BIOLOGICAL EVALUATION OF INDIVIDUAL NPDES PERMITS FOR SEAFOOD PROCESSORS ON ENDANGERED AND THREATENED SPECIES IN THE PRIBILOF ISLANDS, ALASKA

Prepared by:
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101

With Technical Assistance from

Parsons
925 Fourth Avenue, Suite 1690
Seattle, WA 98104

October 2008

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ADF&G	Alaska Department of Fish and Game
BA	biological assessment
BOD	biological oxygen demand
C^o	degrees Centigrade
cm	centimeter
COD	chemical oxygen demand
DPS	distinct population segment
ESA	Endangered Species Act
EPA	U.S. Environmental Protection Agency
F^o	degrees Fahrenheit
FR	*Federal Register*
ft	feet
in	inch
km^2	square kilometer
kph	kilometers per hour
MMPA	Marine Mammal Protection Act
m	meter
mg/L	milligrams per liter
mi^2	square mile
MLLW	mean lower low water
mph	miles per hour
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
nmi	nautical mile
ODCE	Ocean Discharge Criteria Evaluation
spp.	Species, identified to genus level only
TSS	total suspended solids
USFWS	U.S. Fish and Wildlife Service

1.0 BACKGROUND/HISTORY

1.1 Project History

In February 1999, the U.S. Environmental Protection Agency (EPA) Region 10 issued a general National Pollutant Discharge Elimination System (NPDES) Permit for seafood processors discharging within 3 nautical miles (nmi) of the Pribilof Islands (NPDES General Permit No. AK-52-7000; 64 FR 1010). This permit expired in February 2004, but has been administratively extended by the Regional Administrator in accordance with 40 CFR § 122.6. EPA is not reissuing a general permit rather it is issuing individual permits for each facility proposing to process seafood within three nmi of the Pribilof Islands. EPA has received applications from four facilities that would like to process in this area. These facilities are:

- Trident Seafood Corporation - a shore-based seafood processing facility located on St. Paul Island, and discharging through a stationary outfall located within critical habitat for northern fur seals.
- Arctic Star (Icicle Seafoods, Inc.) - a mobile processing facility which moors on St. Paul Island and discharges through a stationary outfall located within critical habitat for northern fur seals.
- Stellar Sea (Stellar Seafoods, Inc.) - a mobile seafood processing vessel that operates within 3 nmi of St. Paul, St. George, or Otter Islands and Sea Lion Rock.
- Westward Seafoods, Highland Light Seafoods, LLC. - mobile seafood processing vessel that operates within 3 nmi of St. Paul, St. George, or Otter Islands and Sea Lion Rock.

1.2 Federal Action History

The Endangered Species Act (ESA) of 1973 requires Federal agencies to ensure that any action they authorize is not likely to jeopardize the continued existence of any endangered or threatened species, or result in the destruction or adverse modification of designated critical habitat. The intent of this document is to fulfill the requirements of Section 7(c) of the ESA, which requires Federal agencies to conduct a biological evaluation (BE) that identifies any threatened or endangered species or critical habitat which are likely to be affected by a proposed action. Federal agencies are required to consult with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) for assistance in complying with the ESA.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ACTION AREA

2.1 Description of the Project Purpose and Objectives

EPA is proposing to authorize discharges from four seafood processing facilities in 2008. The proposed NPDES Permits authorize wastewater discharges to the waters of the State of Alaska and waters of the United States adjacent to State waters within 3 nmi of the Pribilof Islands (i.e., St. Paul, St. George, Walrus, and Otter Islands and Sea Lion Rock) in accordance with the effluent limitations, monitoring requirements, and excluded areas specified in the permits. The following provides a description of facilities and the limitations and conditions in each permit:

Stellar Sea

The Stellar Sea is a 281.4 foot floating seafood processor. This facility processes opilio and/or bairdi crab from January through May in the Pribilof Islands. This vessel has been processing in this location since 1992.

Crab harvesting vessels offload their catch by brailer while moored alongside the vessel. During crab processing the body shell and guts are removed, then the two leg sections are washed, cooked, cooled, and frozen. The facility processes while at anchor. Weather and sea conditions can change frequently and as a result the vessel moves frequently. It is not unusual to move daily. When the crab season is finished the Stellar Sea leaves the Pribilof Islands to process in other areas of Alaska.

Some of the permit limitations and conditions in the permit are as follows:

- Discharge may occur from January to May 5th each year and is limited to processing and discharging crab and associated wastes
- Crab waste must be ground to ½ inch prior to discharge
- Volume of crab waste cannot exceed 78,000 lbs/day
- Permit contains effluent limits for ammonia, chlorine, and pH. Facilities may be granted a compliance schedule to meet the effluent limits for ammonia and chlorine.
- Increased effluent monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- Monitoring requirements for waste conveyor system, grinder system, outfall,
- Sea surface/shoreline and biological monitoring
- Surface water monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- The permit prohibits a discharge within 3 nautical miles (nm) of Walrus Island, within ½ nm of Sea Lion Rock and Northeast Point on St. Paul Island, within ½ nm of Dalnoi Point and South Rookery on St. George Island, and within ½ nm of the Alaska Maritime National Wildlife Refuge.

- Starting May 1st the permit prohibits discharge with ½ nm of land owned and/or managed by the National Marine fisheries Service for the protection of northern fur seal rookeries and haulout areas, and within ½ nm of land owned and/or managed by the U.S. Fish and Wildlife Service for the protection of seabird and seabird nesting areas
- Discharge of any equipment or miscellaneous items is prohibited
- Discharge of wastewater that contain floating solids, debris, sludge, deposits foam, scum, or other residues which cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; or cause a sludge solid or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shoreline, except for incidental foam and scum produced by the discharge of seafood catch transfer water is prohibited
- Discharge of oil and grease that causes a film, sheen, or discoloration on the water is prohibited.
- Facilities may be authorized a mixing zone for solids within the water column.

Arctic Star

The Arctic Star is a floating seafood processor moored in St. Paul Island harbor. Crab harvesting vessels offload their catch by brailer while moored alongside the Arctic Star. The crab are butchered, washed, packed, cooked, frozen and boxed onboard the Arctic Star. Finished product is offloaded to 40 foot refrigerated containers on the beach and then stored in an offsite area maintained by the shipping company(s). When the crab season is finished the Arctic Star leaves the harbor and processes in other areas of Alaska.

The facility discharges though two outfalls. Seafood processing waste, from processing Opilio crab, is discharged through outfall 001 which is a stationary outfall located approximately 920 feet offshore in the Bering Sea, and condenser cooling water is discharged through Outfall 002 which is located in St. Paul Harbor.

Some of the permit limitations and conditions in the permit are as follows:

- Discharge may occur from January to April 30th each year and is limited to processing and discharging crab and associated wastes
- Crab waste must be ground to ½ inch prior to discharge
- Volume of crab waste cannot exceed 65,000 lbs/day
- Permit contains effluent limits for ammonia, chlorine, and pH. Facilities may be granted a compliance schedule to meet the effluent limits for ammonia and chlorine.
- Increased effluent monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- Monitoring requirements for waste conveyor system, grinder system, outfall
- Monitoring of seafloor
- Sea surface/shoreline and biological monitoring

- Surface water monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- Discharge from a failed or leaking outfall is prohibited
- Discharge of any equipment or miscellaneous items is prohibited
- Discharge of wastewater that contain floating solids, debris, sludge, deposits foam, scum, or other residues which cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; or cause a sludge solid or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shoreline, except for incidental foam and scum produced by the discharge of seafood catch transfer water is prohibited
- Discharge of oil and grease that causes a film, sheen, or discoloration on the water is prohibited.
- Facilities may be authorized a mixing zone for solids within the water column.

Trident Seafood

The Trident Seafood Corporation is a seafood processing facility located on St. Paul Island. The facility discharges seafood processing wastes though stationary outfall 001 located in the Bering Sea. The facility also discharges live tank water to St. Paul Harbor through outfall 002. From 1996 through 1999 the facility primarily discharged Opilio crab waste and some halibut wastes. In 2001 the facility also started discharging cod waste, and in 2003 the facility started discharging red king crab waste. Additionally, since 1999 the production of halibut has increased significantly.

Some of the permit limitations and conditions in the permit are as follows:

- Discharge of waste may occur from December to April 30th each year through outfall 001 and is limited to processing and discharging crab and associated wastes.
- Discharge of halibut waste in the summer must occur at an ocean dumping site 7 miles west of St. Paul Island. Discharge of associated waste*water* may occur through Outfall 001
- Crab and halibut waste must be ground to ½ inch prior to discharge
- Volume of crab waste cannot exceed 180,000 lbs/day
- Permit contains effluent limits for ammonia, chlorine, and pH. Facilities may be granted a compliance schedule to meet the effluent limits for ammonia and chlorine.
- Increased effluent monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- Monitoring requirements for waste conveyor system, grinder system, outfall
- Monitoring of seafloor is required
- Sea surface/shoreline and biological monitoring
- Surface water monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc

- Discharge from a failed or leaking outfall is prohibited
- Discharge of any equipment or miscellaneous items is prohibited
- Discharge of wastewater that contain floating solids, debris, sludge, deposits foam, scum, or other residues which cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; or cause a sludge solid or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shoreline, except for incidental foam and scum produced by the discharge of seafood catch transfer water is prohibited
- Discharge of oil and grease that causes a film, sheen, or discoloration on the water is prohibited
- Facilities may be authorized a mixing zone for solids within the water column

Westward Wind

The Westward Wind is a 281.4 foot floating seafood processor. This facility processes opilio, bairdi, blue king, red king crab from January through May 5th in the Pribilof Islands. This vessel engages in catching, procuring, and processing crab. Processing includes all aspects of butchering, cleaning, freezing, packing, and transporting of crab product.

Some of the permit limitations and conditions in the permit are as follows:

- Discharge may occur from January to April 30th each year and is limited to processing and discharging crab and associated wastes
- Crab waste must be ground to ½ inch prior to discharge
- Volume of crab waste cannot exceed 28,500 lbs/day
- Permit contains effluent limits for ammonia, chlorine, and pH. Facilities may be granted a compliance schedule to meet the effluent limits for ammonia and chlorine.
- Effluent monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- Monitoring requirements for waste conveyor system, grinder system, outfall,
- Sea surface/shoreline and biological monitoring
- Surface water monitoring requirements for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc
- The permit prohibits a discharge within 3 nautical mile (nm) of Walrus Island, within ½ nm of Sea Lion Rock and Northeast Point on St. Paul Island, Within ½ nm of Dalnoi Point and South Rookery on St. George Island, and within ½ nm of the Alaska Maritime National Wildlife Refuge.
- Starting May 1st the permit prohibits discharge with ½ nm of land owned and/or managed by the National Marine fisheries Service for the protection of northern fur seal rookeries and haulout areas, and within ½ nm of land owned and/or managed by the U.S. Fish and Wildlife Service for the protection of seabird and seabird nesting areas
- Discharge of any equipment or miscellaneous items is prohibited

- Discharge of wastewater that contain floating solids, debris, sludge, deposits foam, scum, or other residues which cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; or cause a sludge solid or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shoreline, except for incidental foam and scum produced by the discharge of seafood catch transfer water is prohibited
- Discharge of oil and grease that causes a film, sheen, or discoloration on the water is prohibited.
- Facilities may be authorized a mixing zone for solids within the water column.

2.2 Project Description

A detailed characterization of the discharge is included in the Pribilof ODCE (EPA 2008). The following is a brief summary of the characteristics of discharges from the seafood processing facilities and the City of St. Paul wastewater treatment facility which discharges within 30 feet of the Trident Seafood outfall.

Seafood processing facilities:
Discharges from seafood processing facilities may be classified into solid and dissolved (or particulate and soluble) wastes. Solid wastes consist primarily of unused portions of fish and shellfish that have been processed. The unused portions of processed raw fish and shellfish can include heads, skin, scales, viscera, fins, and shells discarded during cleaning and butchering operations. Dissolved wastes can include soluble organic matter and nutrients leached from fish and shellfish tissues during processing. The dissolved wastes may also include disinfectants used to maintain sanitary conditions in compliance with requirements for the production of food for human consumption.

Reports submitted to the EPA by seafood processors in the Pribilofs indicate that the primary fisheries which support seafood processing operations in the Pribilof Is1ands include several species of crab (opilio Tanner crab [*Chionoecetes opilio*], Pacific halibut (*Hippoglossus stenolepis*), and Pacific cod (*Gadus macrocephalus*). A summary of the amount processed are provided in the table below.

Table 1: Amounts of processed raw product and waste product from Pribilof seafood dischargers

Year	**Opolio Crab**		**Halibut**		**Pacific Cod**	
	Raw Product	Waste Product	Raw Product	Waste Product	Raw Product	Waste Product
1996[1]	34,172,080	12,079,213	---	40,000	0	0
1997[1]	37,051,967	12,810,164	---	39,000	0	0

1998[1]	68,757,874	25,333,972	---	---	---	---
1999	90,621,800	33,586,928	863,220	91,233	0	0
2000	11,190,599	3,631,726	1,273,285	142,286	0	0
2001	8,115,582	2,950,264	1,379,188	151,711	3,382,545	2,343,236
2002	10,329,598	4,353,690	1,137,097	126,382	2,692,722	1,767,267
2003	7,328,536	2,635,973	1,130,077	288,140	1,668,343	1,116,845
2004	4,676,000	1,699,054	964,777	201,606	1,837,756	854,447
2005	5,638,840	2,055,838	1,856,580	339,191	2,107,255	1,229,218
2006	13,390,269	4,525,433	1,386,726	406,500	1,129,688	662,609
2007[2]	9,944,918	3,653,959	---	---	0	0
1. Information in this row is from the *Ocean Discharge Criteria Evaluation for the Proposed Pribilof Islands Seafood Processing General NPDES Permit*, August 1998. 2. Information in this column represents the first six months of 2007.						

Processing of crab typically occurs from mid-January through late April. Cod was typically processed from January through March, and halibut was processed from June through October.

No discharge to Zapadni Bay, St. George Island has occurred since 2001. Seafloor inspection data from 2007 indicates that wastes were accumulating at the end of Tridents outfall when Halibut wastes were being discharge.

<u>Summary of Discharge Monitoring data from seafood processors:</u>
Table 2 summarizes the effluent data collected by seafood processors since 1997.

Table 2: Summary of data from all facilities that operated in the Pribilof Islands since 1997

Parameter	**Minimum**	**Maximum**	**Median**	**Number of Samples**
Total Suspended Solids	6.3 mg/L	51,900 mg/L	840 mg/L	27
pH	5.8 s.u.	7.7 s.u.	6.2 s.u.	28
Total Phosphorus	0.12 mg/L	605 mg/L	13.25 mg/L	30
Ammonia	0.7 mg/L	1280 mg/L	6.24 mg/L	28
Total Residual Chlorine	0.1 mg/L	2 mg/L	0.95 mg/L	13
Biochemical Oxygen Demand	2 mg/L	81,000 mg/L	1685 mg/L	30
Oil and Grease	0.88 mg/L	35,800 mg/L	277.5 mg/L	30

Total suspended solids (TSS) concentrations ranged from 6.3 to 51,900 mg/L, which in general may be considered slightly to highly turbid. However, a marine water quality standard (WQS) is currently not available for TSS.

The minimum measured pH levels from the seafood process discharge effluent were slightly more acidic (5.8) than the WQS (6.5). The proposed permits contain effluent limits for pH.

The total phosphorus (TP) concentrations ranged from 0.12 mg/L to 605 mg/L however, no marine water quality standard (WQS) is currently available for phosphorus.

Ammonia concentrations were potentially highly elevated above both the acute and chronic WQS, (9.6 and 1.4 mg/L respectively, calculated based on a salinity of 30 ppt, pH of 8.2 and temperature of 10^{o}C) with a maximum concentration of 1,280 mg/L. Ammonia limits have been incorporated into the proposed permits and facilities may be given a compliance schedule to meet these effluent limits.

Biochemical oxygen demand (BOD) concentration ranged from 2 to 81,000 mg/L. There is currently no WQS for BOD, although the upper range of these numbers is representative of an extreme level of oxygen demand from the receiving water.

The maximum measured oil and grease concentration was 35,800 mg/L; no numeric WQS is currently available from either the State of Alaska or from USEPA; however a narrative water quality standard states:

> "*Total aqueous hydrocarbons in the water column may not exceed 15 µg/L. Total aromatic hydrocarbons in the water column may not exceed 10 µg/L. There may be no concentrations of petroleum hydrocarbons, animal fats, or vegetable oils in shoreline or bottom sediments that cause deleterious effects to aquatic life. Surface waters must be virtually free from floating oil, film, sheen, or discoloration.*"

Based on available DMRs, no oil and sheen was reported for the seafood discharges. Additionally, the proposed permits prohibit the discharges of oil and grease that cause a film, sheen, or discoloration on the water.

Residual chlorine in the effluent, varied from 0.1 mg/L to 2.0 mg/L, which exceeds the acute and chronic criterion of 13.0 µg/L and 7.5 mg/L. Chlorine limits have been incorporated into the proposed permit and facilities may be given a compliance schedule to meet these effluent limits.

In February 2008 EPA requested Stellar Sea, Arctic Star, Trident Seafoods, and Westward Wind to collect 5 effluent samples from crab processing and analyze them for metals. Stellar Sea was operating in Akutan but collected and submitted the effluent samples from that location. Arctic Star and Trident Seafoods were operating in the Pribilof Islands and collected data. Westward Seafood did not comply with the request. The following table provides the results of the monitoring.

Table 3: Monitoring results from effluent samples of seafood processor facilities

Parameter	Most Stringent Aquatic Life Criterion (µg/L)	Arctic Star (Pribilof Islands) (µg/L)	Trident Seafoods (Pribilof Islands) (µg/L)	Stellar Sea (Akutan) (µg/L)
Arsenic	36	64.8 – 246[1]	92.7-168[4]	30 -70
Cadmium	8.8	6.8 – 34.3	5.45-8.16	48.5 – 87.4
Copper	4.8	75.5 – 600	64.8-140	ND – 283
Mercury	0.94	ND	ND	0.3 – 0.9

Nickel	8.2	ND – 31.5	14.8-22.2[5]	11 – 96
Lead	8.1	ND – 5.79	ND	10 – 12[8]
Selenium	71	172 – 207[2]	12.7-132[6]	ND – 67
Zinc	81	123 – 1190[3]	33-83.1[7]	ND - 480

1. The influent water (seawater used during processing) ranged from non-detect (ND) to 55.8
2. The influent water (seawater used during processing) ranged from 173 – 236
3. The influent water (seawater used during processing) ranged from 75.4 – 1570
4. The influent water (seawater used during processing) ranged from 98.7-126
5. The influent water (seawater used during processing) ranged from 16.8-43.7
6. The influent water (seawater used during processing) ranged from ND-155
7. The influent water (seawater used during processing) ranged from 6.37-54.4
8. The influent water (seawater used during processing) ranged from 10 - 12

The source of metals contamination is not clear, however, the proposed permit requires each facility to determine the source(s) of metals contamination and remove the source of contamination.

Sediment chemistry monitoring was required by the general permit but this information was apparently not collected and is not currently available. However, historical studies were conducted at several nearshore sites on St. Paul, St. George, and Otter Islands (Enviro-Tech Diving, Inc. 1997). Sediments were collected in areas near discharges and at reference sites which were not subject to discharges. Sediments were analyzed for a number of constituents to determine if sediment character had been affected by discharges (BOD and COD, nitrogen, sulfide, total organic carbon, tota1 solids, tota1 volatile solids, petroleum hydrocarbons, grain size, semi-volatile organics, PAHs, and microbial contamination). The results of the survey indicate that sediments tested were not affected by discharges and there was no significant difference between stations near discharges and the reference locations. No organic contaminants, oil or grease, or microbial contaminants were found in samples. BOD and COD levels were low. Organic carbon, nitrogen, and sulfides were either not detected or present in low concentrations.

Infaunal samples collected near discharges were not found to be statistically different from reference sites. Species composition, abundance and diversity were similar at the discharge and reference sites. Based on chemical and biological information, no effects of discharges on sediment quality and infaunal organisms are discernible.

Domestic wastewater system:

The St. Paul facility discharges primary treated domestic wastewater from residential homes, businesses and shore-based processors. The city’s discharge commingles with seafood processing wastes and wastewater from the Trident Seafood facility and from the Arctic Star facility during periods when the seafood processor is operating.

Both the quantity and quality of discharge may vary through the year depending on sources from seafood processing facilities. No process flow data are currently available from individual discharges and therefore the effects of seasonality on the quantity of discharge cannot be evaluated. The daily average and maximum flow as indicated in the most recent Notice of Intent (NOI) is 180,000 and 300,000 gallons/day, respectively. In general, quality of discharge does not appear to show a seasonal trend; this is discussed in more detail in Section 5 of the ODCE (EPA 2005). Because the St. Paul facility is a land-based facility, the discharge location does not change as it does with mobile seafood processing facilities.

<u>Summary of discharge monitoring data from Pribilof municipal discharges:</u>
Effluent monitoring from the City of St. Paul indicated exceedances of pH WQS (6.5-8.5 at all times) with minimum and maximum pH of 6.3 and 9.63, respectively. Total Phosphorus (TP) concentration range from 1.36 to 6.88 mg/L, however as stated previously Alaska does not have a water quality standard for phosphorus. Ammonia concentration exceeded both the acute and chronic WQS (9.6 and 1.4 mg/L, respectively, calculated based on a salinity of 30 ppt, pH of 8.2, and temperature of 10^{o}C), with concentration ranging from 9.15 to 44.8 mg/L. TSS concentration ranged from 3 to 81 mg/L. Metals concentrations were less than the aquatic life criteria, except copper which consistently exceeded the associated aquatic life criterion value of 3.1 µg/L with a maximum value of 71.5 µg/L. Silver exceeded the acute aquatic life criterion value of 1.9 µg/L on occasion, with a maximum value of 26.6 µg/L. Maximum BOD and COD concentrations were 191 and 417, respectively, which is much lower than corresponding concentrations in the seafood process discharge. Maximum oil and grease concentrations were also much lower, at 49 mg/L. Volatile organic compounds were not detectable except for toulene, dibromochloromethane, bromoform and 1,4-dichlorobenzene. Dibromochloromethane and bromoform are disinfection byproducts. The maximum toluene concentration was 188 µg/L, but values were generally in the range of 20 to 60 µg/L. Dibromochloromethane ranged from 1 µg/L to 2.5 µg/L, bromoform ranged from 3.3 µg/L to 7.3 µg/L, and 1,4-dichlorobenzene ranged from non-detect to 6.4 µg/L. There are no aquatic life criteria for these compounds.

However, fecal coliform concentrations were extremely high, ranging from 20,000 to 35,500,000 cfu/100mL, which significantly exceeded the WQS in which no more 10% of the samples should exceed 40 cfu/100mL.

2.3 Description of the Action Area

The Pribilof Islands are comprised of extinct volcanoes located on the Bering Sea shelf approximately 300 miles from mainland Alaska (Appendix B, Figure 1). St. Paul and St. George Islands are the largest land masses in the Pribilofs, covering approximately 71 square kilometers (km^2) (27 square miles [mi^2]) and 57 km^2 (22 mi^2), respectively. Other islands include Walrus Island, Otter Island, and Seal Rock. The climate on the Pribilofs is heavily influenced by the Bering Sea, and is often foggy, cool, and wet.

Most of the crab processing in the Pribilof Islands occurs from January through March and with a smaller effort during November through December. Halibut processing occurs from June through November. Meteorological averages reported by the Western Regional Climate Center for wind speed and direction (collected from 1996 to 2002), temperature (recorded from 1971 to 2000), and precipitation (data from 1971 to 2000) indicate that winds from November to March are generally from the north and average between 27 kilometers per hour (kph) (16.8 miles per hour [mph]) and 30.6 kph (19.0 mph) (NOAA 2005a) and the average monthly temperature at St. Paul, for the same months, ranged from -5 Cº (23 Fº) (February) to 0.5 Cº (33 Fº) (November) (NOAA 2005b). Monthly precipitation averages during the November to March period ranged from 2.85 centimeter (cm) (1.12 in) (March) to 7.3 cm (2.87 inches [in]) (November) (NOAA 2005b).

Currently, there are three outfalls located offshore of East Landing in the Bering Sea off of St. Paul Island. One outfall is used by the City of St. Paul for sewage wastewater discharge, another is used to discharge seafood waste by the Arctic Star, and the last is used to discharge seafood waste by Trident Seafoods (Appendix B, Figure 2). The outfalls are a distance of approximately 30 feet from each other. These outfalls are approximately 900 feet long and discharge at depths about 30 ft. The offshore bottom substrate consists of a low gradient boulder field with occasional patches of sand. This substrate continues for approximately 340 m (1,115 ft) from mean lower low water (MLLW), at which point it changes to uncompacted sand. The nearshore habitat at East Landing is a high-energy environment subject to strong longshore currents. Biological resources known to occur in the nearshore habitat include sea anemones, urchins, sponges, and chitons (Envirotech Diving 1995). Seafood processing operations have been discontinued on St. George Island, although an individual application has been submitted by Puffin Seafood to process halibut, cod, sablefish, sea urchins and crab in 2009. Strong one knot currents and wave action within the nearshore waters of the Pribilofs actively disperse seafood wastes (Envirotech Diving 1995*)* suggesting that waste pile accumulations are unlikely. However, in a 2007 dive survey it was found that ½ – 4 inches of halibut waste had accumulated over a 100 foot by 75 foot area. Although this pile eventually dispersed, it is not known how long the pile persisted (*Trident Seafoods, St. Paul Island, Outfall Inspection and Zinc Installation*, September 1 -1 17, 2007, Enviro-Tech Diving, Inc.).

3.0 STATUS OF SPECIES AND CRITICAL HABITAT

3.1 Species List from the Services

In March 2005 both National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) provided letters in response to our request for a species list for the action area of the Seafood Processors of the Pribilof Islands. The letters (included in Appendix A) discusses the threatened and endangered species in the action area of the Pribilof Islands.

The following section provides listing status, abundance, distribution, life history information, for endangered and threatened species within the Pribilof Islands. Table 1 presents the Federal status for species listed as endangered or threatened.

Table 4. Threatened and Endangered Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Status
Marine Mammals		
Bowhead whale	*Balaena mysticetus*	FE
North Pacific right whale	*Eubalaena japonica*	FE
Sperm whale	*Physeter macrocephalus*	FE
Blue whale	*Balaenoptera musculus*	FE
Fin whale	*Balaenoptera physalus*	FE
Humpback whale	*Megaptera novaeangliae*	FE
Steller sea lion	*Eumetopias jubatus*	FE
Sea otter	*Enhydra lutris kenyoni*	FT
Seabirds		
Short-tailed albatross	*Phoebastria albatrus*	FE
Waterfowl		
Steller's eider	*Polysticta stelleri*	FT
Spectacled eider	*Somateria fischeri*	FT

FE = federally listed endangered; FT = federally listed threatened

3.2 Species Summaries

Several species of endangered whales may travel through the Pribilof region while migrating to and from summer feeding grounds. These include bowhead, North Pacific right, sperm, blue, finback, and humpback whales (D. DeMasters, NMFS, pers. comm. 1995; Zimmerman 1998). The western distinct population segment (DPS) of the Steller sea lion and the southwest Alaska DPS of the northern sea otter are the only marine mammals listed as threatened or endangered species that may be present in the Pribilof Islands throughout the year (NMFS 2005b; Burn, NMFS, pers. comm. 2005). The northern fur seal breeds on the Pribilofs and is considered a "depleted" species by the NMFS. Avian species with special status include the federally listed endangered short-tailed albatross, and Steller's eider and spectacled eider, each of which are federally listed as threatened.

3.2.1 Bowhead Whale

The bowhead whale is one of the rarest of all whales and is federally listed as endangered. Although the NMFS considered a petition to designate critical habitat for the Bering Sea stock of bowhead whales, no critical habitat has been designated to date (FR 66 28141).

Geographic Boundaries and Distribution

The majority of these whales inhabit areas around Alaska as part of the Western Arctic stock. Five populations existed historically, however one population may be extinct while three others exist only in low numbers (NMFS 2002b). The bowhead whale winters in southwestern Bering Sea, near the ice edge, and spends summers feeding and calving in the Beaufort Sea off the coast of Canada and Alaska. When the pack ice breaks up in the spring, these whales migrate from the Bering Sea through the Bering Strait into the Chukchi Sea and eventually into the Beaufort Sea (Shelden and Rugh 1995).

Critical Habitat

There is no critical habitat designated for the bowhead whale.

Life History

The Western Arctic bowhead whale has the best known movements (Shelden and Rugh 1995). The bowhead whale winters in southwestern Bering Sea, near the ice edge, and spends summers feeding and calving in the Beaufort Sea off the coast of Canada and Alaska. When the pack ice breaks up in the spring, these whales migrate from the Bering Sea through the Bering Strait into the Chukchi Sea and eventually into the Beaufort Sea (Shelden and Rugh 1995). Calving and breeding take place in open water near the edge of the pack ice (Shelden and Rugh 1995).

Preferred prey items include euphausiids (*Thysanoessa raschii*) and copepods (*Calanus* spp.) which are taken at surface and midwater depths (NMFS 1994).

Population Trends and Risks

Acoustic data from 1993 has resulted in an estimate of 8,200 animals, and is considered the best available abundance estimate for the Western Arctic stock (NMFS 2002b). The minimum population estimate, based on the population estimate of 8,200 for the Western Arctic stock of bowhead whales is 7,738 (NMFS 2002b). Subsistence takes by Eskimos have been regulated by a quota system under the authority of the International Whaling Commission (IWC) since 1977. Alaska Native subsistence hunters take approximately 25 to 40 animals per year (NMFS 1994).

This harvest poses little threat to the existence of the species, and the population has continued to increase during the period of this hunt (NMFS 2002b). Other threats may include offshore oil and gas development, human disturbance and aquatic pollution (NMFS 2002b).

Presence of Species Within Action Area

The bowhead spends the majority of its life in and around Arctic waters (Braham 1984). These animals live much of their lives in and near the pack ice, migrating to the high Arctic in summer, and retreating southward in winter with the advancing ice edge (Duke University 2005). Bowheads occur in the Bering, Chukchi, and Beaufort Seas (Moore and Reeves 1993) with Bering Sea stocks estimated at approximately 7,500 animals (International Whaling Commission 1992). Therefore, some individuals may occur in the area of the Pribilof Islands during the fall and winter seafood processing season. However, most bowhead whales are thought to spend winter months (December through March) in the western Bering Sea, migrating north and west during spring and early summer (Braham et al. 1980; Brueggemann 1982).

3.2.2 North Pacific Right Whale

The Northern Right whale (*Balaena glacialis*) was listed as endangered under the ESA on June2, 1970. On April 10, 2003, the NMFS published a final rule (NMFS 2003c) that split the endangered northern right whale into two endangered species: North Atlantic right whale (*Eubalaena glacialis*) and North Pacific right whale (*Eubalaena japonica*). This section discusses the North Pacific right whale.

Geographic Boundaries and Distribution

The North Pacific stock of northern right whale has historically occurred across the North Pacific, north of 35ºN latitude, with concentrations of whales occurring in the Gulf of Alaska, eastern Aleutian Islands, south-central Bering Sea, Sea of Okhotsk, and the Sea of Japan (NMFS 2001).

Two populations of North Pacific right whale are thought to exist, one in the western North Pacific off Russia and the other in the eastern North Pacific off Alaska (MMC 2002). The distribution and status of neither population is well understood. The eastern population is more severely depleted than western population, with the population thought to number in the tens of individuals versus hundreds for the western population (MMC 2002; NMFS 2005a). Between 1900 and 1994, there have been only 29 reliable sightings of right whales in the eastern North Pacific. Since that time between 4 and 13 individuals have been sighted each year; all these sightings have occurred in a 60 by 100 nautical mile area about 200 nautical miles north of Unimak Pass in the southeastern Bering Sea (CBD 2000; MMC 2002; NMFS 2002c).

Because the North Pacific eastern population is so small and infrequently sighted, little is known about their range and movements. The whales are thought to move northward to high latitudes in the spring, summer in the Bering Sea and Gulf of Alaska, and move southward in the fall and winter possibly as far south as Baja, California (CBD 2000; NMFS 2002c).

Historically, right whales often were observed in coastal waters where their slow speed and tendency to float after death resulted in their near-decimation by whalers in the 1800s. Recent whale sightings have all occurred within the shallower waters of the continental shelf (CBD 2000). No information currently exists regarding the presence of this species in Cook Inlet, Alaska.

Critical Habitat

On June 3, 1994, the NMFS designated critical habitat for the species of northern right whale (NMFS 1994b), which as of April 10, 2003, became referred to as the North Atlantic right whale (NMFS 2003c). The three areas designated as critical habitat are in the North Atlantic Ocean off the eastern United States.

On July 6, 2006, NMFS revised its critical habitat designation for the Northern right whale in the Pacific Ocean. The revised critical habitat designation includes areas in both the Gulf of Alaska and the Bering Sea, comprising a total of approximately 36,750 square miles of marine habitat, which was designated as critical habitat for the Northern Pacific right whale (NMFS 2006).

Life History

As noted in Section 3.9.1, little is known about the movements of the eastern population of North Pacific right whale; although some authors believe they may move seasonally from areas in the Bering Sea and Gulf of Alaska southward possibly as far as the waters off Baja, California (CBD 2000; NMFS 2002c). No sightings of a cow with a calf have been confirmed since 1900 (NMFS 2002c).

Among baleen whales, right whales appear to have the most specialized feeding strategy. Studies conducted in the North Atlantic suggest that right whales require high densities of copepods concentrated in surface waters for effective feeding; the feeding requirements of an adult whale are estimated to be at least 4.07 x 105 Kcal/day (CBD 2000). The feeding preferences of North Pacific right whales have not been determined; however, the NMFS has noted that these whales probably feed almost exclusively on calanoid copepods, a component of the zooplankton (NMFS 2002c).

Population Trends and Risks

The pre-exploitation size of the population on North Pacific right whales has been estimated as likely exceeding 10,000 animals (67 FR 7660, February 20. 2002) to 19,000 animals (CBD

2000). Illegal whaling virtually eliminated the population of North Pacific right whales in the eastern north Pacific off Alaska. Then, in the summer of 1996, a group of four animals was reported in the southeastern Bering Sea. Subsequent annual surveys yielded sightings of between 3 and 13 whales per year in a 60-nm by 100-nm core area about 200 nm north of Unimak Pass in the eastern Aleutian Islands. Extensive aerial, shipboard, and acoustic surveys in 2002 made six sightings and documented numerous right whale vocalizations, but none occurred outside the core area (Marine Mammal Commission 2002).

The North Pacific right whale is considered to be at risk due to the following factors:

- Whaling records indicate that during the 19th century, pelagic whalers harvested over 15,000 North Pacific right whales. As early as the 1870s, the whale was noted as being rare (CBD 2000).

- Right whales are slow-swimming and spend much of their time near the surface of the water, which makes them susceptible to ship strikes. Although vessel-related mortality rates for the North Pacific are not known, the NMFS is considering regulations to implement a strategy to reduce mortalities to North Atlantic right whales as a result of vessel collisions (NMFS 2004).

- The magnitude and nature of entanglements in fishing gear are not known. However, an estimated 57 percent of right whales in the North Atlantic bear scars and injuries indicative of fishing gear entanglement (CBD 2000). The extent of fisheries in the southeastern Bering Sea suggests that fishing gear entanglements may pose a risk to North Pacific right whale.

- Disturbance due to anthropogenic noise may affect right whales by changing normal behavior to temporarily or permanently avoid noise sources. Noise may also raise background noise levels and interfere with the detection of sounds from other whales or natural sources. Information on the hearing capacity of right whales is not available; however, some authors have suggested that their hearing abilities are especially acute below 1 kHz (CBD 2000).

Presence of Species Within Action Area

North Pacific right whale historical range in the eastern Pacific includes waters from California to the Bering Sea and Hawaii (NMFS 1994). The whales migrated northward in spring months with important concentrations historically occurring in the Gulf of Alaska, eastern Aleutian Islands, and south-central Bering Sea (Breiwick and Braham 1984). They typically feed on copepods and euphausiids collected from below the surface, including waters at or near the bottom (NMFS 1994). Although the north Pacific right whale could occur in the Pribilof Islands area during the summer, their presence during the winter seafood processing season would be unlikely.

3.2.3 Sperm Whale

Sperm whales are considered a relatively abundant large whale species; although they are federally listed as endangered, the North Pacific stock is not in danger of extinction (NMFS 2003a). No critical habitat has been designated for the sperm whale.

Geographic Boundaries and Distribution

Sperm whales inhabit all ocean basins, from equatorial to polar waters. Their distribution generally varies by gender and the age composition of groups, and is influenced by prey availability and oceanic conditions (Perry et al. 1999). In the North Pacific, sperm whales are distributed widely, with the northernmost boundary extending from Cape Navarin (62ºN) to the Pribilof Islands (Angliss and Lodge 2003). Mature females, calves, and immature whales of both sexes in the North Pacific are found in social groups and remain in tropical and temperate waters year round from the equator to approximately 45º N latitude (Angliss and Lodges 2003, Perry et. al. 1999). Males lead a mostly solitary life after reaching sexual maturity between 9 and 20 years of age and are thought to move north in the summer to feed in the Gulf of Alaska, Bering Sea, and waters around the Aleutian Islands. Research has revealed considerable east-west movement between Alaska and the western North Pacific (Japan and Bonin Islands), with little evidence of north-south movement in the eastern Pacific (Angliss and Lodge 2003; Perry et al. 1999).
The habitat preferred by sperm whales differs among the sexes and age composition of individual whales. The social groups comprised of females, calves, and immature whales have a broader habitat distribution than males; they are generally restricted to waters with surface temperatures greater than 15ºC and are rarely found in areas with water depths less than 200 to 1,000 m (656 to 3,280 ft) (Gregr and Trites 2001; Reeves and Whitehead 1997). Males exhibit a tighter distribution over deeper waters along the continental shelf break, and are often found near steep drop-offs or other oceanographic features (e.g., offshore banks, submarine trenches and canyons, continental shelf edge), presumably because these areas have higher foraging potential (AKNHP 2005; Gregr and Trites 2001).

Critical Habitat

No critical habitat has been designated for the sperm whale.

Life History

Sperm whales appear to be organized in a social system that consists of groups of 10–40 adult females plus their calves which remain year-round in tropical and temperate waters. Solitary males join these groups during the breeding season, which takes place in the middle of the summer (NMFS 2005a). Males reach sexual maturity at 9-20 years of age (Perry et al. 1999), but do not seem to take an actual part in breeding until their late 20s (ACS 2004). Female sperm whales reach sexual maturity at around 9 years of age and produce a calf approximately once every 5 years (NMFS 2005a).

Sperm whales feed primarily on medium-sized deep water squid, with the remaining portion of their diet comprised of octopus, demersal and mesopelagic sharks, skates, and fish (NMFS 2003a). Feeding occurs all year round, usually at depths below 400 feet (ACS 2004; AKNHP 2005; NMFS 2005a).

Population Trends and Risks

Pre-whaling abundance estimates of sperm whale in the North Pacific are considered unreliable and range from 472,000 to 1,260,000 animals (Angliss and Lodge 2003; Perry et al. 1999; NMFS 2005a). The abundance of whales in the North Pacific in the late 1970s was estimated to be 930,000 animals (Rice 1989), although population estimates based on extrapolations from only a few areas range from 200,000 to 1,500,000 (NMFS 2005a).

Risk factors for sperm whale in the North Pacific are listed below:

- The population of sperm whales was likely well below pre-whaling levels before modern whaling became intensive in the 1940s (Reeves and Whitehead 1997). Commercial whaling of sperm whales in the North Pacific harvested 258,000 animals between 1947 and 1987 (Angliss and Lodge 2003). In addition to reducing overall numbers of animals, commercial whaling altered the male-to-female ratio by selective killing of the larger breeding age males (AKNHP 2005).

- Incidental mortality arising from commercial fishing operations in the Gulf of Alaska have been documented by NMFS observers and may be increasing in frequency. The average annual mortality rate based on observations from 1997 to 2001 is 0.4 whales per year. Most interactions appear to occur with the longline fishery operating in the Gulf of Alaska waters east of Kodiak Island (AKNHP 2005).

- Sperm whales may be impacted by ship strikes, although their behavior suggest that they are at a lesser risk than other baleen whales that spend a greater proportion of their time in surface waters (NMFS 2005a).

- Sperm whales may be especially sensitive to noise pollution, resulting in changes of behavior and distribution in response to unnatural low-frequency sounds (Reeves and Whitehead 1997; Perry et al. 1999).

- Chemical contaminants that bioaccumulate in higher trophic level predators such as sperm whale may be a concern. Relatively high levels of mercury have been measured in breeding females captured off Australia (Perry et al. 1999).

Presence of Species Within Action Area

The distribution of sperm whale indicates that male sperm whales are the only sex that frequent Alaskan waters. In the North Pacific, sperm whales are distributed widely, with the northernmost boundary extending from Cape Navarin (62ºN) to the Pribilof Islands (Angliss and Lodge 2003). While male sperm whales may be located near the Pribilof Islands during the summer for feeding, it is not likely that they are in the action area during the seafood processing season.

3.2.4 Blue Whale

Blue whales are federally listed as endangered and are found throughout all oceans (Breiwick and Braham 1984). No critical habitat has been designated for the blue whale.

Geographic Boundaries and Spatial Distribution

Blue whales are found in all of the world's oceans from the Arctic to the Antarctic. In the North Pacific, they rarely enter the Bering Sea and are only seldom seen as far north as the Chukchi Sea (ADFG 1994a). In the eastern North Pacific, they winter off southern and Baja California; during the spring and summer they are found from central California northward through the Gulf of Alaska. Historical areas of concentration in Alaska include the eastern Gulf of Alaska and the eastern and far western Aleutians (ADFG 1994a).
Blue whales are believed to migrate away from coastlines and feed preferentially in deeper offshore waters (Gregr and Trites 2001; Mizroch et al. 1984). They are seldom seen in nearshore Alaska waters (ADFG 1994a). These preferences make it highly unlikely that blue whales would frequent Cook Inlet waters within the area of coverage of the general NPDES permit.

Critical Habitat

No critical habitat has been designated for the blue whale.

Life History

Blue whales are estimated to reach sexual maturity between 5 and 10 years of age, and may live as long as 70 to 80 years (Environment Canada 2004b). Upon reaching sexual maturity, females bear a single calf every two to three years (ADFG 1994a). Like many other species of baleen whales, blue whales migrate from low-latitude wintering areas to high-latitude summer feeding grounds.

Blue whales appear to practice more selective behavior in feeding than other rorquals (those baleen whales that posses external throat grooves that expand during gulp-feeding) and specialize in plankton feeding, particularly swarming euphausids (krill) in the Antarctic. In the

North Pacific, the species *Euphausia pacifica* and *Thysanoessa spinifera* are the main foods of blue whales (ADFG 1994a).

Population Trends and Risks

The pre-whaling abundance of blue whales in the North Pacific has been estimated at 4,900 to 6,000 animals and is now estimated at 1,200 to 1,700 animals (ADFG 1994a). There have been very few sighting of blue whales in Alaskan waters. The first confirmed blue whale sighting in 30 years was observed by NOAA scientists on July 15, 2004, 100 nautical miles southeast of Prince William Sound (Joling 2004).

Although blue whales typically are found over deeper, offshore waters, they are sometimes observed near the coast following the retreating ice-edge as summer temperatures increase (NMFS 1994). Current population estimates for the Northern Hemisphere are unknown, although 179 individuals were observed off central California during surveys conducted from 1986 to 1988 (Calambokidis *et al*. 1990).

The North Pacific blue whale is considered to be at risk due to the following factors:

- Commercial whaling harvested 9,500 blue whales from the North Pacific between 1910 and 1965 (Ohsumi and Wada 1974). Commercial whaling has been prohibited in the United States since 1972 and there has been an International Whaling Commission prohibition on taking blue whales since 1966 (NMFS 2000b).

- Ship strikes have been implicated in the deaths of blue whales in the eastern North Pacific in 1980, 1986, 1987, and 1993. Additional mortality from ship strikes that are unreported is likely (NMFS 2000b).

- The offshore drift gillnet fishery is the only fishery likely to take blue whales in the eastern North Pacific. Approximately 2,000 whales were taken off the west coast of North America between 1910 and 1965 (NMFS 2000b).

Presence of Species Within Action Area

Within the Pacific Ocean, it was long believed that all blue whale populations undertook extensive annual migrations from low-latitude wintering grounds, such as those off California and Hawaii, to summer feeding grounds in the Arctic or Antarctic (Breiwick and Braham 1984). However, recent monitoring for blue whales using the U.S. Navy’s Sound Surveillance System (SOSUS) hydrophones has demonstrated the year-round occurrence of at least some blue whales in the north Pacific (Moore *et al*. 2002). A seasonal progression of call-location concentrations was centered over the Emperor Seamounts in winter, the Kamchatka Peninsula and seamounts in spring, the Kamchatka Peninsula and waters between the seamounts and Aleutian Islands in summer, and the seamounts again in fall. Although the high-concentration areas were mapped south of the Aleutian Islands, these findings suggest the potential for blue whales to occur in waters off the Pribilof Islands during the winter seafood processing period.

3.2.5 Fin Whale

The fin whale was listed as endangered under the ESA on June 2, 1970.

Geographic Boundaries and Distribution

In the North Pacific Ocean, fin whales can be found from above the Arctic Circle to lower latitudes of approximately 20ºN (Leatherwood et al. 1982). Fin whales along the Pacific coast of North America have been reported during the summer months from the Bering Sea to as far south as central Baja California; three stocks are recognized: Alaska (Northeast Pacific), California/Washington/Oregon, and Hawaii (Angliss and Lodge 2003; NMFS 2003d).
Fin whales are believed to feed preferentially mainly in offshore waters, with preferred habitat encompassing a large area that includes the continental shelf break and offshore waters (Gregr and Trites 2001).

Critical Habitat

Although no critical habitat has been designated, a draft recovery plan has been prepared for this species (FR 63 41802).

Life History

Fin whales tend to be more social than other rorquals, gathering in pods of 2–7 whales or more. Sexual maturity occurs at ages of 6–10 years in males and 7–12 years in females, and they may live as long as 90 years of age (Duke University 2005). Reproductive activity occurs in winter when whales have migrated to warmer waters. Females can mate every 2 to 3 years. Similar to blue whales, fin whales feed at or near the surface on euphausiids, but may also supplement their diet with small schooling fishes such as capelin, anchovies, and herring (Breiwick and Braham 1984).

Population Trends and Risks

The pre-whaling abundance of fin whales in the North Pacific has been estimated at 42,000 to 45,000 animals; estimates in the early 1970's range from 14,620 to 18,630 whales (Ohsumi and Wada 1974). There have been very few sightings of fin whales in Alaskan waters. A survey conducted in August 1994 covering 2,050 nautical miles of track line south of the Aleutian Islands encountered only four fin whale groups (NMFS 2003d).

The Northeast Pacific fin whale is considered to be at risk due to the following factors:

- Commercial whaling harvested 46,032 fin whales throughout the North Pacific between 1946 and 1975 (NMFS 2003d). In the North Pacific and Bering Sea, catches of fin whales ranged from 1,000 to 1,500 animals per year from the mid-1950s to mid 1960s. Commercial whaling has been prohibited in the United States since 1972 and there has been an International Whaling Commission prohibition on taking fin whales since 1976 (NMFS 2003d).

• A ship strike has been implicated in the death of a single fin whale in Uyak Bay, Alaska in 2000 (NMFS 2003d). Additional mortality from ship strikes that are unreported may occur.

• Prior to 1999, there were no observed or reported mortalities of fin whales incidental to commercial fishing operations within the range of the Northeast Pacific stock. However, in 1999, one fin whale was killed incidental to the Bering Sea/Aleutian Island groundfish trawl fishery (NMFS 2003d).

Presence of Species Within Action Area

Fin whales are migratory, moving toward the poles in summer to exploit the food-rich, cold waters, and traveling in winter to warmer waters, where they reproduce (Duke University, 2005). Fin whales frequent both inshore and offshore waters (San Diego Natural History Museum, 2005); however, they would likely be absent from areas around the Pribilof Islands during the seafood processing season as they would likely be located in warmer waters.

3.2.6 Humpback Whale

The humpback whale was listed as endangered under the ESA on June 2, 1970.

Geographic Boundaries and Distribution

The humpback whale is distributed worldwide in all ocean basins, although it is less common in Arctic waters. Currently there are four recognized stocks of humpback whales in U.S. waters based on geographically distinct winter ranges (NMFS 2005b):

- Stock 1 spends winters off the coast of Mexico and summers off the coasts of California, Oregon, and Washington.
- Stock 2 winters in offshore Mexican waters, near the Revillagigedo Islands; the summer grounds unknown.
- Stock 3 winters in the central north Pacific and Hawaiian Islands and summers in Alaska (Prince William Sound) and British Columbia.

- Stock 4 winters in the western north Pacific, near Japan and Taiwan, and summers in the Bering Sea and the coast of the Aleutian Islands, west of the Kodiak Archipelago.

The central North Pacific stock includes animals found in Alaskan waters. In Alaskan waters, most humpbacks tend to concentrate in southeast Alaska, Prince William Sound, the area near Kodiak and Barren Islands, the area between the Semidi and Shumagin Islands, eastern Aleutian Islands, and the southern Bering Sea (ADFG 1994b). In inside waters off southeastern Alaska (i.e., Glacier Bay and Frederick Sound) photo-identification studies summarized by Perry et al. (1999) appear to show that humpback whales use discrete, geographically isolated feeding areas that individual whales return to year after year. These studies find little documented exchange in individual animals between Prince William Sound areas and the Kodiak Island area and between the Kodiak Island area and southeast Alaska feeding areas, suggesting that while movement among these areas may occur, it is reasonably uncommon.

Although humpback whales can be observed year-round in Alaska, most animals migrate during the fall to temperate or tropical wintering areas where they breed and calve. Most whales that spend the summer in Alaskan waters are thought to migrate to winter in waters near Hawaii (ADFG 1994b; Perry et al. 1999).

Humpback whales feed preferentially over continental shelf waters (Gregr and Trites 2001) and are often observed relatively close to shore, including major coastal embayments and channels (NMFS 2005b).

Critical Habitat

No critical habitat has been designated for the humpback whale anywhere throughout their range.

Life History

Humpback whales are seasonal migrants. The whales mate and give birth while in wintering areas outside of Alaskan waters. Sexual maturity occurs at age 4-6 years, with mature females giving birth every 2–3 years (ADFG 1994b). During spring, the whales migrate back to feeding areas in Alaskan waters, where they spend the summer (ADFG 1994b; Perry et al. 1999).

Humpback whales use a variety of feeding behaviors to catch food including underwater exhalation of columns of bubbles that concentrate prey, feeding in formation, herding of prey, and lunge feeding (ADFG 1994b). Based on their diet, humpbacks have been classified as generalists (Perry et al. 1999).

They have been known to prey upon euphausids (krill), copepods, juvenile salmonids (*Oncorhynchus spp.*), Arctic cod (*Boreogadus saida*), capelin (*Mallotus villosus*), Pacific herring (*Clupea harengus pallasi*), sand lance (*Ammodytes hexapterus*), walleye pollock (*Theragra chalcogramma*), pollock (*Pollachius virens*), pteropods, and some cephalopods. On Alaska feeding grounds, humpback whales feed primarily on capelin, juvenile walleye pollock, sand lance, Pacific herring, and krill (NMFS 2003c; Perry et al. 1999).

Population Trends and Risks

The pre-whaling abundance of humpback whales in the North Pacific has been estimated to be approximately 15,000 animals (ADFG 1994b). The current total estimated abundance of the Central North Pacific stock of humpback whales is 4,005 individuals (NMFS 2005b). NMFS (2005b) reports abundance within known feeding areas in Alaska as: southeast Alaska (961 whales), Kodiak Island area (651 whales), and Prince William Sound (149 whales). At least some portions of this stock have increased in abundance between the early 1800s and 2000. The rate of population increase in southeast Alaska may have recently declined, which may indicate the stock is approaching its carrying capacity (NMFS 2005b).

The Central North Pacific humpback whale is considered to be at risk due to the following factors:

- Commercial whaling harvested more than 28,000 animals from the North Pacific during the 20th century and may have reduced this population to as few as 1,000 individuals after the 1965 hunting season (NMFS 2005b).

- Direct ship strikes are a significant source of mortality in the eastern North Pacific stock of humpback whales in California, Oregon, and Washington waters, where there is an average of 0.6 whales killed per year (Perry et al. 1999). Little information is available on mortality rates from ship strikes for humpback whale in Alaskan waters. One pregnant humpback whale was reported killed by a cruise ship in Glacier Bay in July 2001 (Richardson 2003).

- Prior to 1990, there were thought to be little mortality in U.S. waters due to commercial fishing operations. Perry et al. (1999) reported that NMFS observers had reported no mortalities from the Bering Sea, Aleutian Islands, and Gulf of Alaska groundfish trawl, longline, and pot fisheries. Data accumulated through 1995 from Hawaii and southeastern Alaska areas were used to calculate an estimated minimum mortality incidental to commercial fishing operations of 0.8 whales per year (Perry et al. 1999).

- Humpbacks exhibit variable responses to noise, and the level and type of response exhibited by whales has been correlated to group size, composition, and apparent behaviors at the time of possible disturbance. Humpback whales have suffered severe mechanical damage to their ears from noise pulses from underwater blasting; whales exposed to playbacks of noise from drillships, semisubmersibles, drilling platforms, and production platforms do not exhibit avoidance behaviors at noise levels up to 116 db (Malme et al. 1985).

Presence of Species Within Action Area

Like other baleen whales, humpbacks migrate long distances. In the summer, they move toward the poles to exploit the high productivity of the cold waters. In contrast to whales with more oceanic habitats, humpbacks are commonly found in shallower continental shelf waters and are known to frequent Alaskan waters seasonally during migratory periods (NMFS 1994). Prey items within southeastern Alaska include capelin, herring, walleye pollock, and krill (Bryant *et al*. 1981). In winter, humpbacks travel to warm tropical waters, where they concentrate on mating and calving (Duke University 2005). Although members of the North Pacific stock could use the Pribilof Islands area during the summer, their presence during the winter seafood processing season would be unlikely.

3.2.7 Steller Sea Lion

The Steller sea lion was originally listed as a threatened species under the ESA in November 1990 (55 FR 49204). Based on biological information obtained since the species was listed as threatened, NMFS reclassified the Steller sea lion into two distinct population segments. Effective on June 4, 1997, Steller sea lions occurring west of 144° longitude (a line near Cape Suckling, Alaska) were reclassified as endangered. The remainder of the Steller sea lion population, east of 144° longitude, maintained the threatened listing (FR 62 24345; FR 62 30772). Therefore, Steller sea lions occurring in the vicinity of the Pribilof Islands are listed as endangered. Model predictions indicated that the western population would be reduced to very low levels should declining population trends persist (FR 62 24345).

Geographic Boundaries and Distribution

The Steller sea lion is distributed around the North Pacific Ocean rim from northern Hokka, Japan along the western North Pacific northward through the Kuril Islands and Okhotsk Sea, then eastward through the Aleutian Islands and central Bering Sea, and southward along the eastern North Pacific to the Channel Islands, California (NMML 2004b). Two distinct populations (western and eastern) are thought to occur within this range, with the dividing line being designated as 144ºW longitude (NMFS 1997).

There is designated critical habitat for Steller sea lion and other habitat considered as critical habitat by the NMFS within the lease-sale area: at Cape Douglas, the Barren Islands, and marine areas adjacent to the southwestern Kenai Peninsula, and at the extreme southern end of Cook Inlet. There is additional critical habitat—including rookeries, haulouts, and marine foraging areas for the western population stock—near the action area, including the Pribilof Islands (MMS 2003).

Critical Habitat

September 27, 1993, NMFS issued a final rule designating critical habitat for the Steller sea lion, including all U.S. rookeries, major haulouts in Alaska, horizontal and vertical buffer zones (5.5 km) around these rookeries and haulouts, and three aquatic foraging areas in north Pacific waters: Sequam Pass, southeastern Bering Sea shelf, and Shelikof Strait (NMFS 1993b). This final rule was amended on June 15, 1994 to change the name of one designated haulout site from Ledge Point to Gran Point and to correct the longitude and latitude of 12 haulout sites, including Gran Point (NMFS 1994b). This designation included one major rookery and four major haulout sites within the Pribilof Islands. The major rookery is located on Walrus Island, east of St. Paul Island (Figure 1). The boundary for the critical habitats includes a 20 nm offshore zone (Zimmerman 1998, FR 62 24352). Two major haulout sites are present on St. Paul Island (Northeast Point and Sea Lion Rock; Figure 2) and two occur on St. George Island (South Rookery and Dalnoi Point; Figure 3) (58 FR 45269).

Critical habitat includes a terrestrial zone that extends 3,000 ft (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 ft (0.9 km) above the terrestrial zone of each major rookery and haulout area measured vertically from sea level. Critical habitat within the aquatic zone in the area east of 144ºW longitude (ESA threatened population) extends 3,000 ft (0.9 km) seaward in state and federally managed waters from the base point of each rookery or major haulout area. Critical habitat within the aquatic zone in the area west of 144ºW longitude (ESA endangered population) extends 20 nautical miles (37 km) seaward in state and federally managed waters from the baseline or base point of each rookery or major haulout area (NMFS 1993b).

Life History

Steller sea lions rely on both marine and terrestrial habitat. Terrestrial habitats include rookeries, or breeding areas, and haulouts, or resting areas. The locations of sea lion rookeries and haulouts tend to remain the same from year to year (NMFS 1992). Characteristics that may influence the location of rookeries and haulouts include substrate, exposure, human activities, potential food sources, and thermoregulatory factors. Rookery sites are often used as haulouts at times other than the breeding season (NMFS 1992).

The breeding season for Steller sea lions is from May to July, where the animals congregate at rookeries and the males defend territories, mating occurs, with the highest pup counts in early July (63 FR 30477). Non-reproductive animals congregate to rest at more than 200 haulout sites where little or no breeding occurs. Bulls become sexually mature between 3 and 8 years of age, but typically are not able to gain sufficient size and successfully defend territory within a rookery until 9–10 years of age. Females reach sexual maturity and mate at 4–6 years of age and typically bear a single pup each year. Sea lions continue to gather at both rookeries and haulout sites throughout the year, outside of the breeding season (NMML 2004b). Habitat types that typically serve as rookeries or haulouts include rock shelves, ledges, slopes, and boulder, cobble, gravel, and sand beaches. Seasonal movements occur generally from exposed areas in summer to protected areas in winter (ADFG 1994c).

When not on land, at rookeries or haulouts, Steller sea lions range from areas close to shore out to the edge of the continental shelf (NMFS 1992). Studies on adult females indicate that during the breeding season sea lions tend to stay close to rookeries, often foraging within 30 km of rookeries (Minerals Management Service 1992). During this period they make shallow dives with average and maximum depths of less than 30 m and 120 m, respectively (NMFS 1992). During winter, sea lions venture farther offshore and dive to greater depths. Offshore dive depths average up to 84 m, with maximum depths of approximately 273 m (NMFS 1992).

According to studies conducted in Alaska since 1975, walleye pollock (*Theragra chalcogramma*) is an important food source of Steller sea lions (NMFS 1992). Estimates indicate that 33% of the sea lion's diet while in the eastern Bering Sea and Aleutian Islands region is composed of walleye pollock (Perez 1990). They are opportunistic predators and feed on a variety of fish (walleye Pollock, Atka mackerel (*Pleurogrammus monopteryguius*), Pacific herring, capelin, sand lance, Pacific cod (*Gadus macrocephalus*), and salmon), and invertebrates (squid, octopus) (ADFG 1994c; NMML 2004b). Many of the preferred prey species are harvested by commercial fisheries, and food availability for sea lions may be affected by fishing. As a result, restrictions have been placed on the fisheries in attempts to minimize impacts to the sea lions (FR 62 24352).

Population Trends and Risks

In 1980, the world population of Steller sea lion was estimated to be between 245,000 and 290,000 (Loughlin et al. 1992). The western population of Steller sea lion has declined at about 5.0 percent per year over the period of 1991–2000, while the eastern population has increased at about 1.7 percent per year (Loughlin and York 2000). Based on recent survey data collected in 2003–2004, Fritz and Stinchcomb (2005) suggest that the decline of the western population within Alaskan territory may have abated in recent years, with an annual rate of increase estimated at 2.4 to 4.2 percent.

The great majority (approximately 99%) of the statewide Steller sea lion subsistence take has been from the western U. S. stock and the majority (79%) of this take was by Aleut hunters in the Aleutian and Pribilof Islands. Real-time monitoring of Steller sea lion harvest involves monitoring of harvest information directly after the harvest, and occurs on St. Paul Island. Results are summarized and reported annually and are used as the source of the Steller sea lion subsistence harvest estimates in the annual Alaska Department of Fish and Game (ADF&G) report (e.g., Wolfe et al. 2004). The mean annual subsistence take from this stock over the 4-year period from 2000-03, excluding the harvest on St. Paul Island, was 162.5 sea lions; the mean annual subsistence take from St. Paul Island during this period was 25.3 sea lions per year (Zavadil et al. 2004), for a total annual mean subsistence harvest of 187.8 Steller sea lions. The subsistence harvesting may have some localized impact on survival; however its impact upon the survival of the overall population of Steller sea lions is not considered significant (FR 62 24352).

A substantial amount of research has been devoted to trying to determine the cause(s) of the Steller sea lion decline, whose number has dropped by more than 80 percent in the last three decades in Alaskan waters (National Academies 2002). Currently, there is no consensus on a single causal factor, and it is likely that many factors could have contributed to the decline of this species (NMML 2004b). The hypotheses can be divided into two categories (National Academies 2002); those that propose factors that would affect the overall health and fitness of sea lions and those that propose factors that would directly kill sea lions regardless of their general health. The first four items listed below fall into the former category; the last five items fall within the latter category:

- Reduced prey availability or prey quality due to large-scale fishing operations
- Climate changes in the 1970s that may have affected the availability of quality of prey
- Non-fatal diseases that inhibit sea lions' ability to forage for food
- Impairment (reduced fecundity) caused by the consumption of contaminated prey
- Predation by killer whales
- Incidental mortality caused by fishing operations
- Illegal harvest
- Subsistence harvesting
- Fatal diseases caused by contagious pathogens or increased exposure to pollutants

While there may not be consensus on a single causative factor for the decline of sea lion abundance in Alaskan waters, nutritional stress is probably the leading hypothesis (NMFS 1995B; Porter 1997). Sea lion declines in abundance have coincided with the declines of other Alaskan pinniped stocks (harbor seal and northern fur seal) and some sea bird breeding colonies. Over the same period of these declines, there has been a rapid growth in groundfish fisheries in Alaska, which suggests that competition by fisheries and reduced prey availability may be limiting the growth and reducing the fitness of sea lions (Porter 1997). Pollock make up over 50 percent of the prey consumed by sea lions; the removal of large quantities of Pollock, and other groundfish that could provide alternative prey, by commercial fisheries may have caused increased nutritional stress and reduced the fitness of sea lions resulting in increased mortality rates.

<u>Presence of Species Within Action Area</u>

The Steller sea lions may be present in the nearshore waters of the Pribilof Islands, including the seafood processing outfalls, throughout the year (Zimmerman 1998).

3.2.8 Sea Otter

The southwest Alaska DPS of the northern sea otter was listed as threatened by the U.S. Fish and

Wildlife Service effective September 8, 2005 (FR 70 46366). This portion of the otter population has declined substantially since the mid-1980s. Overall, the southwest Alaska stock has declined at least 55 to 67 percent, with some specific locations experiencing reductions of 90 percent or more (FR 70 46366). No critical habitat has been designated for the northern sea otter.

Geographic Boundaries and Distribution

The overall range of the sea otter extends from northern Japan to southern California. There are three recognized subspecies of *Enhydra lutris*. *E. lutris kenyoni*, referred to as the northern sea otter, has a range that extends from the Aleutian Islands in southwestern Alaska to the coast of the state of Washington (USFWS 2005b).

Sea otters generally occur in shallow water areas near the shoreline where they forage in shallow water. Visual observation of 1,251 dives by sea otters in southeast Alaska, indicates that foraging activities typically occurs in water depths ranging from 2 to 30 m (7 to 98 ft), although foraging at depths up to 100 m (328 ft) was observed (Bodkin et al. 2004).

Sea otter movements are influenced by local climatic conditions such as storm events, prevailing winds, and in some areas, tidal conditions. They tend to move to protected or sheltered waters during storm events of high winds (USFWS 2005b). The animals usually do not migrate and seldom travel unless an area has become overpopulated and food is scarce (ADFG 1994d).
The home ranges of sea otters in established populations are relatively small. Sexually mature females have home ranges of 8–16 km (5–10 miles). Breeding males remain for all or part of the year within the bounds of their territory, which constitutes a length of coastline from 100 m (328 ft) to 1 km (.6 mile). Male sea otters that do not hold territories may move greater distances between resting and foraging areas than territorial males (USFWS 2005b).

Critical Habitat

No critical habitat has been designated for the northern sea otter.

Life History

Sea otters mate at all times of the year, and young may be born in any season; however, in Alaska, most pups are born in May or June and young are dependent on their mothers for six to eight months (ADFG 1994d, Estes 1980). Females typically give birth in the water, although they have been observed giving birth on shore (USFWS 2005b). Male sea otters appear to reach sexual maturity at 5–6 years of age, and have a lifespan of about 10–15 years. Female sea otters reach sexual maturity at 3–4 years of age and have a lifespan of about 15–20 years (USFWS 2005b). Sea otters are gregarious and may become concentrated in an area, sometimes resting in pods of fewer than 10 to more than 1,000 animals (ADFG 1994d).

The search for food is one of the most important daily activities of sea otters, as large amounts are required to sustain the animal in healthy condition. Sea otters typically use rocky substrate areas between the shoreline and the outer limit of the kelp colony; they also inhabit areas with soft sediment substrates. Sea otter diets vary between community types, although in general, they prey on sea urchins, octopus, and mussels in rocky substrates, and clams dominate their diet in soft substrates (FR 70 46366). Otters typically occur in shallow water near the shoreline and the majority of all foraging takes place in water less than 30 m (100 ft) deep.

Population Trends and Risks

Prior to commercial exploitation, the world population of sea otter in the North Pacific Ocean was estimated to be between 150,000 and 300,000 individuals (USFWS 2005b). Over the 170 years of commercial exploitation, sea otters were hunted to the brink of extinction first by Russian and later by American fur hunters. Sea otters became protected under the International Fur Seal Treaty of 1911; at that time the entire population may have been reduced to 1,000–2,000 animals (USFWS 2005b).

By the 1980s, sea otters in southwest Alaska had increased in abundance and re-colonized much of their former range. The population in southwest Alaska is currently estimated at 41,865 animals (USFWS 2005b); 15 percent (6,284 animals) of this total occur within the Kodiak Archipelago.

Presence of Species Within Action Area

The sea otter is native to the Pribilof Islands (Nowak 1991), although human exploitation for their fur extirpated the otter from the Pribilofs by the early 1900s. A population was translocated to the Pribilof Islands in the 1970s and a remnant population is present on St. George, although the St. Paul population has likely been extirpated (Sowls, pers. comm. 2005). The number of sea otters currently using habitats near St. George is unknown, although it is probably in the range of 10 to 20 individuals (Sowls, pers. comm. 2005).

3.2.9 Short-tailed Albatross (*Phoebastrai Albatrus)*

The short-tailed albatross was listed as endangered throughout its range under the ESA in U.S. waters on July 31, 2000 (USFWS 2004).

Geographic Range and Distribution

The short-tailed albatross once ranged throughout most of the North Pacific Ocean and Bering Sea with known nesting colonies on several islands within the territorial waters of Japan and Taiwan. Other undocumented nesting colonies may also have existed in areas under U.S. jurisdiction on Midway Atoll and in the Aleutian Islands; however, the evidence for breeding on the Alaskan Aleutian Islands is based on scant evidence and is considered highly unlikely (USFWS 2000a).

Breeding colonies of the short-tailed albatross are currently known on two islands in the western North Pacific and East China Sea. The marine range within U.S. territorial waters includes Alaska's coastal shelf break areas and the marine waters of Hawaii for foraging. The extent to which the birds use open ocean areas of the Gulf of Alaska, North Pacific Ocean, and Bering Sea is unknown (USFWS 2000a). Observations by the USFWS (Terry Antrobus, Anchorage, personal communication cited in USFWS 2000a) suggest that short-tailed albatross frequent nearshore and coastal waters, with "many" birds being sighted within 10 km (6 mi) of shore, and fewer birds ("several") observed within 5 km (3 mi) of shore.

Critical Habitat

No critical habitat has been designated for short-tailed albatross. The USFWS has determined that the designation of critical habitat for this species is not prudent because it would "not be beneficial to the species" (65 FR 46643, July 31, 2000). USFWS concluded that designation of critical habitat for potential and actual breeding areas within United States' areas of jurisdiction on the Midway Atoll National Wildlife Refuge would not provide additional benefit or protection over that conferred through the jeopardy standard of Section 7 of the ESA. With regard to the designation of critical habitat for foraging in the waters of United States, USFWS concluded there is no information available to support a conclusion that any specific marine habitat areas are uniquely important (USFWS 2000a).

Life History

Currently, breeding colonies are limited to the two Japanese Islands of Torishima and Minami-kojima (USFWS 2000a). About 80 to 90 percent of the population can be found in breeding colonies on Toroshima Island, Japan; the remainder of the population breeds on Minamikojima Island, Japan. The birds are reported to be long-lived and slow to mature, with an average age at first breeding of 6 years old (USFWS 2000a). Birds arrive at the Torishima breeding colony in October and initiate breeding and egg-laying, which continue through late November. The chicks hatch in late December and January and are close to being full grown by late May or early June at which time the adults begin to abandon the breeding colony and return to sea. The chicks fledge after the departure of the breeding adults and depart the colony by mid-July. Non-breeders and failed breeders disperse from the breeding colony in late winter through spring (USFWS 2000a).

The albatross is generally pelagic during the non-breeding season (summer and fall), and is generally found in the Gulf of Alaska, along the Aleutian chain, and north into the Bering Sea during this period. However, they have also been observed within several miles of shore during the non-breeding period. The short-tailed albatross feeds on small fish and squid (USFWS 2004).

Population Trends and Risks

The total population of short-tailed albatross was estimated to be 1,200 birds in 2000 (USFWS 2000a). Demographic information provided by USFWS (2000a) indicates that the breeding population on the island of Torishima is growing at a "fairly rapid rate," with an annual population growth rate of 7.8 percent. No information is available for the other breeding colony on the island of Minami-kojima.

Approximately 5 million short-tailed albatrosses were harvested commercially between 1885 and the early 1900's (USFWS 2004). Although the birds are no longer harvested, other threats to their population include loss of breeding habitat due to volcanic eruption, erosion and mudslides caused by monsoon rains, and competition with other seabirds for nest sites. Seaborne plastic pollution, oil pollution, oil spills, and changes in food availability or distribution also threaten the continued existence of the short-tailed albatross (USFWS 2004). In addition, the albatross is known to follow longline fishing vessels while the vessels are setting their lines, and they occasionally ingest baited hooks and are drowned (USFWS 2004, FR 62 10017). In order to minimize the incidental mortality of the albatross and other seabird species during fishing, there are requirements in effect for the use of seabird bycatch avoidance devices (USFWS 2004, FR 62 23176, FR 62 65635).

The short-tailed albatross population is considered to be at risk due to the following factors (USFWS 2000a):

- The primary breeding colony on Torishima Island is at risk due to the potential for habitat destruction from volcanic eruptions on the island and the destruction of nesting habitat and birds by frequent mud slides and erosion caused by monsoon rains.

- Direct harvest of birds at the breeding colonies in Japan at the beginning of the 20th century dramatically reduced the numbers of birds. Harvesting continued until the early 1930s. By 1949, there were no short-tailed albatross breeding at any of the historically known breeding sites, and the species was thought to be extinct.

- The world population is vulnerable to the effects of disease because of the small population size and extremely limited number of breeding sites.

- Oil spills are considered to pose a potential threat to the species' conservation and recovery due to damage related to oil contamination, which could cause physiological problems from petroleum toxicity and by interfering with the bird's ability to thermoregulate. An oil spill in an area where a large number of birds were rafting, such as near breeding colonies, could significantly affect the population

• Consumption of plastics at sea may be a factor affecting the species' conservation and recovery. Plastics can cause injury or mortality due to internal damage following ingestion, reduction in ingestion volumes, or dehydration.

• Mortality incidental to longline fishing in the North Pacific and Bering Sea. ESA consultations have determined that Alaskan groundfish and halibut fisheries are likely to adversely affect short-tailed albatrosses, but are not likely to result in an appreciable reduction in the likelihood of survival and recovery of the species.

Presence of Species Within Action Area

The albatross is generally found in the Gulf of Alaska, along the Aleutian chain, and north into the Bering Sea during the non-breeding season (summer and fall), therefore the species could be present in the action area during the halibut processing season (June through November). During breeding season, breeding colonies are limited to the two Japanese Islands of Torishima and Minami-kojima (USFWS 2000a). Therefore, it would be unlikely that the short-tailed albatross would be in the action area during winter seafood processing season.

3.2.10 Steller's eider

Steller's eider is a marine diving duck, whose Alaskan breeding population was listed in 1997 as a threatened species under the ESA (62 FR 31748).

Geographic Range and Distribution

The historical breeding range of the Alaska-breeding population of Steller's eider is unclear; it may have extended discontinuously from the eastern Aleutian Islands to the western and northern Alaska coasts, possibly as far east as the Canadian border (USFWS 2001). In western Alaska, historical (pre-1970) data suggests that the birds formerly nested on the Yukon-Kuskokwim River Delta (Y-K Delta) and at least occasionally at other western Alaska sites, including the Seward Peninsula, St. Lawrence Island, and possibly the eastern Aleutian Islands and Alaska Peninsula (USFWS 2002).

In recent times, breeding has occurred in two general areas, the Arctic Coastal Plain on the Alaskan North Slope and on the Y-K Delta in western Alaska (USFWS 2001). The Arctic Coastal Plain area, particularly the area surrounding Barrow, is extremely important to nesting Steller's eiders (USFWS 2002). Aerial surveys conducted from 1999-2002 in a 2,757 km2 area from Barrow south to Meade River recorded between two to over 100 breeding pairs for a maximum density of 0.08 birds per square kilometer. The Y-K Delta is currently of much lesser importance; only seven nests were found on the Y-K Delta from 1994 to 2002 (USFWS 2002).

After breeding, Steller's eiders move to marine waters where they molt and individuals remain flightless for about 3 weeks. The birds, which presumably consist of members of both Alaskan and Russian populations, primarily molt along the north side of the Alaska Peninsula, in Izembek Lagoon, Nelson Lagoon, Port Heiden, and Seal Islands (USFWS 2002). After molting, many Steller's eiders disperse to the Aleutian Islands, the south side of the Alaska Peninsula, Kodiak Island, and as far east as Cook Inlet. Wintering birds usually occur in waters less than 10 m (30 ft) deep and are, therefore, usually found within 400 m (400 yd) of shore except where shallows extend further offshore in bays and lagoons (USFWS 2002).

Critical Habitat

Critical habitat for the species was designated by the USFWS in 2001. The designated critical habitat for the Steller's eider includes five units located along the Bering Sea and north side of the Alaskan Peninsula. These areas are the Delta, Kuskokwim Shoals, Seal Islands, Nelson Lagoon, and Izembek Lagoon (USFWS 2001). Within these areas, the primary habitat components that are essential include areas to fulfill the biological needs of feeding, roosting, molting, and wintering. The eider's breeding range in the U.S. is currently limited to the arctic coastal plain of northern Alaska, from Wainwright to Prudhoe Bay (USFWS 2004; Quakenbush and Cochrane 1993; FR 62 31748). The eiders generally are present on breeding grounds from mid-May through mid-September (USFWS 2005a). Important habitats include the vegetated intertidal zone and marine waters up to 9 m (30 ft) and the underlying substrate and benthic community, associated invertebrate fauna, and where present eelgrass beds and associated biota (USFWS 2001). Critical habitat excluded wintering areas for which recent replicated surveys indicated that Steller's eiders are of rare and/or irregular occurrence, including the Pribilof Islands (A. Sowls, Service, pers. comm. 1999 as cited in 65 FR 13270)

No critical habitat is designated within the geographical area of the general NPDES permit for seafood processing discharges in the Pribilof Islands.

Life History

Steller's eider nest on tundra adjacent to small ponds or drained basins in locations generally near the coast, but ranging at least as far as 90 km (56 mi) inland (USFWS 2002). Young hatch in late June and feed in wetland habitat on aquatic insects and plants until they are capable of flight in about 40 days. After breeding, Steller's eiders move to marine waters where they molt from late July to late October. After molting most birds disperse to winter in shallow, sheltered waters along the south side of the Alaska Peninsula, Kodiak island, and as far east as Cook Inlet (USFWS 2002).

Steller's eiders prefer shallow, nearshore marine waters. This species primarily preys on mollusks, crustaceans, and polychaete worms found in shallow water habitats. Prey of wintering eiders includes blue mussels and sand-hoppers found in sheltered bay and lagoon foraging areas. During breeding season, they move inland in coastal areas and generally feed on aquatic insects (e.g., chironomid larvae), plants, crustaceans, and mollusks in freshwater ponds (Quakenbush and Cochrane 1993; FR 62 31748).

Population Trends and Risks

Determining the population trends for Steller's eider is difficult (USFWS 2000b). Counts conducted in 1992 indicated that at least 138,000 birds wintered in southwest Alaska; although the proportion belonging to the Alaska-breeding population versus those from Russian-breeding populations is uncertain (USFWS 2002). It does appear that the breeding range in Alaska has substantially contracted, with the species disappearing from much of its historical range in western Alaska (USFWS 2000b). The size of the breeding population on the Alaskan North Slope varies considerably among years, and it is not known whether the population is currently declining, stable, or improving (USFWS 2000b). Estimates during the 1960s indicate that there were approximately 400,000 Steller's eiders world-wide (Quakenbush and Cochrane 1993). More recent population estimates were between 150,000 and 200,000 individuals, indicating a 50% decline in the worldwide population (Quakenbush and Cochrane 1993). Current estimates of the Alaskan breeding population range from hundreds to the low thousands (USFWS 2004).

The Alaska-breeding population of the Steller's eider is considered to be at risk due to the following factors; destruction or modification of habitat is not thought to have played a major role in the decline of the Steller's eider (USFWS 2002):

- Exposure to lead thought to result primarily from the ingestion of spent lead shot when foraging may pose a significant health risk to Steller's eiders.

- Although there is no information to suggest that disease contributed to the decline of Steller's eiders, recent sampling suggests that Steller's eiders and other sea ducks in Alaska may have significant exposure rates to a virus in the family Adenoviridae (USFWS 2002).

- Changes in predation pressure in breeding areas are hypothesized as the reason for the near disappearance of birds on the Y-K Delta. Recent studies within the primary breeding area on the North Slope near Barrow suggest that nest success is very poor and predation is thought to be the primary factor.

- Although hunting of Steller's eider is prohibited under the Migratory Bird Treaty Act, some intentional or unintentional shooting occurs.

- The Steller's eider Recover Plan (USFWS 2002) suggests that other unidentified factors may also have played a role in the decline of this species. The authors of this plan note that more information is needed to assess the natural or anthropogenic factors that may be affecting this species.

Presence of Species Within Action Area

The majority of the world's population of Steller's eiders, including the Russian Pacific population and the Alaska breeding population winter along the Alaskan Peninsula from the eastern Aleutian Islands to the southern portion of Cook Inlet (USFWS 2005a). Recent replicated surveys indicate that Steller's eiders wintering areas are of rare and/or irregular occurrence in the Pribilof Islands (A. Sowls, Service, pers. comm. 1999 as cited in 65 FR 13270).

3.2.11 Spectacled Eider

The spectacled eider, a large sea duck, is federally listed as threatened throughout its range and critical habitat was designated in 2001 (FR 66 9146).

Geographic Boundaries and Distribution

Primary nesting grounds include the Yukon-Kuskokwim Delta and Norton Sound with some still found on St. Lawrence Island (USFWS 1996). Important late summer and fall molting areas have been identified in eastern Norton Sound and Ledyard Bay in Alaska. Wintering flocks of spectacled eiders have been observed in the Bering Sea between St. Lawrence and St. Matthew Islands (USFWS 1999, USFWS 2004).

Critical Habitat

Critical habitat for the spectacled eider is designated on the Yukon-Kuskokwim Delta, in eastern Norton Sound along the central west coast of Alaska, in northwest Alaska in Ledyard Bay, and in winter habitat at Bearing Sea, between St. Lawrence and St. Matthew Islands.

Life History

Spectacled eiders are diving ducks that spend most of the year in marine waters where they feed on bottom-dwelling mollusks and crustaceans. Around the time of spring break-up, breeding pairs move to nesting areas on wet coastal tundra. They establish nests near shallow ponds or lakes, usually within 3 meters of freshwater. During this season they feed by diving and dabbling in ponds and wetlands, eating aquatic insects, crustaceans and vegetation. Soon after eggs are laid, usually by the end of June, males leave the nesting grounds for offshore molting areas. 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 congregate in relatively shallow coastal water, usually less than 36 meters deep. During the winter they move far offshore to waters where they gather in dense flocks in openings of nearly continuous sea ice (USFWS 1999).

Spectacled eiders do not nest in large groups, but may be semi-colonial with nests clumped at some sites and dispersed at others. Females may exhibit strong fidelity for nesting areas from year to year. It is not know whether this is typical behavior, but it could reduce the immigration of breeding females from other populations (USFWS 1996).

Population Trends and Risks

Historically, spectacled eiders nested discontinuously from the Nushagek Penninsula of southwestern Alaska north to Barrow and east nearly to the Yukon Territory of Canada and also on St. Lawrence Island. Today, primary nesting grounds include the Yukon-Kuskokwim Delta and Norton Sound with some still found on St. Lawrence Island (USFWS 1996). Important late summer and fall molting areas have been identified in eastern Norton Sound and Ledyard Bay in Alaska. Wintering flocks of spectacled eiders have been observed in the Bering Sea between St. Lawrence and St. Matthew Islands (USFWS 1999). Spectacled eiders spend 8-10 months in the Bering and Chukchi Seas (USFWS 1996). The breeding population on the Yukon-Kuskokwim Delta declined over 96 percent in the 1970s to the early 1990s and only about 4,000 pairs nest there today. Biologists estimate that about 9,000 pairs nest on the arctic coastal plain of Alaska, but that population may also be declining. The last current worldwide population estimate is 360,000 birds (USFWS 1999).

Reasons for decline are not well understood. Some possible causes include lead poisoning from lead shot, hunting, predation and complex changes in fish and invertebrate populations in the Bering Sea that may affect food availability. Disturbances of marine benthic feeding areas by commercial bottom-trawl fisheries, environmental contaminants and competition with bottom-feeding walruses and gray whales may also affect eiders (USFWS 1999). No evidence has demonstrated that any one of these factors has directly affected spectacled eiders in the North Pacific or Arctic Oceans and more information is needed on the species and its habitat (USEPA 2002a).

Presence of Species Within Action Area

Today, primary nesting grounds include the Yukon-Kuskokwim Delta and Norton Sound with some still found on St. Lawrence Island (USFWS 1996). Important late summer and fall molting areas have been identified in eastern Norton Sound and Ledyard Bay in Alaska. Wintering flocks of spectacled eiders have been observed in the Bering Sea between St. Lawrence and St. Matthew Islands (USFWS 1999). Spectacled eiders spend 8-10 months in the Bering and Chukchi Seas (USFWS 1996). As the action area is outside their typical range, it is unlikely that there would be spectacled eider presence in the Pribilof Islands.

4.0 ENVIRONMENTAL BASELINE

Five islands comprise the Pribilofs: St. Paul, St. George, Otter Island, Walrus Island and Sea Lion Rock. The Pribilofs sit at the edge of the continental shelf with the shallower Eastern Bering Sea to the east and the deeper waters of the Aleutian Basin to the west. The contours of the sea floor and nutrient rich waters are responsible for the islands' extraordinary biological wealth. The shallow continental shelf breaks to plunge a mile down into deep ocean. Currents from the southwest bring nutrient rich waters to the surface near the Pribilof Islands. Here currents tumble and rise, mixing all sorts of nutrients needed to fuel marine food chains. The islands' varied seabird species, all with different food choices and eating habits, can find what they need within flying distance from their nests (USFWS 2006). Known as "the Galapagos of the North," the Pribilofs are home to some of the largest breeding colonies of marine birds and mammals in North America (Nature Conservancy 2006).

About 200 sq km in total area, the islands are mostly rocky, covered with meadow and tundra, and support a human population of somewhat over 600, concentrated in the towns of St. Paul and St. George (Wikipedia 2006). On St. Paul Island, much of the shoreline slopes gently from the sea, creating prime rookery and haul-out habitat for the world's greatest single gathering of *Callorhinus ursinus*, the northern fur seal (Stolzenburg 2006). Down from 2.4 million fur seals in the 1950s, the population now numbers fewer than 800,000 and is dropping 5 percent a year (Stolzenburg 2006). The counts of territorial males with females on both Pribilof islands showed an increase in 2002 compared to the declines observed in the previous 8 years. Data for 2002 show an increase in the territorial males with females of 15.4% on St. George and 8.3% on St. Paul (NMML 2006). St. George dominates the seabird censuses, its cliffs and boulders heavily stocked with nesting murres, auklets, kittiwakes, fulmars, puffins and cormorants. They are some 3 million seabirds in all, including more than a million thick-billed murres and a quarter-million red-legged kittiwakes, the species' largest colony anywhere (Stolzenburg 2006). Over 240 different species of birds have been identified on the Pribilof Islands, with an estimated 2 million seabirds which nest there annually. Over the last decade, even as the seals continued their slide, the red-legged kittiwakes of St. George have resurged, climbing to within 20 percent of peak counts in the 1970s. The kittiwakes have raised hopes that their decline owed more to a natural cycle than to a permanent malaise of the Bering Sea (Stolzenburg 2006).

5.0 EFFECTS ASSESSMENT

5.1.1 Bowhead Whale

The National Marine Fisheries Service letter dated March 2005 indicated that although endangered bowhead whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow project areas potentially affected by seafood processing discharges. Therefore, the seafood processing discharges will have **no effect** on the bowhead whale.

5.1.2 North Pacific Right Whale

The National Marine Fisheries Service letter dated March 2005 indicated that although endangered North Pacific right whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow project areas potentially affected by seafood processing discharges. Therefore, the seafood processing discharges will have **no effect** on the North Pacific right whale.

5.1.3 Sperm Whale

The National Marine Fisheries Service letter of March 2005 indicated that although endangered sperm whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow project areas potentially affected by seafood processing discharges. Therefore, the seafood processing discharges will have **no effect** on sperm whales.

5.1.4 Blue Whale

The National Marine Fisheries Service letter of March 2005 indicated that although endangered blue whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow project areas potentially affected by seafood processing discharges. Therefore, the seafood processing discharges will have **no effect** on sperm whales.

5.1.5 Fin Whale

The National Marine Fisheries Service letter of March 2005 indicated that although endangered fin whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow project areas potentially affected by seafood processing discharges. Therefore, the seafood processing discharges will have **no effect** on finback whales.

5.1.6 Humpback Whale

Direct Effects

The National Marine Fisheries Service indicated that although endangered whales may occur near the Pribilof Islands, it is unlikely that they would occur in the relatively shallow areas potentially affected by seafood processing discharges, with the exception of the humpback whale, which may occasionally frequent nearshore areas (NMFS 2005b). In the event that whales would swim in the vicinity of discharges, their presence would likely be transient and exposure to discharged effluent would be minimal. Toxic effect studies of seafood processing waste have not been conducted on marine mammals. However, it is unlikely that humpback whales or other large cetaceans would feed in proximity to seafood processing discharge outlets.

The city sewage treatment plant on St. Paul Island discharges wastewater through the outfall located offshore of East Landing. The presence of coliform or enterococci bacteria from inadequately treated sewage in waters close to the discharge point could indicate a possible risk of bacterial and viral disease transmission to endangered whales (or other cetaceans) that entered the contaminated waters. However, based on the small volumes of human sewage and the high potential for dilution with uncontaminated seawater, the ocean area that contains potentially infectious levels of pathogens is probably small. Animals that did not enter areas with enterococci levels greater than 35 per 100 mL (or 100 MPN/100mL for fecal coliform) probably would have a low risk of developing pathology from inadequately treated discharges of human sewage from St. Paul Island.

Indirect Effects

Due to the relatively small volumes of discharge anticipated from the Pribilof Islands, and the low potential for waste accumulations, no indirect effects to humpback whales related to reduced prey availability or foraging success are anticipated. Some temporary disturbance of whale activities may occur due to increases in vessel traffic. In addition, humpback whales may come into temporary contact with a mixing zone for seafood processing solids within the water column. In areas where humpback whales are present there is adequate tidal and wave action to disperse the seafood solids, however, there may be solids in the water column as dispersion is occurring. However, such disturbances would be local and temporary, and would not likely result in adverse effects.

Summary

Because they would not be expected to forage with regularity in the vicinity of the Pribilof Islands, the humpback whale is **not likely to be adversely affected** by discharges of seafood processing wastes or inadequately treated human sewage, from the Pribilof Islands. The proposed discharge would not result in the destruction or adverse modification of critical habitat, and would not threaten the continued existence, of any of the cetacean species described above.

5.1.7 Steller Sea Lion

Direct Effects

Because Steller sea lions have an extensive foraging range and haulout sites within 2 nm of St. Paul outfalls (Figure 2), they may frequently come into contact with seafood processing waste discharges in the mixing zone for seafood solids in the water column. There is some evidence that sea lions are attracted to process discharges, particularly unground fish wastes and livers (Zimmerman 1998), although seafood particles within the discharges would be ground to one-half inch diameter. This may affect both the behavior of individual animals in proximity of the discharge outfalls as well as the overall Steller sea lion population.

The proposed permits do not authorize discharges from mobile processors or new shore-based operations within a 3.0 nm radius of designated Steller sea lion rookeries (i.e., Walrus Island) or within 0.5 nm of designated Steller sea lion haulouts. The previously permitted facilities on St. Paul (i.e., Trident Seafoods, and Arctic Star) were exempted from this restriction, provided that the conditions described in Section 2.0 are met. Thus, some contact with waste discharges may occur during foraging periods and during travel to and from rookeries or haulouts. However, the contact with seafood discharge solids should be local and temporary and result in insignificant effects.

What is known of the water and sediment quality for both the seafood process discharge and the municipal waste discharges has been summarized in Section 3, including pH, ammonia, TSS, metals, VOCs, BOD, and other constituents. This information, combined with an incomplete understanding of Steller sea lion biology at the Pribilof Islands, is not adequate to evaluate whether these concentrations could constitute adverse effects to the species of concern. This permit includes additional monitoring for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc and provides effluent limits for ammonia, chlorine and pH. Facilities may be given a compliance schedule to meet the effluent limits for ammonia and chlorine. The compliance schedule is an enforceable permit condition and will ensure that the permittee takes the necessary steps to change their process and/or install the technology necessary to meet effluent limits. The increased monitoring and additional effluent limitations will assist in understanding effects of seafood discharges on Steller sea lions and help minimize potential adverse effects.

In addition to contaminants in the process discharges, seafood process or municipal waste may contain earplugs, rubber packing bands, and other materials used during processing. Such wastes were observed both in February and September of 1994 on the beach at the Kitovi northern fur seal rookery on St. Paul Island (NMFS 1994). The potential exists that these materials, if discharged with seafood waste, may be ingested by foraging sea lions. However, such discharges would be in violation of the permit.

As described for whales, the presence of coliform or enterococci bacteria from inadequately treated human sewage in waters close to the discharge point could indicate a substantial risk of bacterial or viral disease transmission to sea lions that entered the contaminated waters. The risk would be higher for the resident sea lions than for whales, which are highly transitory and would spend little time in the vicinity of the human sewage pollution. However, based on the small volumes of human sewage and the high potential for dilution with uncontaminated seawater, the ocean area that would contain potentially infectious levels of pathogens would be small. Sea lions that only rarely entered areas with fecal coliform levels below 100 MPN/100mL probably have a low risk of developing pathology from inadequately treated discharges of human sewage from St. Paul Island. The risk would be higher if, for example, sea lions entered the area contaminated with sewage to feed on seafood processing wastes.

Because organic wastes may accumulate on the sea bottom during the summer months when halibut is being processed by Trident Seafoods (see Section 3.0), direct effects to Steller sea lions from contact with accumulated waste piles are possible. However, to minimize this the proposed permit requires the Trident facility to barge its halibut waste to an ocean dumping site where it is unlikely organic wastes will accumulate on the sea bottom. Further, available data suggest that anthropogenic contamination of Steller sea lion food resources has not significantly contributed to the decline in species abundances (FR 58 45271). Most crab processing in the Pribilof region occurs from January to April and from November to December. Halibut processing occurs from June through November. Sea lion breeding activities occur primarily at rookeries but may also take place at haulouts (NMFS 1992) during the period extending from late May to early July. These animals are also known to be attracted to seafood process discharges. However, potential contact with waste discharges during critical breeding periods is expected to be minimal (see Appendix B, Figure 4) because the halibut waste will be barged approximately 7 miles west of St. Paul Island.

In summary, two of the proposed permits are for floating processors which would be discharging seafood processor wastes in areas with high tidal movement allowing for wastes to be quickly dispersed and incorporated into the surface water, thereby limiting attraction by Steller sea lions and direct interactions with seafood discharges or other wastes. In addition, the permit requires effluent limits for ammonia, chlorine and pH, which will minimize potential exposure to these constituents. Additional monitoring is required for sea surface and shoreline in the vicinity of seafood processors as well as monitoring for a variety of water quality parameters and constituents including heavy metals to obtain a better understanding of how water quality is impacted near seafood processors and how that could potentially affect Steller sea lions. There are exclusion zones surrounding rookeries and haulouts which are considered critical habitat for the Steller sea lion. The crab processing season, which occurs during the winter months of the year, limits potential exposure during breeding season for Steller sea lion and additional seafood processing wastes from halibut processing will be barged to a location further away from Steller sea lion activity. These permit requirements and measures should help to minimize potential direct effects to Steller sea lion from seafood processing facilities in the Pribilof Islands.

Indirect Effects

Potential indirect effects of the proposed permit on Steller sea lions include incidental fishery-related takings, entanglement in debris, increased probability of vessel collisions, and disturbance from vessel activities. The discharge of process wastes near sea lion foraging grounds could reduce visibility and individual foraging success.

The location of seafood processors on and near the Pribilof Islands could lead to increased vessel traffic and commercial fishing activity in the area. Should commercial fishing levels increase near the Pribilof Islands, incidental take of Steller sea lions in trawl nets or abandoned fishing line or net debris may occur. Further, increased vessel traffic increases the likelihood of collisions with marine mammals, shipwrecks, accidental spills or discharge of other materials (e.g., fuel, oil). The proposed permits prohibits discharge and therefore vessels and equipment to within 3 nm of Walrus Island, within ½ nm of Sea Lion Rock and Northeast point on St. Paul Island, within ½ nm of Dalnoi Point and South Rookery on St. George Island and within ½ nm of the Alaska Maritime National Wildlife Refuge. This should help minimize potential indirect effects including disturbance from vessels and entanglement in debris.

Effects on the Steller sea lion from waste discharges also were considered cumulatively with other factors affecting area populations. Most importantly, the sea lions will continue to experience competition for food sources with commercial fisheries. Effects on the sea lion population from waste discharges will be small compared to population pressures from competition for fish stocks. Subsistence harvesting also may have some localized impact on Steller sea lion populations, but its impact on the survival of the overall Steller sea lion population is not considered significant (FR 62 24352).

Summary

There are several conditions stated in the proposed permit that are designed to limit the potential for direct contact with these endangered species. These include establishment of a 3-nm exclusion zone for Steller sea lion rookeries; requirements for processors to conduct sea surface and shoreline monitoring; effluent limits for ammonia, chlorine and pH; and barging of halibut wastes to minimize attraction to seafood discharges during halibut processing. Therefore, compliance with these conditions and appropriate waste management practices should result in insignificant and discountable direct effects to Steller sea lion populations.

Indirect effects to Steller sea lions may result from increased vessel traffic, heightened vessel activity, increased probability of incidental take (e.g. fishing by-catch), and greater likelihood of spills (e.g., fuel and oil). Vessel traffic in close proximity to Steller sea lion critical habitat (e.g., Sea Lion Rock) may lead to disturbance or modification of haulouts or rookeries. Although pinniped response to vessel traffic is not well documented (Richardson et al. 1991), reports indicate that disturbance from fishing activities near the Farallon Islands, California resulted in the shift of a breeding group to an undisturbed site (NMFS 1992). Therefore, compliance with conditions stated in the permit including exclusions from areas near Steller sea lion rookeries and haulouts should result in insignificant and discountable indirect effects to Steller sea lions from seafood processors in the Pribilof Islands.

In conclusion, EPA has determined proposed seafood processor discharge from the NPDES permit for seafood processors in the Pribilof Islands is **not likely to adversely affect** the Steller sea lion and its designated critical habitat.

5.1.8 Sea Otter

Direct Effects

The U.S. Fish and Wildlife Service does not believe that commercial fishing activities have played a significant role in the population-level sea otter decline in southwest Alaska and these activities do not pose an immediate threat to the listed DPS (FR 70 46366). The facilities all operate on and around St. Paul Island. Because no otters are present in the waters around St. Paul Island there would be no direct effects to the sea otter.

Indirect Effects

Commercial fishing activities, including incidental fishery-related takings, entanglement in debris, disturbance from vessel activities, and reduction or change in fish or invertebrate community structure could affect individual sea otters around St. George Island, although population level effects are unlikely.

Summary

The translocated population of sea otters that once used the waters around St. Paul Island has been extirpated and seafood processing operations. Two of the facilities are mobile seafood processors operating in the Pribilof Island area and while sea otters in the area may be attracted to the discharges these facilities, the mobile facilities should be located in areas of high tidal activity that will disperse the seafood discharges and minimize potential attraction of the Northern sea otter. Because of these conditions, the seafood processing discharges from the facilities located on or near St. Paul Island are **not likely to adversely affect** Northern sea otters.

5.1.9 Short-tailed Albatross

Direct Effects

Although the short-tailed albatross can be found within several miles of shore during the non-breeding season, the albatross is primarily pelagic in distribution during this period. The albatross is not known to breed in the Pribilof Islands; therefore, it is unlikely that the bird would be exposed to the processing waste discharges or human sewage from the stationary outfalls. The seafood processing wastes do not contain significant quantities of toxic pollutants that are prone to bioaccumulate in aquatic organisms. As a result, adverse effects would not be expected should the short-tailed albatrosses ingest discharged seafood waste products or other wastes (EPA 1998b).

Indirect Effects

Should the short-tail albatross venture close to shore near the seafood processing facilities, they would be in close proximity to vessel traffic. Therefore, the albatross could be disturbed by increased vessel traffic and heightened activities related to the seafood processing industry. In addition, increased shipping activity increases the chance of accidental spills or discharges of materials (e.g., fuel oil) that may indirectly affect the short-tailed albatross. These potential adverse effects are probably discountable in light of the ability of the albatross to avoid such disturbances.

Summary

Potential impacts of seafood processing and related activities to the short-tailed albatross are minimal because the species does not breed in the Pribilof region and is generally pelagic in its occurrence in Alaskan waters. In addition, there are several conditions stated in the proposed permit that are designed to limit the potential for direct contact with species of concern. These include requirements for existing stationary processors to conduct sea surface and shoreline monitoring, effluent monitoring, subsurface discharge, and the one-half inch grind requirement. Compliance with these provisions and appropriate waste management practices result in seafood discharges of the Pribilof Islands are **not likely to adversely affect** the short-tailed albatross population. The proposed discharge will not result in the destruction or adverse modification of critical habitat.

5.1.10 Steller's eider

Direct Effects

Because they prefer shallow, near shore marine waters, eiders may be exposed to processing waste discharges from the stationary outfalls, including possible sanitary wastes and cleaning

solutions. A mixing zone for solids within the water column may be needed while dispersion is occurring. Two of the facilities are floating seafood processors where adequate tidal and wave action should disperse the seafood discharge solids thereby minimizing attraction, and contact with the seafood discharge solids should be local and temporary. Processing discharges are not expected to contain pollutants at toxic levels or to result in adverse effects. This permit includes additional monitoring for chlorine, ammonia, pH, oil and grease, BOD, TSS, salinity, arsenic, copper, cadmium, lead, mercury, nickel, selenium, silver, and zinc and provides effluent limits for ammonia, chlorine and pH. Facilities may be given a compliance schedule to meet the effluent limits for ammonia and chlorine. The compliance schedule is an enforceable permit condition and will ensure that the permittee takes the necessary steps to change their process and/or install the technology necessary to meet effluent limits. The increased monitoring and additional effluent limitations will assist in understanding potential effects of seafood discharges on Steller's eiders and help minimize potential adverse effects.
Potential contact with waste discharges would be minimal during the critical breeding period (see Appendix B, Figure 4). Therefore, potential direct effects from seafood processing discharges in the Pribilof Islands are expected to result in insignificant effects to Steller's eiders.

Indirect Effects

Potential indirect effects on Steller's eider from the discharge of seafood process wastes include possible increases in exposure to predatory or scavenger species. Seafood wastes may attract scavengers, such as gulls, which prey on Steller's eiders. In addition, the presence of such wastes during the winter may allow larger populations of scavenger species to winter in the Pribilofs. However, because gulls primarily prey on Steller's eiders' eggs and young rather than adults, and because Steller's eiders do not breed in the Pribilof Islands, the potential effects on eider populations of increased predation by gulls would be negligible.

As mentioned above, Steller's eiders prefer shallow, nearshore marine waters. Such areas are in close proximity to vessel traffic. Thus, Steller's eiders may be disturbed by increased vessel traffic related to the seafood processing industry. In addition, increased shipping activity heightens the probability of accidental spills or discharges of materials (e.g., fuel and oil) that may indirectly affect these birds. Once again, because Steller's eiders do not breed in the Pribilof Islands, the potential for adverse effects from vessel traffic is minimal.

Summary

Previous studies have demonstrated that Steller's eiders can be attracted to seafood processing discharges and that this may put them at risk to exposure to other discharges including wastewater treatment discharges that could expose Steller's eiders to high fecal coliform counts. However, any potential impacts of seafood processing and related activities to Steller's eiders are minimal because the species does not breed in the Pribilof Islands and Steller's eiders are rarely seen in the Pribilof Islands during winter during the seafood processing season. There are several conditions stated in the proposed permit that are designed to limit the potential for direct contact with species of concern (i.e., requirements for existing stationary processors to conduct sea surface and shoreline monitoring, effluent monitoring, subsurface discharge). Steller's eiders will rarely come into contact with discharges from the seafood processing discharges of the Pribilof Islands and compliance with these provisions and appropriate waste management practices would result in the seafood processing discharges having insignificant and discountable effects to Steller's eiders. Therefore, EPA has determined that the permit for seafood processors in the Pribilof Islands is **not likely to adversely affect** Steller's eider populations. As there is no designated critical habitat for Steller's eiders in the Pribilof Islands, the proposed discharge will not result in the destruction or adverse modification of critical habitat.

5.1.11 Spectacled Eider

Direct Effects

Although the spectacled eider prefers shallow, nearshore marine waters, and could be exposed to processing waste discharges, their presence on St. Paul Island is not regularly expected. Potential contact with waste discharges would be minimal during the eider's critical breeding period (see Appendix B, Figure 4). As a result, there would not likely be any adverse effect to the spectacled eider, nor its designated critical habitat, as a result of seafood or municipal waste processing discharges.

Indirect Effects

The spectacled eider uses habitats that are used by the commercial fishing industry. Thus, the eider may be disturbed by increased vessel traffic related to commercial fishing and the seafood processing industry. In addition, increased shipping activity heightens the probability of accidental spills or discharges of materials (e.g., fuel or oil) that could indirectly affect the eider. However, because the spectacled eider does not breed in the Pribilof Islands, and their wintering grounds are to the north in the central Bering Sea, the potential for indirect adverse effects related to seafood processing or the commercial fishing industry on the Pribilof Islands is minimal.

Summary

Because the spectacled eider does not breed on, or regularly use habitats in the Pribilof Islands, seafood processing discharges are **not likely to adversely affect** the spectacled eider. The proposed discharge will not result in the destruction or adverse modification of critical habitat.

6.0 CUMMULATIVE EFFECTS

Based on the foregoing discussion, it appears that both direct and indirect effects for many of the listed species would fall under the category of "may affect, but not likely to adversely effect". Water and sediment quality monitoring data are inconclusive with regard to whether effects to the listed species could be significant, but even where concentrations may be high exposures are expected to be relatively low, thus causing little or no impact to protected populations of these animals.

Interdependent actions are defined as actions with no independent use apart from the proposed action. Interrelated actions are those that are a part of a larger action and depend upon the larger action for justification. There are no interdependent or interrelated actions expected as a result of issuance of the NPDES permit for seafood processing discharges in the Pribilof Islands, Alaska.

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 section because they require separate consultation pursuant to section 7 of ESA. Based on this definition, no cumulative effects are expected to occur in the action area.

7.0 CONCLUSIONS

Table 5: Conclusions for threatened and endangered species in Pribilof Islands

Common Name	Scientific Name	Effects Determination
Marine Mammals		
Bowhead whale	*Balaena mysticetus*	NE
North Pacific right whale	*Eubalaena japonica*	NE
Sperm whale	*Physeter macrocephalus*	NE
Blue whale	*Balaenoptera musculus*	NE
Fin whale	*Balaenoptera physalus*	NE
Humpback whale	*Megaptera novaeangliae*	NLAA
Steller sea lion	*Eumetopias jubatus*	NLAA
Sea otter	*Enhydra lutris kenyoni*	NLAA
Seabirds		
Short-tailed albatross	*Phoebastria albatrus*	NLAA
Waterfowl		
Steller's eider	*Polysticta stelleri*	NLAA
Spectacled eider	*Somateria fischeri*	NLAA

NE = No Effect
NLAA = Not Likely to Adversely Affect
LAA = Likely to Adversely Affect

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9.0 ESSENTIAL FISH HABITAT

9.1 DESCRIPTION OF PROPOSED ACTION

Please refer to Section 2 of this document for a description of the proposed action.

9.2 EFH FOR APPROPRIATE FISHERIES MANAGEMENT PLANS

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).

EFH has been designated in waters of Alaska for anadromous fish and certain life stages of marine fish under NMFS' jurisdiction. EFH for Fishery Management Plans in Alaska are described in Chapter 6, "NMFS Recommendations on the Description and Identification of EFH" in the "Essential Fish Habitat – Environmental Assessment for Amendment 55 to the Fishery Management Plan for the Groundfish Fishery of the Bering Sea and Aleutian Islands Area; Amendment 55 to the Fishery Management Plan for Groundfish of the Gulf of Alaska; Amendment 8 to the Fishery Management Plan for the King and Tanner Crab Fisheries in the Bering Sea/Aleutian Islands; Amendment 5 to the Fishery Management Plan for Scallop Fisheries off Alaska; Amendment 5 to the Fishery Management Plan for the Salmon Fisheries in the EEZ off the Coast of Alaska," dated January 20, 1999 (http://www.fakr.noaa.gov/habitat/efh_ea/; NPFMC, 1999). The discussion in the following three paragraphs is an excerpt from Chapter 6. Table 9.1 lists FMP-managed species in Alaska.

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 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 AD&FG 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. Available at: http://www.fakr.noaa.gov/habitat/seis/efheis.htm).

Bering Sea-Aleutian Islands Groundfish		**Alaska Stocks of Pacific Salmon**	
Walleye pollock	Shortraker/rougheye rockfish	Pink	Chinook
Pacific cod	Northern rockfish	Chum	Coho
Yellowfin sole	Thornyhead rockfish	Sockeye	
Greenland turbot	Yelloweye rockfish		
Arrowtooth flounder	Dusky rockfish		
Rock sole	Atka mackerel		
Alaska plaice	Skates		
Rex sole	Sculpins		
Dover sole	Sharks		
Flathead sole	Forage fish complex		
Sablefish	Squid		
Pacific ocean perch	Octopus		
Bering Sea-Aleutian Island Crab		**Alaska scallops**	
Red king crab	Tanner crab	Weathervane scallop	
Blue king crab	Snow crab		
Golden king crab			

9.2.1 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.

9.2.2 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).

9.2.3 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.

9.2.4 Greenland Turbot

Also know 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.

9.2.5 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.

9.2.6 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.

9.2.7 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).

9.2.8 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).

9.2.9 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.

9.2.10 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).

9.2.11 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).

9.2.12 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).

9.2.13 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.

9.2.14 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 thrornyhead 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.

9.2.15 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”.

9.2.16 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).

9.2.17 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.

9.2.18 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).

9.2.19 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.

9.2.20 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.

9.2.21 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.

9.2.22 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).

9.2.23 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 know of their food habits, longevity, or abundance.

9.2.24 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).

9.2.25 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.

9.2.26 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 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.

9.2.27 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).

9.2.28 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.

9.2.29 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).

9.2.30 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).

9.2.30.1 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).

9.2.30.2 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).

9.2.30.3 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).

9.2.30.4 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).

9.2.30.5 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).

9.3 EFFECTS OF THE PROPOSED ACTION

9.3.1 Potential effects of action on BSAI groundfish EFH

BSAI groundfish EFH is found within the action area, which is defined as Alaska surface waters within State boundaries up to three nautical miles from baseline (the line of ordinary low water and the line marking the seaward limit of inland waters). Visual inspection of NOAA EFH maps (http://www.fakr.noaa.gov/habitat/efh.htm; accessed May 2006) 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). If adequate disposal facilities are not available at marinas that generate a large amount of fish waste, there is a potential for disposal of fish waste in areas without enough flushing to prevent decomposition and the resulting dissolved oxygen depression (EPA 1993).

Processors discharging fish waste are required to adhere to the technology based and water quality based limits outlined in the NPDES permits. Various water quality standards, including those for BOD, total suspended solids, fecal coliform bacteria, oil and grease, pH and temperature, are all considerations for permits that apply to State marine waters within 3 nm from shore. 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 which allows dispersion and dilution of the seafood discharges, 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.

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. Shore-based and near-shore seafood operations in Alaskan coastal waters have a greater likelihood to adversely impact demersal fish spawning activities than off-shore operations because spawning grounds are more commonly found in these waters. 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).

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 coastal waters in the action area is unlikely to occupy more than a fraction of this total coastal action 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 coastal 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. It is expected that since two of the seafood processors are floating processors they will be at least 1 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.

9.3.2. 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 Alaska surface waters within State boundaries up to three nautical miles from baseline (the line of ordinary low water and the line marking the seaward limit of inland waters). Visual inspection of NOAA EFH maps (http://www.fakr.noaa.gov/habitat/efh.htm; accessed July 2006) 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 coastal water. Secondly, in areas with strong currents and high tidal ranges, waste materials disperse rapidly. It is expected that since two of the seafood processors are floating processors they will be at least 1 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.

9.3.3 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.fakr.noaa.gov/habitat/efh.htm; accessed July 2006) 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.

9.3.4 Potential effects of action on Alaska stocks of Pacific salmon EFH

EFH for Alaska stocks of Pacific salmon is 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.

9.4 PROPOSED MITIGATION

As described in Section 9.3.1-9.3.5, EPA's proposed action may adversely affect BSAI groundfish, BSAI crab, 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 concerns.

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.
3) The current proposed permit includes two mobile offshore facilities that may not stay in a specific location more than seven days. 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.
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).
7) Explore options for additional research. Look at potential to update technology-based effluent guidelines.
8) Locate new plants outside rearing and nursery habitat. As two of the seafood processors are floating processors likely to be 1 nm or more from shore it is expected that some of the 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.

9.5 CONCLUSIONS BY 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. Two of the seafood processors are floating seafood processors that are likely to be at least 1 nm from shore, therefore the seafood processing discharges from these vessels 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 Individual NPDES permits for seafood processors in the Pribilof Islands may adversely affect essential fish habitat.***

9.6 REFERENCES

NMFS. 2005. Final Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska (Chapter 3). National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Region. Available at http://www.fakr.noaa.gov/habitat/seis/efheis.htm.

APPENDIX A: AGENCY CONSULTATION LETTERS

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

March 1, 2005

RECEIVED
MAR 8 2005
U.S. EPA REGION 10
OFFICE OF WATER AND WATERSHEDS

Rebecca Derr
Environmental Scientist, NPDES Permits Unit
EPA Region 10
1200 Sixth Avenue
Seattle, Washington 998101

Re: NPDES No. AK527000

Dear Ms. Derr:

NOAA'S National Marine Fisheries Service (NMFS) received your letter requesting information on the occurrence of threatened or endangered species in the vicinity of the City of Saint Paul, Alaska. The endangered western Distinct Population Segment of the Steller sea lion is commonly found along the Pribilof Islands. Sea lions may be present in nearshore waters, including the area of the identified outfall, throughout the year. Additionally, designated critical habitat exists on Walrus Island (a sea lion rookery) and at two major sea lion haul outs on St. Paul Island: Northeast Point and Sea Lion Rock. There is evidence sea lions are attracted to process discharges, particularly unground fish wastes and livers. It is common to see sea lions in the immediate area of such discharges. The proximity of this discharge of seafood processing waste and these endangered species should be considered in your evaluation. NMFS believes the proposed limitations of one-half inch grind/screening and discharge may not be risk-averse in terms of the conservation of Steller sea lions, as well as the depleted Northern fur seal.

The endangered humpback whale occurs seasonally in the central Bering Sea and may in occur near shore areas. Other endangered whales may occur near the Pribilof Islands but would be unlikely to occur within the project area.

We hope this information is useful to you in fulfilling your requirements under section 7 of the Endangered Species Act. Please direct any questions to Brad Smith in our Anchorage field office at 271-5006.

Sincerely,

Kaja Brix
Assistant Regional Administrator
for Protected Resources

2005-097

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Anchorage Fish and Wildlife Field Office
605 West 4th Avenue, Room G-61
Anchorage, Alaska 99501-2249

RECEIVED
MAR 2 1 2005
U.S. EPA REGION 10
OFFICE OF WATER AND WATERSHEDS

March 15, 2005

Rebecca Derr
Environmental Scientist
U.S. Environmental Protection Agency – Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Re: Saint Paul, Pribilof Islands, NPDES permit re-issuance (*consultation number 2005-097*)

Dear Ms. Derr,

Thank you for your February 2005 fax requesting endangered species information for the proposed Saint Paul, Pribilof Islands, National Pollution Discharge Elimination System (NPDES) permit re-issuance for 15 Seafood Processors and City of Saint Paul. The U.S. Fish and Wildlife Service has reviewed the information on this project and is providing the information below in accordance with section 7 (a) (2) of the Endangered Species Act of 1973 (87 Stat. 884, as amended, 16 U.S.C. 1531 *et seq.* (ESA)).

Our records indicate that one endangered species, short-tailed albatrosses (*Phoebastria albatrus*), two threatened species, Steller's eiders (*Polysticta stelleri*) and Spectacled eiders (*Somateria fischeri*), and one proposed species, sea otters (*Enhydra lutris)* occur in the area of the proposed National Pollution Discharge Elimination System (NPDES) permit re-issuance project. There are no areas designated or proposed as critical habitat within the action area of the proposed project.

I have enclosed a copy of the U.S. Fish and Wildlife Service's Anchorage Field Office's Fact Sheet Booklet titled ***Alaska's Threatened and Endangered Species*** for more complete information about the species listed above. If you have any further endangered species questions, please contact me at (907) 271-2807. Please refer to consultation number 2005-097 in future correspondence on this project. Thank you for your interest.

Sincerely,

Gregory S. Risdahl

Greg Risdahl
Wildlife Biologist

Enc.

APPENDIX B: FIGURES AND MAPS

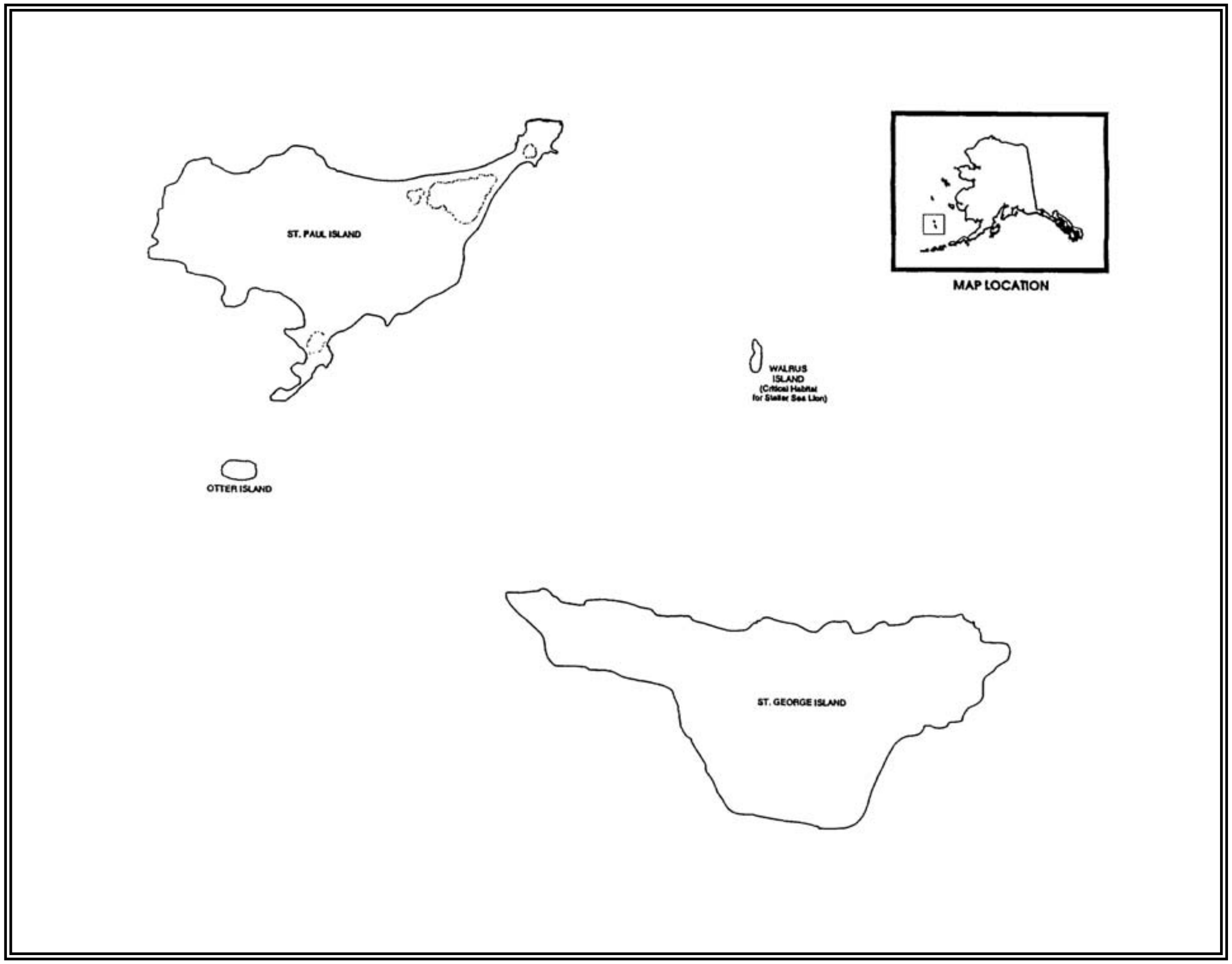

Figure 1. Regional map of the Pribilof Islands, Alaska, including Steller sea lion critical habitat on Walrus Island.

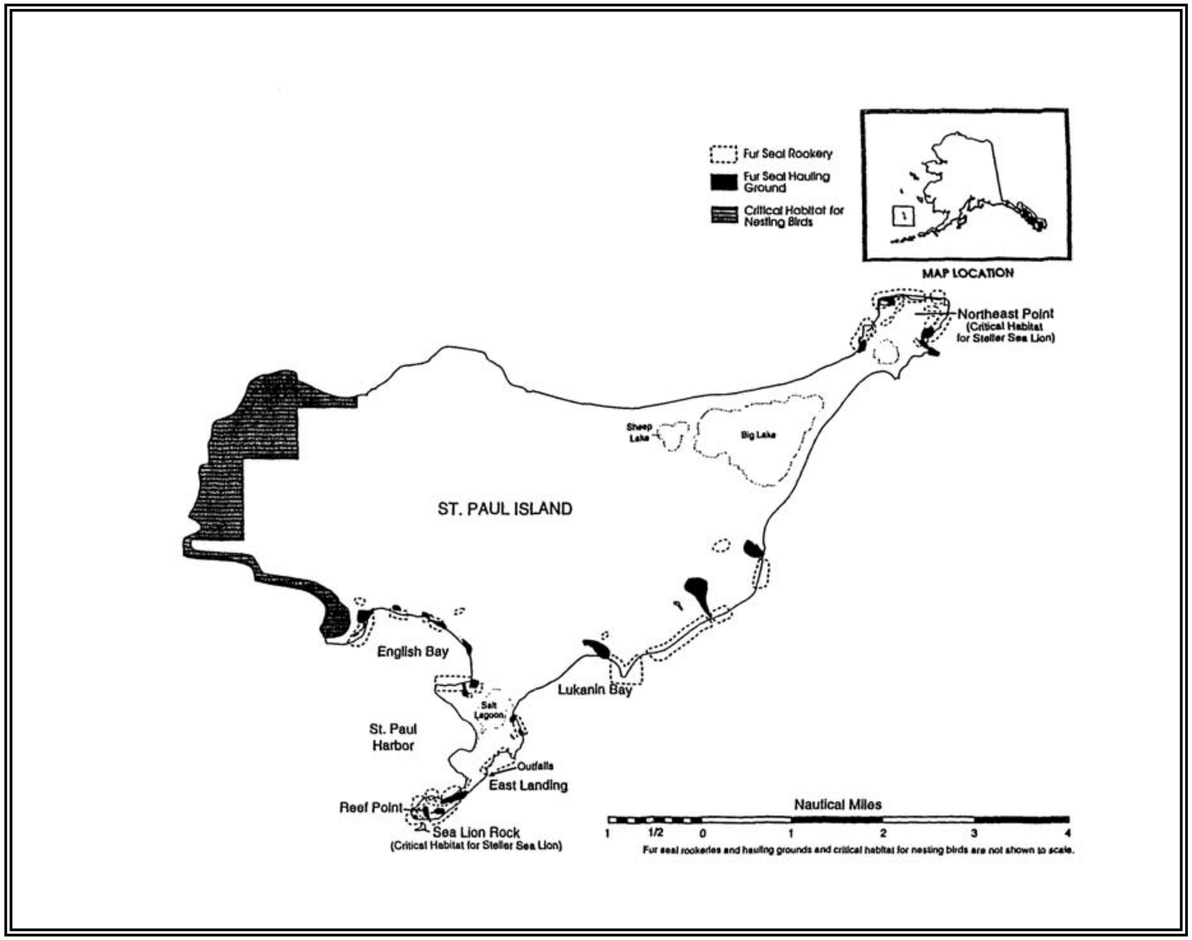

Figure 2: St. Paul Island, Alaska, including protected marine mammal and seabird habitats.

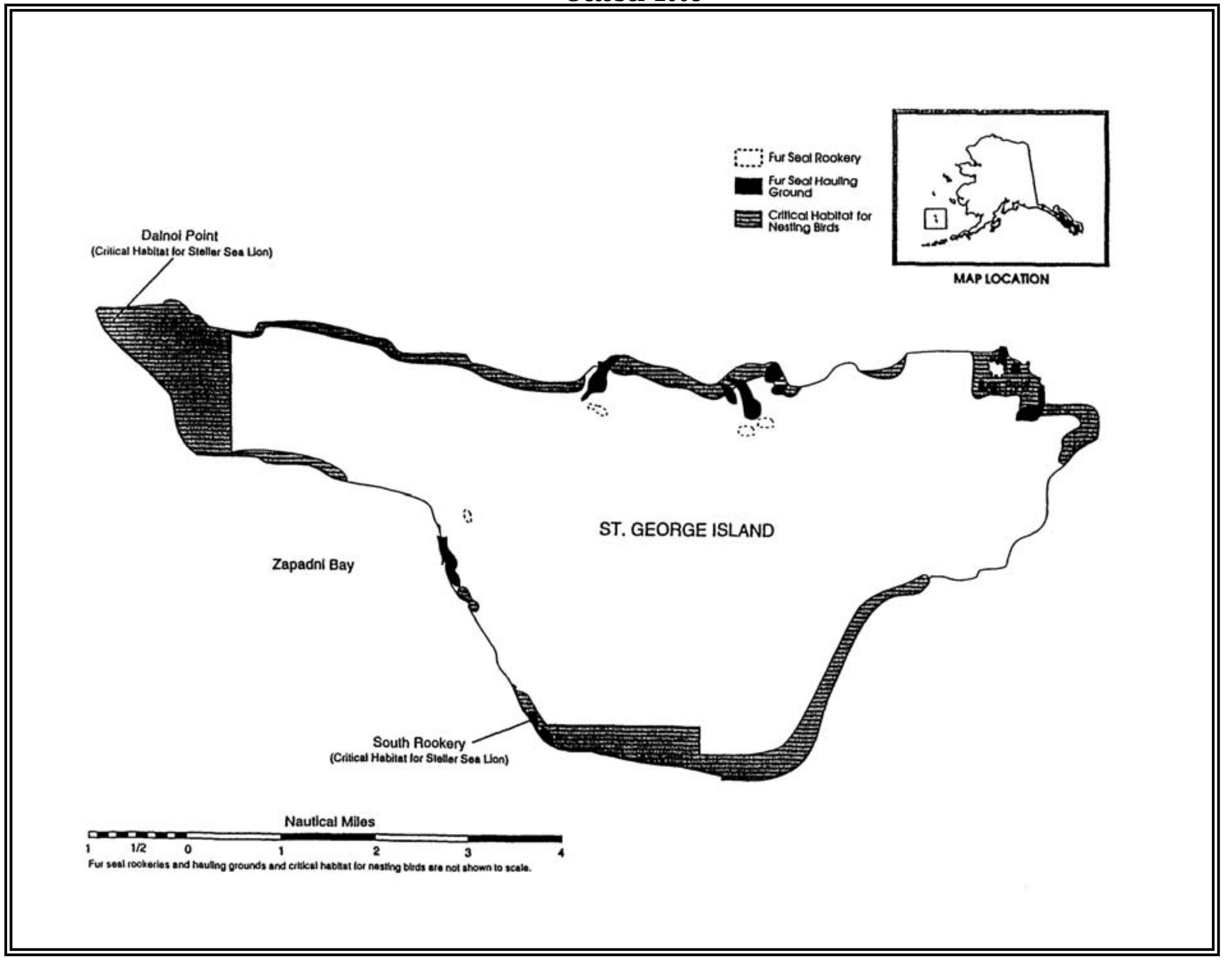

Figure 3: St. George Island, Alaska, including protected marine mammal and seabird habitats.

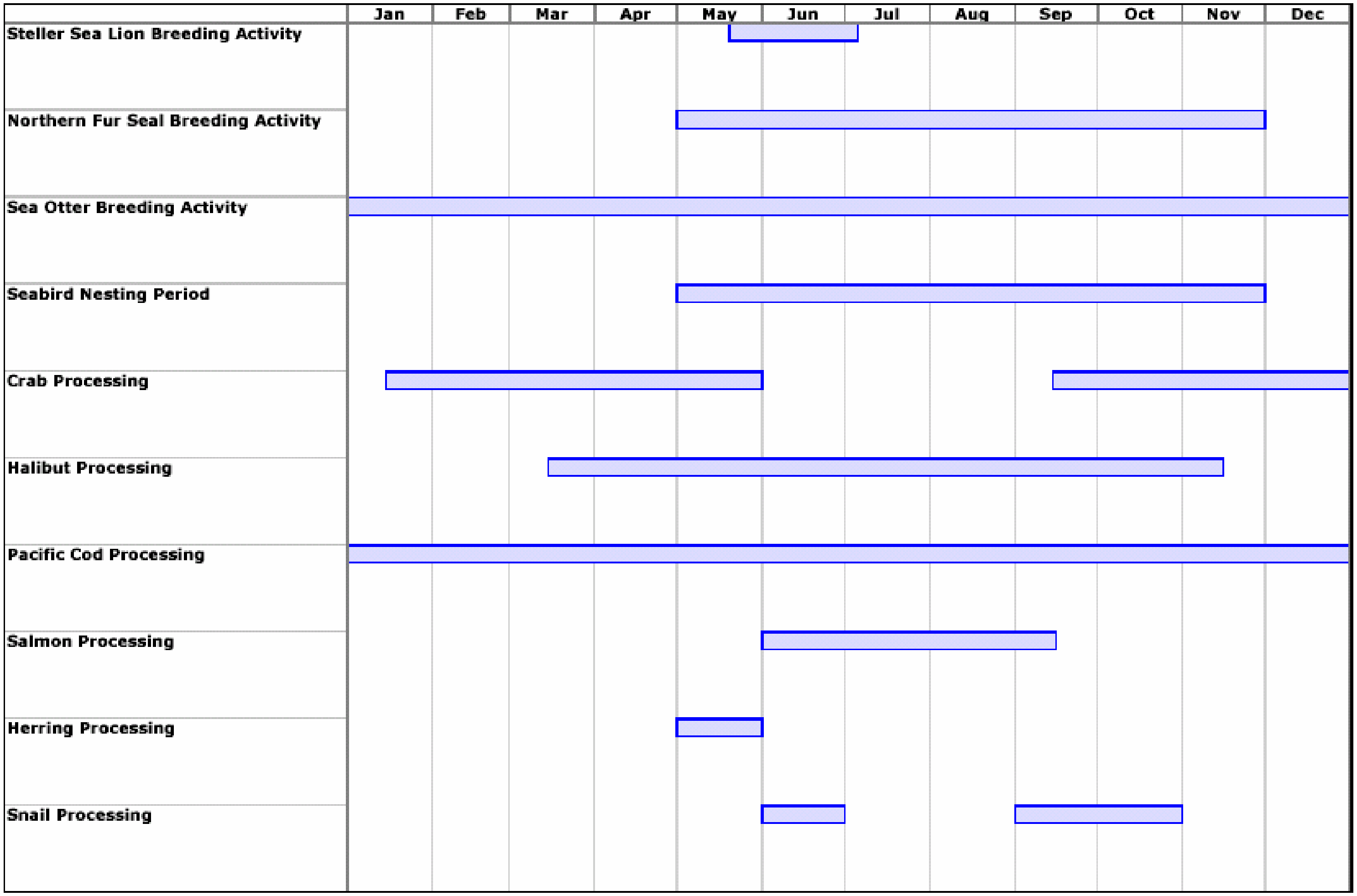

Figure 4. Critical breeding and nesting periods compared to seafood processing activities by month.