whale	Not likely to adversely affect
Cook Inlet Beluga Whale	Not likely to adversely affect
Gray Whale	Not likely to adversely affect
Reptiles	
Green Sea Turtle	Not likely to adversely affect
Loggerhead Sea Turtle	Not likely to adversely affect
Leatherback Sea Turtle	Not likely to adversely affect
Olive Ridley Sea Turtle	Not likely to adversely affect

7.0 ESSENTIAL FISH HABITAT

7.1 Description of Proposed Action

Please refer to Section 2.0 of this document for a description of the proposed action.

7.2 EFH FOR APPROPRIATE FISHERIES MANAGEMENT PLANS

The Federal and State parallel groundfish fisheries in the GOA and BSAI are managed under FMPs (16 U.S.C. 1801 2(b)(4)) developed by the North Pacific Fishery Management Council pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (MSA).The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires Federal agencies to consult with the National Marine Fisheries Service (NMFS) on activities that may adversely affect Essential Fish Habitat (EFH).

EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (50 CFR § 600.10). All federal agencies are required to consult with the National Marine Fisheries Service (NMFS) on any actions authorized, funded, or undertaken by the agency that may adversely affect EFH (50 CFR § 600.920.10). The objective of this EFH assessment is to determine whether or not the proposed actions “may adversely affect” designated EFH for relevant commercially, federally-managed fisheries species within the proposed action area. Again, NOAA has defined “adverse effect” in the context of EFH consultation as “any impact which reduces the quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions” (50 CFR 600.810). Table 6 lists FMP-managed species in Alaska.

The FMPs for the BSAI and GOA can be found on the Council’s webpage:
http://www.npfmc.org/wp-content/PDFdocuments/fmp/BSAI/BSAIfmp.pdf
and
http://www.npfmc.org/wp-content/PDFdocuments/fmp/GOA/GOAfmp.pdf.

Briefly, EFH for Bering Sea and Aleutian Islands (BSAI) region groundfish includes pelagic, epipelagic, and meso-pelagic waters, as well as on-bottom and near-bottom habitats of the Bering Sea and Aleutian Islands. It also includes pelagic and bottom nearshore, inshore, and intertidal waters of the Bering Sea and Aleutian Islands. EFH for Gulf of Alaska (GOA) species include pelagic, pelagic inshore, epipelagic, and bottom habitats; EFH for BSAI crabs occurs throughout the water column and includes bottom habitats and inshore waters.

EFH for the salmon fisheries off the coast of Alaska consists of the aquatic habitat, both fresh water and marine, necessary to allow for salmon production needed to support a long-term sustainable salmon fishery and salmon contributions to healthy ecosystems (NPFMC, 1999). For the purpose of identifying EFH, the distribution of salmon in a watershed can be assumed based on access to salt water, with the upstream limits determined by presence of migration blockages. According to the Alaska Forest Resources and Practices Act (AS 41.17), an “anadromous water body” means the portion of a fresh water body or estuarine area that (a) is cataloged under AS 16.05.870 as important for anadromous fish; or (b) has been determined by Alaska Department of Fish and Game to contain or exhibit evidence of anadromous fish in which case the anadromous portion of the stream or waterway extends up to the first point of physical blockage. Therefore, if salmon occur in a stream’s estuary, the area of stream up to the first point of physical blockage is presumed to be salmon habitat.

Information on life histories and salmon distributions can be found in the “Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes” and the “Atlas to the Catalog of Waters Important for Spawning, Returning or Migration of Anadromous Fishes.” However, not all waters important to salmon are identified in the Catalog and Atlas. For example, these documents are derived from U.S. Geological Survey maps which may be out of date because of changes in channel and coastline configurations. In addition, only a limited number of water bodies have actually been surveyed and are not included in the Catalog or Atlas. Waters that may not be included may include small- and medium-sized tributaries, flood channels, intermittent streams and beaver ponds which are often used for rearing or otherwise provide important habitat for anadromous fish (NPFMC, 1999).

Table 6: Fisheries management plan (FMP)-managed species in Alaska (from Appendix D, Section D-3, Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska, NOAA, 2005).

Bering Sea-Aleutian Islands Groundfish	**Gulf of Alaska Groundfish**
Walleye pollock Shortraker/rougheye rockfish	Walleye pollock Thornyhead rockfish
Pacific cod Northern rockfish	Pacific cod Yelloweye rockfish
Yellowfin sole Thornyhead rockfish	Yellowfin sole Dusky rockfish
Greenland turbot Yelloweye rockfish	Arrowtooth flounder Atka mackerel
Arrowtooth flounder Dusky rockfish	Rock sole Sculpins
Rock sole Atka mackerel	Alaska plaice Skates
Alaska plaice Skates	Rex sole Sharks
Rex sole Sculpins	Dover sole Forage fish complex
Dover sole Sharks	Flathead sole Squid
Flathead fole Forage fish complex	Sablefish Octopus
	Pacific Ocean perch

Sablefish Squid Pacific Ocean perch Octopus	Shortraker/rougheye rockfish Northern rockfish
Bering Sea-Aleutian Island Crab Red king crab Tanner crab Blue king crab Snow crab Golden king crab	**Alaska Stocks of Pacific Salmon** Pink Chinook Chum Coho Sockeye
Alaska scallops Weathervane scallop	

7.2.1. EFH Groundfish Species

7.2.1.1 Walleye Pollock

Pollock are widely distributed throughout the North Pacific Ocean in temperate and sub-arctic waters (NMFS 2005). Pollock are found throughout the water column from the surface to about 500 meters (1,640 feet). Juveniles have EFH in inner continental shelf regions with water depths ranging from 1 to 50 meters (3 to 164 feet). Seasonal migrations occur from the outer continental shelf to shallow waters (90 to 140 meters [295 to 459 feet]) for spawning. Spawning takes place in early spring; the eggs are pelagic, and found at depths from 0 to 1000 meters, and hatch in about 10-20 days depending on water temperature. Epipelagic larvae have a similar distribution, spending 20-30 days in the surface waters. Juvenile and adults are most often in lower and middle portion of the water column at depths less than 200 meters, for juveniles, and less than 1000 meters for adults. These life stages have no substrate preference.

7.2.1.2 Pacific Cod

Pacific cod is a demersal species that occurs on the continental shelf and upper continental slope. Spawning habitat occurs along the continental shelf and slope between about 40 to 290 meters (131 to 951 feet) with spawning typically occurring from January to April. Pacific cod converge in large spawning masses over relatively small areas, with spawning occurring in the sublittoral/bathyl zone near the bottom. The eggs sink to the bottom and are somewhat adhesive. Little is known about the substrate type required for egg incubation. The optimal conditions for embryo development are water temperatures between 3 to 6ºC, salinity between 13 to 23 parts per thousand (ppt), and dissolved oxygen concentrations from 2 to 3 parts per million (ppm). The larvae are epipelagic, occurring primarily in the upper 45 meters (148 feet) of the water column shortly after hatching, and they move downward in the water column as they grow. The larvae occur primarily in waters less than 100 meters deep over soft substrate. Cod are concentrated on the shelf edge and the upper slope (100 to 200 meters deep) in the winter and spring. These fish overwinter in this zone and spawn from January to April; then they move to shallower waters (less than 100 meters deep) in the summer. Adults occur in depths from the shoreline to 500 meters (1,640 feet); their preferred substrate is soft sediment from mud to clay or sand (NMFS 2005). All life stages of Pacific cod, except juveniles, have EFH in inner continental shelf regions with water depths ranging from 1 to 50 meters (3 to 164 feet). Juvenile and adult EFH occurs in the lower portion of the water column in the inner, middle, and outer continental shelf from 0 to 200 meters; where their preferred substrate is soft sediment primarily from mud to gravel (NMFS 2005).

7.2.1.3 Yellowfin Sole

The EFH for all the life stages of the yellowfin sole occurs in either intertidal or inner continental shelf waters at depths less than 50 meters (164 feet). Yellowfin sole eggs, larvae, and juveniles are pelagic and are usually found in shallow areas. Larvae are planktonic for at least 2 to 3 months until metamorphosis occurs, usually inhabiting shallow nearshore areas. Adults are benthic and occupy separate winter and spring/summer spawning and feeding grounds. Adults overwinter near the shelf slope-break at approximately 200 meters and move into nearshore spawning areas as the shelf ice recedes (NMFS 2005). Spawning is protracted and variable, beginning as early as May and continuing through August. Spawning primarily occurs in water less than 30 meters deep. After spawning, adults disperse broadly over the continental shelf for feeding. Adults exhibit wintertime migration to deeper waters of the shelf margin to avoid extreme cold water temperatures, and feeding diminishes during this time.

7.2.1.4 Greenland Turbot

Also known as Greenland halibut, are distributed from Baja California northward throughout Alaska, although primarily found in the eastern Bering Sea and Aleutian Island region. Spawning occurs in winter from September through March, on the eastern Bering Sea slope. The eggs are benthypelagic (suspended in the water column near the bottom). The larvae are planktonic for up to 9 months until metamorphosis occurs, usually with a widespread distribution throughout shallow waters. Juveniles spend the first 3 to 4 months on the continental shelf, and then move to the slope as adults. Greenland halibut or turbot are demersal to semi pelagic. Adults inhabit continental slope waters with annual spring/fall migrations from deeper to shallow waters.

7.2.1.5 Arrowtooth Flounder

All life stages of arrowtooth flounder occur in inner continental shelf regions with water depths ranging from 1 to 50 meters (3 to 164 feet). Spawning is thought to occur from September through March. Larvae are planktonic for at least 2 to 3 months until metamorphosis occurs; juveniles usually inhabit shallow areas. Adults are found in continental shelf waters until age four and occupy both shelf and deeper slope waters at older ages with highest concentrations at 100 to 200 meters (NMFS 2005). Both adults and juveniles are found often over softer substrate, typically mud and sand, in the lower portion of the water column.

7.2.1.6 Rock Sole

EFH for all life stages of rock sole, except egg, occurs in inner continental shelf regions with water depths ranging from 1 to 50 meters (3 to 164 feet) along the western portions of Alexander Archipelago extending eastward along the coastline to Kodiak Island. Spawning takes place during late winter/early spring near the edge of the continental shelf at depths from 125 to 250 meters (410 to 820 feet). Eggs are demersal and adhesive. The larvae are planktonic for at least 2-3 months until metamorphosis occurs.

Juveniles inhabit shallow waters until at least age one (NMFS 2005). Juveniles and adults occur over moderate to softer substrates of sand, gravel and cobble mostly in depths from 0 to 200 m.

7.2.1.7 Alaska Plaice

Defined EFH for Alaska plaice includes eggs, larvae, late juveniles and adults. Alaska plaice is considered a "deep water" species in the Gulf of Alaska groundfish management area. Eggs are present over a range of depths (0 to 500 meters) in the spring. Juvenile and adult EFH is in the lower portion of the water column at depths of 0 to 200 meters, over sand and mud substrate (NMFS 2005).

7.2.1.8 Dover Sole

EFH for Dover sole life stages from egg through late juvenile occurs in intertidal and inner shelf [1 to 50 meters (3 to 64 feet)]. These areas include areas adjacent to the western sides of Admiralty, Baronof, Chichagof, Kuiu, and Kupreano Islands. This fish is considered a "deep water flatfish" in the Gulf of Alaska management area. The EFH ranges to great depths (0 to 3000 meters) for larvae and eggs. Adults and juvenile EFH are less deep (0 to 500 meters) in the middle and outer shelf and upper slope areas, occurring in the lower portion of the water column over softer substrate of sand and mud (NMFS 2005).

7.2.1.9 Flathead sole

EFH for all life stages of flathead sole occurs in inner continental shelf regions with water depths ranging from 1 to 50 meters (3 to 164 feet). Adults are benthic and have separate winter spawning and summer feeding distributions. The fish over-winter near the continental shelf margin and then migrate onto the mid and outer-continental shelf areas in the spring to spawn. The eggs are pelagic and the larvae are planktonic and usually inhabit shallow areas. Egg and larvae EFH ranges from 0 to 3000 meters, while juvenile and adults' EFH is shallower 0 to 200 meters occurring over sand and mud substrate. Like all flatfish they occur in the lower portion of the water column.

7.2.1.10 Sablefish

Sablefish are found in the Gulf of Alaska, westward to the Aleutian Islands, and in gullies and deep fjords generally at depths greater than 200 meters such as Prince William Sound and Southeast Alaska. Studies have shown that sablefish can be highly migratory for at least part of their lifecycle moving between the Gulf of Alaska to the Aleutian Islands and the Bering Sea. EFH for early juvenile sablefish occurs in inner continental shelf regions in water depths less than 50 meters (164 feet). Spawning is pelagic at depths of 300 to 500 meters (984 to 1,640 feet) near the edges of the continental slope. Larvae are oceanic through the spring; by late summer small juveniles [10-15 centimeters (4-6 inches)] occur along the outer coasts of Southeast Alaska, where they predominantly spend their first winter. First to second year juveniles are found primarily in nearshore bays; they move to deeper offshore waters as they age with EFH habitat at depths of 200 to 1000 meters. Adults are found on the outer continental shelf mainly on the slope and in deep gullies at typical depths of 200 to 1000 meters, over varied habitat, usually in softer substrate (NMFS 2005).

7.2.1.11 Pacific Ocean Perch

This species has historically been the most abundant rockfish species in the Gulf of Alaska. Known spawning areas are southeast of the Pribilof Islands in the Eastern Bering Sea and in the Gulf of Alaska near Yakutat. Major feeding areas are found off Unimak Pass and Kodiak Island and adjoining islands. Most of the adult population occurs in patchy, localized aggregations. Pacific Ocean perch appear to exhibit annual bathymetric migration from deep water in winter (approximately 300 to 420 meters) to shallower water (150 to 300 meters) in the summer and fall. It is primarily a demersal species that inhabits the outer continental shelf and upper continental slope regions of the North Pacific Ocean. Similar to other rockfish, Pacific Ocean perch have internal fertilization and release live young. Insemination occurs in the fall, and release of larvae occurs in April or May. The larvae are thought to be pelagic and drift with the current. Later-stage juveniles are believed to migrate to an inshore, demersal habitat, where they seem to inhabit rockier, higher relief areas than adults. As they mature, juveniles move to progressively deeper waters of the continental shelf. Adults [longer than 25 centimeters (10 inches)] are associated with pebble substrate on flat or low relief bottom, while juveniles prefer rugged areas containing cobble-boulder and epifaunal invertebrate cover (NMFS 2005).

7.2.1.12 Shortraker/Rougheye Rockfish

Shortraker and rougheye rockfish inhabit the outer continental shelf and upper continental slope of the northeastern Pacific from the Eastern Bering Sea to as far south as Point Conception, California. Trawl surveys have found juvenile rougheye rockfish at many inshore locations and also offshore on the continental shelf. In contrast, very few juvenile shortraker rockfish have ever been caught, and their preferred habitat is unknown. Adults of both species are semidemersal and are usually found on the continental slope in deeper waters and over rougher bottoms than Pacific Ocean perch. Shortraker and rougheye adults appear together often in trawl hauls and are concentrated in a narrow band along the slope at depths of 300 to 500 meters. Habitats with steep slopes and frequent boulders are used at a higher rate than those with gradual slopes and few boulders (NMFS 2005).

7.2.1.13 Northern Rockfish

Northern rockfish in the northeast Pacific range from the Eastern Bering Sea, throughout the Aleutian Islands and the Gulf of Alaska, to northernmost British Columbia. Little is known about the biology and life history of this species. Like other members of their genus, they are believed to bear live young in the early spring. There is no information on the habitat requirements of larval or early juvenile stages. Older juveniles are found on the continental shelf, generally at locations inshore of adult habitat, which is on relatively shallow rises of banks on the outer continental shelf at depths of 75 to 150 meters (NMFS 2005). The fish appear to be associated with relatively rough bottoms on these banks, and they are mostly demersal in their distribution.

7.2.1.14 Thornyhead Rockfish

Thornyheads in Alaska comprise two species: the shortspine thornyhead and the longspine thornyhead. The shortspine thornyhead is a demersal species found in deep water from 93 to 1460 meters, from the Eastern Bering Sea to Baja California. The longspine thornyhead inhabit depths from 370 to 1600 meters. Little is known about thornyhead life history. These fish spawn large masses of buoyant eggs during the late winter and early spring. Juveniles are pelagic for the first year. Thornyhead rockfish inhabit the outer shelf and slope region through the northeastern Pacific and the Eastern Bering Sea.

7.2.1.15 Yelloweye Rockfish

Yelloweye rockfish occur on the continental shelf from Northern Baja California to the Eastern Bering Sea, commonly in depths less than 200 meters (NMFS 2005). They inhabit areas of rugged, rocky relief, and adults appear to prefer complex bottoms with "refuge spaces".

7.2.1.16 Dusky Rockfish

Dusky rockfish are included within the assemblage of rockfish species termed "pelagic shelf rockfish". Genetic and morphometric studies indicate that two species of dusky rockfish occur in the North Pacific Ocean: an inshore, shallow water, dark-colored variety and an offshore lighter-colored variety (NMFS 2005). Life history information on the dusky rockfish is extremely sparse. Females give birth to live young apparently in the spring, but there is no information on the larval or early juvenile stages. Older juveniles have not been sampled in large numbers, but appear to live on the inner continental shelf, generally at locations inshore of adults. The preferred habitat of adult fish appears to occur over the offshore banks of the outer continental shelf at depths of 100 to 149 meters (328 to 489 feet) (NMFS 2005).

7.2.1.17 Atka Mackerel

Atka mackerel are distributed from the east coast of the Kamchatka Peninsula, throughout the Aleutian Islands and the Eastern Bering Sea, and eastward through the Gulf of Alaska to Southeast Alaska (NMFS 2005). Their current center of abundance is in the Aleutian Islands, with marginal distributions extending into the southern Bering Sea and the western Gulf of Alaska. Adult Atka mackerel are semi-pelagic and spend most of the year over the continental shelf in water depths generally less than 200 meters (656 feet). Adults migrate annually to shallow coastal waters during spawning. Females deposit adhesive eggs in nests or rocky crevices (NMFS 2005). Planktonic larvae are found up to 800 kilometers from shore, usually in the upper water column, but little is known about their distribution until the fish are 2 years old and appear in the fishery.

7.2.1.18 Skates

EFH for adult skates is defined as waters from 0 to 500 meters on shelf and upper slope areas. They are present in the lower portion of the water column over varied substrate from mud to rock. Skates are oviparous, fertilization is internal, and eggs are deposited in a horny case for incubation. After hatching, juveniles likely remain in shelf and slope waters, but distribution is unknown. Adults and juveniles are demersal and feed on bottom invertebrates and fish. Data from surveys indicates that Alaska skates are most common from 50 to 200 meters deep on the continental shelf in the Eastern Bering Sea and the Aleutian Islands and are less common in the Gulf of Alaska between 100 and 350 meters. The Bering skate is found in the Gulf of Alaska and the Eastern Bering Sea between 100 and 350 meters. No data is available on habitat requirements or movement (NMFS 2005).

7.2.1.19 Sculpins

Both juvenile and adults sculpin species are present in the lower portion of the water column in the inner, middle and outer shelf (0 to 200 meters) and also in the upper slope (200 to 500 meters) in the Gulf of Alaska, over varied substrate (mud to rock). Most spawning occurs in the winter, with some species having internal fertilization. Typically, eggs are laid in rocks where males guard them. Larvae often have diel migrations (near surface at night), and may be present year around.

7.2.1.20 Sharks

Sharks in the project area include spiny dogfish, the Pacific sleeper shark, and salmon sharks. Spiny dogfish are widely distributed in the Pacific Ocean. In the North Pacific, they are more common in the Gulf of Alaska, but are also found in the Eastern Bering Sea. They are a pelagic species, found from the surface down to 700 meters, but most commonly along the continental shelf to 200 meters depth. The females give birth in shallow coastal waters from September to January. Spiny dogfish move inshore in summer and offshore in winter. The Pacific sleeper shark is distributed throughout the Eastern Bering Sea, and occurs primarily on the outer shelf and the upper slope, but has also been seen near shore. Fertilization and development of these sharks is unknown. Salmon sharks are distributed epipelagically along the continental shelf. They can be found in shallow waters throughout the Gulf of Alaska and the Eastern Bering Sea. These sharks have been found mostly on the outer shelf/upper slope areas in the Eastern Bering Sea, but from nearshore areas to the outer shelf in the Gulf of Alaska, especially near Kodiak Island and in Prince William Sound. Females likely give birth in offshore pelagic areas.

7.2.1.21 Forage Fish Complex

Forage fish, as a group, occupy a central position in the North Pacific Ocean food web, being consumed by a wide variety of fish, marine mammals, and seabirds. The complex includes many species, but the most common are capelin, eulachon, Pacific sand lance, and Pacific herring.

Capelin are distributed along the entire coastline of Alaska and south along British Columbia to the Strait of Juan de Fuca. Spawning occurs in the spring in intertidal zones of coarse sand and fine gravel, especially in Norton Sound, northern Bristol Bay, and around Kodiak Island. In the Eastern Bering Sea, adults are found only in nearshore habitats during the months surrounding the spawning run. During other times of year, capelin are found far offshore in the vicinity of the Pribilof Islands and the continental shelf break. This seasonal migration may be associated with the advancing and retreating polar ice front. Capelin have fairly narrow temperature preferences and probably are very susceptible to increases in water column temperatures.

Eulachon spawn in the lower reaches of coastal rivers and streams from northern California to Bristol Bay. This fish plays a significant cultural and ecological role in the coastal areas of Alaska. The number of streams supporting eulachon on the west coast of North American is relatively small, but Southeast Alaska has more than 25 runs of eulachon. They spawn in the spring in the rivers of the Alaska Peninsula and are

consistently found in groundfish surveys between Unimak Island and the Pribilof Islands in the Eastern Bering Sea, and the Shelikof Strait in the Gulf of Alaska.
Pacific sand lance are usually found on the sea bottom, at depths between 0 and 100 meters except when feeding (pelagically) on crustaceans and zooplankton. Spawning occurs in winter and little is known about their distribution and abundance. Near Kodiak Island, sand lance have been found to hatch between March and April after spending up to several months in beach sediments. Newly hatched sand lance migrate offshore in early spring and spend time in offshore bank areas. In late summer, massive schools of fish start migrating inshore to suitable beach habitat for spawning and overwintering.
Pacific herring migrate in schools and are found along both shores of the ocean, ranging from San Diego Bay to the Bering Sea. They generally spawn during the spring in confined shallow vegetated areas in the intertidal and subtidal zones with eggs hatching about two weeks later. Young larvae drift and swim with the currents before metamorphosis into the juvenile form. Juveniles rear in sheltered bays and inlets. After spawning, most adults leave inshore waters and move offshore to feed. Herring schools spend daylight hours near the bottom and move upward in the evening to feed.

7.2.22 Squid

Juvenile and adult squid use the entire water column over the shelf (0 to 500 meters) and the entire slope (500 to 1,000 meters) regions (NMFS 2005). Reproduction is poorly known. But fertilization is internal, and squid lay eggs in gelatinous masses in water 200 to 800 meters deep. Young juveniles are often in water less than 100 meters deep, while older juveniles and adults are more often in waters 150 to 500 meters deep. Spawning occurs in the spring (NMFS 2005).

7.2.1.23 Octopi

In the Bering Sea and the Gulf of Alaska, the most commonly encountered octopi are the shelf demersal species *Enteroctopus dofleini* (the giant octopus), which inhabits the sublittoral to upper slope regions, and the bathypelagic species *Vampyroteuthis infernalis*, which lives at depths well below the thermocline, most commonly from 700 to 1500 meters depth. Little is known of their food habits, longevity, or abundance.

7.2.1.24 Red King Crab

The red king crab is widely distributed in the Gulf of Alaska and the BSAI, but defined EFH is restricted to the BSAI. They are present in the shelf areas to 250 meters depth. Mating occurs in water less than 50 meters deep from January to June. Larvae spend 2 to 3 months in a pelagic stage. After metamorphosis young of the year juvenile crabs are present in water less than 50 meters. At age of 1.5 to 2 years juveniles migrate in large pods to deeper water. Early stage juveniles use high relief coarse substrate (e.g., boulders, cobbles) areas. This habitat is present in the continental shelf area of 0 to 200 meters wherever there is substrate of rock, cobble, gravel and biogenic structures. Defined late juvenile and adult stage EFH is located primarily in Bristol Bay, with small areas in the Aleutian Islands and Norton Sound (NMFS 2005).

7.2.1.25 Blue King Crab

Blue king crab are found in discontinuous populations throughout their range which includes Alaskan regions from the Bering Sea, Pribilof Islands, St. Mathews Island, St.

Lawrence Island to Southeast Alaska (NMFS 2005). Defined EFH is restricted to the BSAI region and excludes the GOA region. Adults are found at an average depth of 70 meters. Larvae, after 3.5 to 4 months as pelagic stage, settle to the bottom between 40 to 60 meters. Juveniles require rocky shell hash nearshore habitat, while adults reside typically at 45 to 75 meters in mud-sand substrate (NMFS 2005). The EFH characteristics for late juveniles is found in nearshore waters where rocky areas and shell hash are present in 0 to 50 meters, extending out wherever rock cobble and gravel are present to 200 meters in the continental shelf areas of the BSAI (NMFS 2005). Adult EFH characteristics are the same as late juveniles except substrate consists of sand and mud adjacent to rocky –shell hash areas. Defined late juvenile and adult stage EFH is located primarily in the central Bering Sea (Pribilofs, St. Mathews Island areas), with a very small region in Norton Sound.

7.2.1.26 Golden King Crab

Golden king crab in the Alaskan region has a wide distribution ranging from the BSAI to Southeast Alaska. They are present at great depths, 200 to 1000 meter deep, typically in regions of high relief such as inter Island passes (NMFS 2005). Defined EFH is restricted to the BSAI region and excludes the GOA. Life stage affects depth distribution. Legal males occur at about 274 to 639 meters, and females from 274 to 364 meters. Juveniles can be found at all depths within their depth range distribution. EFH characteristic for late juvenile crab ranges from upper slope (200 to 500 meters) to basins more than 3000 meters deep containing boulders, vertical walls, ledges and panicles in high relief with living substrate areas of the BSAI. EFH characteristics for adults are similar to juveniles except they extend into shallower outer shelf waters (100-200 meters) as well as regions greater than 3000 meters. Defined late juvenile and adult stage EFH is located in small areas primarily surrounding the Aleutian Islands, and scattered areas in the Bering Sea.

7.2.1.27 Tanner Crab

Tanner crab in Alaska are concentrated around the Pribilof Islands, just north of the Alaskan Peninsula, and in low abundance in the GOA (NMFS 2005). Defined EFH is restricted to the BSAI and excludes regions in the GOA. Mating occurs in January to June and egg hatching from April to June. Larvae are pelagic in the 1 to 100 meters depth, and then settle to bottom areas of mud, 10 to 20 meters deep, in the summer. Late juveniles migrate offshore. EFH includes inner (0 to 50 meters) to outer (100 to 200 meters) continental shelf regions for both late juveniles and adults, wherever substrate is primarily mud, in the regions designated as EFH (NMFS 2005). Defined late juvenile and adult stage EFH is located primarily in a triangular shape region extending from a wide area just north of the Alaskan Peninsula in Bristol Bay to the northwest central Bering Sea (NMFS 2005).

7.2.1.28 Snow Crab

Snow Crab in Alaskan waters are found from the Arctic Ocean to the Bering Sea and do not extent to the GOA (NMFS 2005). They are most common at depths less than 200 meters. Immature crabs are more abundant at less than 80 meters depth. Mating occurs from January to June, with brooding likely occurs at depths greater than 50 meters. EFH characteristics for late juvenile and adult stages include inner (0 to 50 meters) to outer (100 to 200 meters) continental shelf regions throughout the BSAI where mainly mud bottom is present. Defined late juvenile and adult stage EFH is located primarily in a large central Bering Sea area surrounding the Pribilof Islands and St. Matthews Island, mostly well offshore.

7.2.1.29 Weathervane Scallop

Weathervane scallops can be present from intertidal to 300 meters, but highest abundance is 40 to 130 meters (NMFS 2005). They mature in 3 years and spawn from May to July by releasing eggs and sperm into the water. Larvae are pelagic for a month before settling to the bottom. The defined EFH of late juvenile and adult stage weathervane scallops extends to suitable depths from about the entrance of Icy Straits west of Juneau, to north just short of Prince William Sound and then again from the Cook Inlet entrance along the south region of the Alaskan Peninsula, with a small area extending into the Bering sea near the end of the Alaskan Peninsula. EFH habitat of late juveniles and adults are along the sea floor in the middle (50 to 100 meters) to outer (100 to 200 meters) shelf areas. Their distribution is generally elongated with the current flow direction lines (NMFS 2005). They are typically present over clay to gravel substrates. While they are capable of swimming they generally remain along sea floor depressions. Fertilization is external, with pelagic larvae drifting for a month before settling to the sea floor (NMFS 2005).

7.2.2 Salmon

There are five Pacific salmon species (pink, chum, sockeye, Chinook and coho salmon) that are present in Alaskan waters. They have broad distribution in Alaskan waters with some species found in nearly all potential marine or freshwater action areas. They are unique among the EFH species with EFH in the project area in being present in the freshwater, estuarine and marine environments. While each species has specific life history characteristics, several common characteristics are present among the species. They all deposit their eggs in freshwater or estuarine (some) environments, these eggs and early juveniles incubate within a gravel environment for several months. The juveniles emerge from gravel and spend days to years in mostly freshwater before entering estuarine and marine areas. They eventually move into the marine environment where they may rear for at least a year in regions that may be several hundred miles from where juveniles emerged from gravel. As they approach adult stage they all return to their natal freshwater source area to spawn once and die. So EFH in the overall potential action area may include any of the 6 life stage categories (freshwater eggs, freshwater larvae and juveniles, estuarine juveniles, marine juveniles, marine immature and maturing adults, and freshwater adults) (Table 8-4).

7.2.2.1 Pink Salmon

Pink salmon are the most common salmon species in Alaska and have freshwater distribution covering nearly the entire coastal areas. The EFH for pink salmon, within the potential project areas, includes adult spawning, juvenile freshwater rearing, estuarine juvenile, marine juvenile and marine immature and maturing adults (NMFS 2005). The estuarine EFH would be the mouth areas of streams from the mean high tide line to the salinity transition zone. All other marine life stage EFH could be included in the entire potential project area, as EFH habitat for this species extends from the mean higher tide line to the 200 nautical mile limit of the U.S. EEZ. This species is pelagic to a depth of about 200 meters. Pink salmon spawn in small streams within a few miles of the shore, or within the intertidal zone, or at the mouths of streams. Eggs are laid in stream gravels. After hatching salmon fry move downstream to the open ocean. Pink salmon stay close to the shore moving along beaches during their first summer feeding on plankton, insects and small fish. At about 1 year of age, pink salmon move offshore to ocean feeding Adult pink salmon return to their natal streams to spawn between June and mid-October. This species is pelagic to a depth of about 200 meters, and generally rears in ocean areas south of the limits of spawning streams (NMFS 2005).

7.2.2.2 Chum Salmon

Chum salmon have the widest distribution in the North Pacific Ocean of any salmon species (NMFS 2005). The EFH for chum salmon, within the potential action areas, includes adult spawning, juvenile freshwater rearing, estuarine juvenile, marine juvenile, and marine immature and maturing adults (NMFS 2005). The estuarine EFH would be the mouths of streams from the mean high tide line to the salinity transition zone. All other marine life stage EFH could be included in the entire potential action area, as EFH habitat for this species extends from the mean higher tide line to the 200 nautical mile limit of the U.S. EEZ. This species is pelagic to a depth of about 200 meters. Most chum salmon spawn in small streams within 100 miles of the ocean, or within the intertidal zone, but sometimes travel great distances up large rivers (e.g., Yukon River). Adults return to spawn between June and January, with earliest spawning occurring in the northern portion of their range. Eggs are laid in stream gravels or in some areas in intertidal zones, such as Prince William Sound (NMFS 2005). After hatching salmon fry move downstream to estuaries then into the open ocean. Estuaries are very important to chum salmon during the spring and summer (NMFS 2005).

7.2.2.3 Sockeye Salmon

Sockeye salmon have wide distribution within Alaskan waters, but are unique among salmon species in usually requiring a lake for early rearing. The EFH for sockeye salmon, within the potential project area, includes adult spawning, juvenile rearing, estuarine juvenile, marine juvenile and marine immature and maturing adults (NMFS 2005). The estuarine EFH includes the mouth areas of streams from the mean high tide line to the salinity transition zone. All other marine life stage EFH could be included in the potential project area, as EFH habitat for this species extends from the mean higher tide line to the 200 nautical mile limit of the U.S. EEZ. This species is pelagic to a depth of about 200 meters. Sockeye salmon spawn in stream systems with lakes, or on lake shoreline areas, during late summer or fall. After moving into lakes in the spring they typically rear in the limnetic zone. After one to 3 years in fresh water lakes the fry move downstream to the open ocean. During their first year in the ocean they generally stay in a narrow nearshore band until at least fall when they are suspected to move offshore (NMFS 2005).

7.2.2.4 Chinook Salmon

Chinook salmon, which are the largest of all salmon species, are usually most abundant in the largest river systems in Alaska. The EFH for Chinook salmon, within the potential action area, includes adult spawning, juvenile freshwater rearing, estuarine juvenile, marine juvenile and marine immature and maturing adults (NMFS 2005). The estuarine EFH would be the mouth areas of streams from the mean high tide line to the salinity transition zone. All other marine life stage EFH could be included in the entire potential project area, as EFH habitat for this species extends from the mean high tide line to the 200 nautical mile limit of the U.S. EEZ. This species is pelagic to a depth of about 200 meters. Chinook salmon spawn in small and large streams, but may include some of the longest migration of any salmon, over 2000 miles in some systems. Adults return to streams at age 2 to 7 years. They usually spawn in freshwater systems during late summer or early fall. Eggs are laid in stream gravels. Two forms of juvenile freshwater rearing life history are present for Chinook salmon. Juveniles that emerge and migrate to the ocean within weeks or a few months are called “ocean type”, and have extensive estuary rearing. Those juveniles that rear in freshwater for typically 1 to 3 years before migrating to the ocean in the spring are called “stream type”, and spend less time in estuarine waters. Stream-type Chinook salmon are dominant in Alaska. Chinook salmon tend to stay deeper in the water column than other salmon, typically deeper than 30 meters, while other species tend to stay in the upper 20 meters (NMFS 2005).

7.2.2.5 Coho Salmon

Coho salmon, which use the broadest environment of any salmon, are present in many streams south of Point Hope Alaska, including the Aleutian Islands (NMFS 2005). The EFH for coho salmon, within the potential project areas, includes adult spawning, juvenile freshwater rearing, estuarine juvenile, marine juvenile and marine immature and maturing adults (NMFS 2005). The estuarine EFH would be the mouth areas of streams from the mean high tide line to the salinity transition zone. All other marine life stage EFH could be included in the entire potential action area, as EFH habitat for this species extends from the mean higher tide line to the 200 nautical mile limit of the U.S. EEZ. This species is pelagic to a depth of about 200 meters. Coho salmon spawn in small streams. They are typically the last salmon to arrive at the spawning areas, generally from July to December (NMFS 2005). Eggs are laid in stream gravels. After one to 3 years in fresh water ponds, lakes, and stream pools the salmon smolts move downstream to the open ocean. Some coho salmon may use estuarine areas in the summer of their first year in the ocean, but migrate upstream to overwinter in freshwater (NMFS 2005).

7.3 EFFECTS OF THE PROPOSED ACTION

7.3.1 Potential effects of action on BSAI groundfish EFH

BSAI groundfish EFH is found within the action area, including federal waters 3 nautical miles (nm) or more from shoreline. Visual inspection of NOAA EFH maps (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html: accessed July 2017) and text descriptions of EFH indicate that EFH for multiple life stages of many BSAI groundfish are within the potential action area for offshore seafood processing facilities. The coastal waters of southeastern Alaska, the southern coast of the Kenai peninsula, waters of the Shelikof Strait, coastal waters surrounding Kodiak Island, coastal waters surrounding the Alaska Peninsula and Aleutian Islands, and some coastal waters of the Bristol Bay area are designated as EFH for one or more BSAI groundfish, including the following: walleye pollock, pacific cod, Greenland turbot, arrowtooth flounder, rock sole, Alaska plaice, rex sole, Dover sole, flathead sole, and yelloweye rockfish. No information was found on the geographic distribution of EFH for some BSAI groundfish, including forage fish complex or octopus.

The following description of potential adverse effects from seafood processing discharges is provided in Appendix G to the Alaska Essential Fish Habitat Environmental Impact Statement (NOAA 2005).

Offshore seafood processing wastes consist of biodegradable materials that contain high concentrations of soluble organic material. Seafood processing operations have the potential to adversely affect EFH through (1) direct source discharge, (2) particle suspension, and (3) increased turbidity and surface plumes.

Seafood processing operations have the potential to adversely affect EFH through the direct discharge of nutrients, chemicals, fish byproducts and “stickwater” (water and entrained organics originating from the draining or pressing of steam-cooked fish products). EPA investigations show that impacts affecting water quality are direct functions of the receiving waters. In areas with strong currents and high tidal ranges, waste materials disperse rapidly. In areas of quieter waters, waste materials can accumulate and result in shell banks, sludge piles, dissolved oxygen depressions, and associated aesthetic problems (Stewart and Tangarone 1977). This permit covers offshore seafood processors 3 nm or more from shore and requires discharges to occur in areas with adequate flushing.

Processors discharging fish waste are required to adhere to the technology based and water quality based limits outlined in the NPDES permits. Although fish waste, including heads, viscera and bones, is biodegradable, fish parts that are ground to fine particles may remain suspended for some time, thereby overburdening EFH from particle suspension (Council 1999). Such pollutants have the potential to adversely impact EFH. The wide differences in habitats, types of processors and seafood processing methods define those impacts and can also prevent the effective use of technology-based effluent limits.

Seafood discharge piles can alter benthic habitat, reduce locally associated invertebrate populations and lower dissolved oxygen levels in overlying waters. Impacts from accumulated processing wastes are not limited to the area covered by the waste piles. Severe anoxic and reducing conditions occur adjacent to effluent piles (EPA 1979). Examples of localized damage to benthic environment include several acres of bottom driven anoxia by piles of decomposing waste up to 26 feet (7.9 meters) deep. Juvenile and adult stages of flatfish are drawn to these areas for food sources. One effect of this attraction may lead to increased predation on juvenile fish species by other flatfishes, diving seabirds and marine mammals drawn to the food source (Council 1999). The proposed permit covers offshore seafood processors which includes mobile vessels that are located in high tidal areas with good flushing which allows dispersion and dilution of the seafood discharges. In addition, ZODs are not permitted in this permit. Therefore, the potential for accumulated seafood wastes is minimal.

Scum and foam from seafood waste deposits can also occur on the water surface or increase turbidity. Increased turbidity decreases light penetration into the water column, reducing primary production. Reduced primary production decreases the amount of food available for consumption by higher trophic level organisms. In addition, stickwater takes the form of a fine gel or slime that can concentrate on surface waters and move onshore to cover intertidal areas. However, this permit requires discharge in high tidal areas with adequate flushing which should minimize the potential for these impacts to occur.

A number of important species including, walleye pollock, Pacific cod, rock sole, and sand lance release demersal eggs. As with other types of fish eggs, demersal eggs require oxygen for development. Seafood waste discharges resulting in waste piles are typically anoxic due to decay and decomposition of the waste. Thus, demersal eggs could be smothered if located beneath a discharge. Such smothering of demersal eggs could have a substantial adverse impact on these demersal species and other aquatic organisms that prey upon these fish. Seafood wastes that are discharged during spawning and egg production periods have the most potential to adversely affect these species. A number of studies have been conducted regarding effects of suspended solids on egg mortality, but the effect of waste deposition on egg mortality is not well documented (USEPA 1984b). In particular, it is not known at what depth of deposition egg survival would be impaired. However, it is reasonable to conclude that impairment may occur at fairly shallow waste depths (e.g., 0.4 in) if that depth of waste was sufficient to impair oxygen transfer to the egg or if anoxic conditions were present such as those commonly observed in and around the ZOD (e.g., Germano & Associates, 2004). As stated earlier, this permit covers vessels located 3 nm or more in high tidal areas with good flushing, which should minimize the potential for waste piles and smothering of demersal eggs.

For context, Alaska has approximately 47,000 miles of coastal marine shoreline, and the surface area of coastal bays and estuaries alone in Alaska is 33,211 square miles (ADEC, 2005). The potential aggregate area of all offshore seafood processor facilities in Alaska waters in the action area is unlikely to occupy more than a small fraction of the total offshore area.

The revised offshore seafood processing permit may reduce, but does not mandate avoidance of, adverse effects from authorized offshore seafood processing to EFH. The mechanisms described in the preceding paragraphs, together with an understanding of the characteristics of offshore seafood processors that have been authorized in Alaska, suggests that there is potential for offshore seafood processor discharge to adversely affect EFH.

EPA expects that these effects, while possible, are likely to be limited in extent for several reasons. First, the spatial scale of impacts to EFH would be limited given the large geographic ranges of BSAI groundfish species' EFH and the limited aggregate size of offshore seafood processor discharges relative to other available offshore water. In addition, some BSAI groundfish may have the ability to avoid areas where seafood processing discharges are located. Secondly, in areas with strong currents and high tidal ranges, waste materials disperse rapidly. Since the offshore seafood processors covered under this permit will be at least 3 nm from shore, the seafood processing discharge would be in areas with strong currents and high tidal ranges and would dissipate rapidly not allowing for accumulation of the seafood discharge.

Despite these factors, however, EPA is unable to rule out the possibility that the proposed approval of the revised offshore seafood processor permit will adversely affect BSAI groundfish EFH. The State's revised offshore seafood processor permit does not set forth a procedure for (a) assessing potential impacts of a permitting action on EFH or, in the event of a potential for adverse impact, (b) procedures or requirements for avoiding or otherwise addressing that impact.

Therefore, EPA has determined that the offshore seafood processor permit **may adversely affect** BSAI groundfish EFH.

7.3.2 Potential Effects of Action on GOA Groundfish EFH

GOA groundfish EFH is found within the action area, which is defined as federal waters 3 nm or more from shore. Visual inspection of NOAA EFH maps (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html: accessed July 2017) and text descriptions of EFH indicate that EFH for multiple life stages of many GOA groundfish are within the potential action area. For example, EFH has been defined for species including Pacific cod, arrowtooth flounder, Dover sole, flathead sole, northern rockfish, dusky rockfish, and Atka mackerel in coastal waters including those around the Aleutian Islands, Kodiak Island, and the Shelikof Strait.

For the same reasons explained in detail in Section 9.3.1, EPA has determined that the approval of the offshore seafood processor permit **may adversely affect** GOA groundfish EFH.

7.3.3. Potential Effects of Action on BSAI King and Tanner Crab EFH

BSAI King and Tanner crab EFH is found within the action area, which is defined as federal waters 3 nm or more from shore. Visual inspection of NOAA EFH maps (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html: accessed July 2017) and text descriptions of EFH indicate that EFH for BSAI King and Tanner crab is found within the potential action area. For example, EFH has been defined for blue king crab, red king crab, and Tanner crab in coastal waters including those around the Aleutian Islands, Pribilof Islands, and St. Matthew's Island.

Tanner and King crabs, which feed on a wide variety of organisms including worms, clams, mussels, snails, crabs, other crustaceans, and fish parts, may suffer adverse effects from loss of prey species due to burial from seafood processor discharge.

The revised offshore seafood processor permit may reduce, but does not mandate avoidance of, adverse effects from authorized offshore seafood processing to EFH. Indeed, the potential for adverse effects to EFH within offshore seafood processing facilities authorized by DEC has been recognized elsewhere.

EPA expects that these effects, while probable, are likely to be limited in extent for several reasons. First, the spatial scale of impacts to EFH would be limited given the large geographic ranges of BSAI King and Tanner crabs' EFH and the limited aggregate size of offshore seafood discharges relative to other available offshore water. Secondly, in areas with strong currents and high tidal ranges, waste materials disperse rapidly. Since the offshore seafood processors covered under this permit will be at least 3 nm from shore, the seafood processing discharge would be in areas with strong currents and high tidal ranges and would dissipate rapidly not allowing for accumulation of the seafood discharge.

Despite these factors, however, EPA is unable to rule out the possibility that the proposed approval of the offshore seafood processor permit will adversely affect BSAI crab EFH. The revised offshore seafood processor permit does not set forth a procedure for (a) assessing potential impacts of a permitting action on EFH or, in the event of a potential for adverse impact, (b) procedures or requirements for avoiding or otherwise addressing that impact.

Therefore, EPA has determined that the offshore seafood processor permit **may adversely affect** BSAI crab EFH.

7.3.4 Potential Effects of Action on Alaska Scallop EFH

Alaska scallop EFH is found within the action area. Visual inspection of NOAA EFH maps (http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html: accessed July 2017) and text descriptions of EFH suggests that much of the scallop EFH may lie within the action area.

For the same reasons explained in detail in Section 9.3.1, EPA has determined that the proposed approval of the offshore seafood processor permit **may adversely affect** Alaska scallop EFH.

7.3.5 Potential Effects of Action on Alaska Stocks of Pacific Salmon EFH

EFH for Alaska stocks of Pacific salmon is also found within the action area. As described in Section 9.2.30, the five FMP-managed Pacific salmon have broad distribution in Alaskan waters with some species found in nearly all potential marine action areas. EFH for the FMP-managed Alaska stocks of Pacific salmon are present in the estuarine and marine environments. EFH in the potential action area may include any of the 6 life stage categories (freshwater eggs, freshwater larvae and juveniles, estuarine juveniles, marine juveniles, marine immature and maturing adults, and freshwater adults).

For the same reasons explained in detail in Section 9.3.1, EPA has determined that the proposed approval of offshore seafood processor permit **may adversely affect** EFH for Alaska stocks of Pacific salmon.

7.4 Proposed Mitigation

As described in Section 9.3.1-9.3.5, EPA's proposed action may adversely affect BSAI groundfish, BSAI crab, GOA groundfish, Alaska scallop and Alaska stocks of Pacific salmon EFH. These adverse effects relate to physical, chemical, and biological changes to EFH within areas of offshore seafood processor discharge.

EPA has included the following list of conservation measures that are identified in Appendix G of the Alaska Essential Fish Habitat Environmental Impact Statement (NMFS 2005). This is a potential approach that could identify, prevent, and/or mitigate any site-specific adverse effects of offshore seafood processor discharge authorized under Alaska's proposed NPDES permit.

The proposed conservation measures are as follows:

1) To the maximum extent practicable, base effluent limitations on site-specific water quality parameters including water depth, current velocity, tidal exchange, salinity, temperature, pH, etc. This permit requires that offshore processors discharge in 60 feet depths (MLLW) in areas of good flushing to avoid potential impacts to species.

2) To the maximum extent practicable, avoid the practice of discharging untreated solid and liquid waste directly into the environment. Encourage the use of secondary or wastewater treatment systems where possible. This permit requires that sanitary wastes are treated with a system that meets the applicable U.S. Coast Guard (USCG) pollution control standards in effect [33 CFR 159: "Marine sanitation devices"].

3) Minimization of new ZODs and reduction of footprints of existing ZODs. The proposed permit does not allow for ZODs. The current proposed permit is for mobile offshore facilities located in federal waters 3 nm or more from shore. According to the requirements of the permit, these processor vessels are expected to be in high tidal areas with good flushing so accumulation of seafood deposits on the seafloor is expected to be minimal.

4) Control stickwater by physical or chemical methods. Often, stickwater is collected and evaporated to produce condensed fish solubles which can be used as an attractant for fish meal rather than eliminating stickwater through processor effluent.

5) Promote sound fish waste management through a combination of fish-cleaning restrictions, public education and proper disposal of fish waste.

6) Encourage the alternative use of fish processing wastes (e.g. fertilizer for agriculture and animal feed). While some of the vessels covered under this permit have fish meal plants on board, which help minimize the disposal of fish processing wastes, not many of the processors can add them to vessels that do not have them already due to costs and ability of boats to handle the heavy equipment.

7) Explore options for additional research to minimize effects from seafood processor effluent. The permit currently requires daily sea surface visual monitoring to observe if ESA species are interacting with the discharge. This may inform the potential effects seafood processor influent is having on EFH species.

8) Locate new plants outside rearing and nursery habitat. As this permit applies to offshore processors 3 nm or more from shore it is expected that vessels will discharge outside rearing and nursery habitat. Biological and chemical changes to the sites should be minimal as the offshore processor vessels are in areas of high tidal activity which allow for dispersion and dilution of the discharges from the vessels.

9) Consider cumulative impacts of the discharges as well as other discharges into receiving waters and assure that the permittee is using state-of-the-art technology for

collecting monitoring data for analyses. This monitoring along with daily monitoring of the sea surface should provide additional information on cumulative impacts of offshore discharges along with other discharges into receiving water.

7.5 CONCLUSION for EFH

Several specific mechanisms by which offshore seafood processors could impact aspects of essential fish habitat have been described in Section 9.1. For example, various fish and crab species have a diet composed mainly of small benthic invertebrates. Impacts from accumulated processing wastes can alter benthic habitat, reduce locally associated invertebrate populations and lower dissolved oxygen levels in overlying waters. This could result in reduced prey availability or loss of habitat for some of the EFH managed species. A number of important species including, walleye pollock, Pacific cod, rock sole, and sand lance release demersal eggs. Seafood waste discharges resulting in waste piles are typically anoxic due to decay and decomposition of the waste which could affect the viability of the demersal eggs. In addition, demersal eggs could be smothered if located beneath a discharge.

EPA expects that these effects, while possible, are likely to be limited in extent for several reasons. First, the spatial scale of impacts to EFH would be limited given the large geographic ranges of EFH species' habitat and the limited aggregate size of offshore seafood processor discharges relative to other available coastal water. In addition, some EFH species may have the ability to avoid areas where seafood processing discharges are located. Secondly, in areas with strong currents and high tidal ranges, waste materials disperse rapidly. Since the offshore seafood processors covered under this permit will be 3 nm from shore, the seafood processing discharge would be in areas with strong currents and high tidal ranges and would dissipate rapidly preventing accumulation of the seafood discharge in waste piles.

Due to the possibility that adverse effects on EFH may arise from offshore seafood processors, and because the provisions in the regulation do not ensure that adverse effects to EFH will be avoided, ***EPA has determined that EPA's proposed approval of the General NPDES permit for offshore seafood processors in Alaska may adversely affect essential fish habitat.***

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