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

IN REPLY REFER TO:
AFWFO

MAY 21 2008

Ms. Marcia Heer, Project Manager
U.S. Army Engineer District, Alaska
Regulatory Division
P.O. Box 6898
Elmendorf AFB, Alaska 99506-0898

Re: Biological Opinion on the Effects of the Goodnews Bay Salmon Processing Plant Project on Steller's Eiders (*Polysticta stelleri*)

Dear Ms. Heer:

The attached document transmits the U.S. Fish and Wildlife Service's (USFWS) Biological Opinion, which is based on our review of the proposed development of a salmon processing facility in Platinum, AK on South Spit at the mouth of Goodnews Bay. The purpose of the salmon processing plant is to provide additional processing capacity for the region, to provide economic development for the region, to create access markets for local seafood stocks, and to make beneficial use of an underutilized fishery resource. The Biological Opinion considers the effects of construction and operation of this new facility on the Steller's eider (*Polysticta stelleri*) in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). This letter provides only a summary of the findings included in the Biological Opinion. A complete discussion of the effects analysis is provided in the Biological Opinion.

The following is a summary of the recent consultation history for this project. The complete administrative record for this consultation is on file at the Anchorage Fish and Wildlife Field Office (AFWFO).

- On March 30, 2007, the U.S. Army Corps of Engineers, Alaska District (ACOE) issued a Public Notice of Application for Permit for the proposed project.
- On April 3, 2007, Charla Sterne from the AFWFO took the lead on this section 7 consultation.
- On April 12, 2007, Charla Sterne attended a meeting with ACOE, NOAA, ADNR, and the applicant, Coastal Villages Resource Fund (CVRF).
- During June and July, 2007, Steller's eider surveys were conducted by HDR Alaska, Inc. for the applicant.

- In July 2007, Nick Rowse took the lead for AFWFO on the Section 7 consultation.
- In December 2007, Catherine Berg took the lead for the AFWFO on the Section 7 consultation.
- On January 10, 2007, AFWFO received a Biological Assessment from the ACOE. The BA was prepared by HDR Alaska, Inc. The ACOE requested initiation of a formal consultation.
- On February 6, 2007, formal consultation was initiated.
- On March 4, 2007, Catherine Berg and Greg Balogh held an informal meeting with CVRF to discuss the project and potential Steller's eiders issues.
- On April 25, 2007 Catherine Berg and Ellen Lance, Ann held an informal meeting with ACOE and CVRF to discuss the *Draft* Biological Opinion, Reasonable and Prudent Measures and the Terms and Conditions.

After reviewing all the available information on the proposed action and the best available information on the status, distribution, and life history of the Steller's eider, it is the Service's biological opinion that the action, as proposed, is likely to adversely affect Steller's eiders, but is not likely to jeopardize the continued existence of the species. The adverse effects are directly related to disturbance from an increase in small vessel traffic and barge traffic in the immediate vicinity of molting eiders.

The current Steller's eider Alaska-breeding population is estimated to be approximately 500 birds, and we assume that listed Steller's eiders represent 0.7% of the Pacific winter population. A maximum of approximately 200 Steller's eiders have been observed molting within the action area of the proposed salmon processing facility. Based on June/July 2007 survey data, Steller's eiders roost on the shoreline and rest and feed on the waters in the immediate vicinity of the proposed fish processing facility. Of the 200 Steller's eiders that molt at this location, we assume that 1.4 (200 x 0.007 = 1.4) is from the listed population. Therefore, over the 20-year life of this airport project, 28 Steller's eiders from the listed population will be "taken" through disturbance by vessel traffic associated with the operation of the salmon processing facility.

The enclosed Biological Opinion on the Effects of the Goodnews Bay Salmon Processing Plant Project on Steller's Eiders (*Polysticta stelleri*) includes Reasonable and Prudent Measures and Terms and Conditions that the USFWS believes will minimize the impacts of incidental take to Steller's eiders.

<u>Reasonable and Prudent Measures</u>
The USFWS believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Steller's eider:

1. The COE and/or the project sponsor shall minimize effects to Steller's eiders during operation of the salmon processing facility.
2. The COE and/or the project sponsor shall monitor effects of vessel traffic on Steller's eiders during the operation of the salmon processing facility.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the project sponsor must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The following terms and conditions shall implement Reasonable and Prudent Measure No.1. "The project sponsor shall minimize effects to Steller's eiders during the operation of the salmon processing facility."

1.1 Project participants shall design, produce, and install information signs for the purpose of minimizing potential impacts of development on Steller's eiders. One sign will give background information on Steller's eiders and their use of the surrounding area and how individual boat operators can take measures to avoid harassing birds. The other sign will address the effects of oil on the marine environment, ways that the public can prevent and reduce fuel spills, and that discharging oil is illegal. Design, content, text, number, and placement of the signs will be developed in cooperation with the U.S. Fish and Wildlife Service. Signs shall be completed and installed by June 15, 2009, when the salmon processing facility is expected to become operational.

1.2 Project participants shall institute and delineate a vessel traffic channel for use by all vessels approaching the barge/dock. All traffic approaching the dock shall be instructed on the use of the marked vessel traffic channel. Information on using the channel to minimize disturbance to Steller's eiders shall be included in a fact sheet to be distributed to all barge/dock users. Design, content, and text in the fact sheet will be developed in cooperation with the U.S. Fish and Wildlife Service. Fact sheets shall be completed by June 15, 2009, when the salmon processing facility is expected to become operational.

1.3 During employee training at the beginning of each operational season at the facility, a training module will be presented with information on Steller's eiders and their use of the surrounding area and how individuals can avoid harassing birds loafing on the shoreline (beach). Content will be developed in cooperation with the Service and completed prior to June 15, 2009, when the salmon processing facility is expected to become operational.

2 The following terms and conditions shall implement Reasonable and Prudent Measure No.2. "The project sponsor shall monitor effects of vessel traffic on Steller's eiders during the operation of the salmon processing facility."

2.1 The project participant shall monitor the effects of small vessel disturbance on Steller's eiders by assessing the correlation between small vessels approaching and leaving the barge/dock and disturbance behavior of Steller's eiders resting on the beach in the vicinity and feeding or loafing on the water in the vicinity. This monitoring task shall be added to the duties assigned to the offal outfall monitor. The project participant shall work with the USFWS prior to initiation of plant operations to develop appropriate data parameters, a data log, data collection timing and frequency, and a set of instructions for use by the monitor.

Thank you for your cooperation in meeting our joint responsibilities under section 7 of the Endangered Species Act. If you have any questions concerning this Biological Opinion, please contact me at (907) 271-2787, or Catherine Berg, AFWFO Endangered Species Branch, at (907) 271-1630.

Sincerely,

Ann G. Rappoport
Field Supervisor

Enclosure

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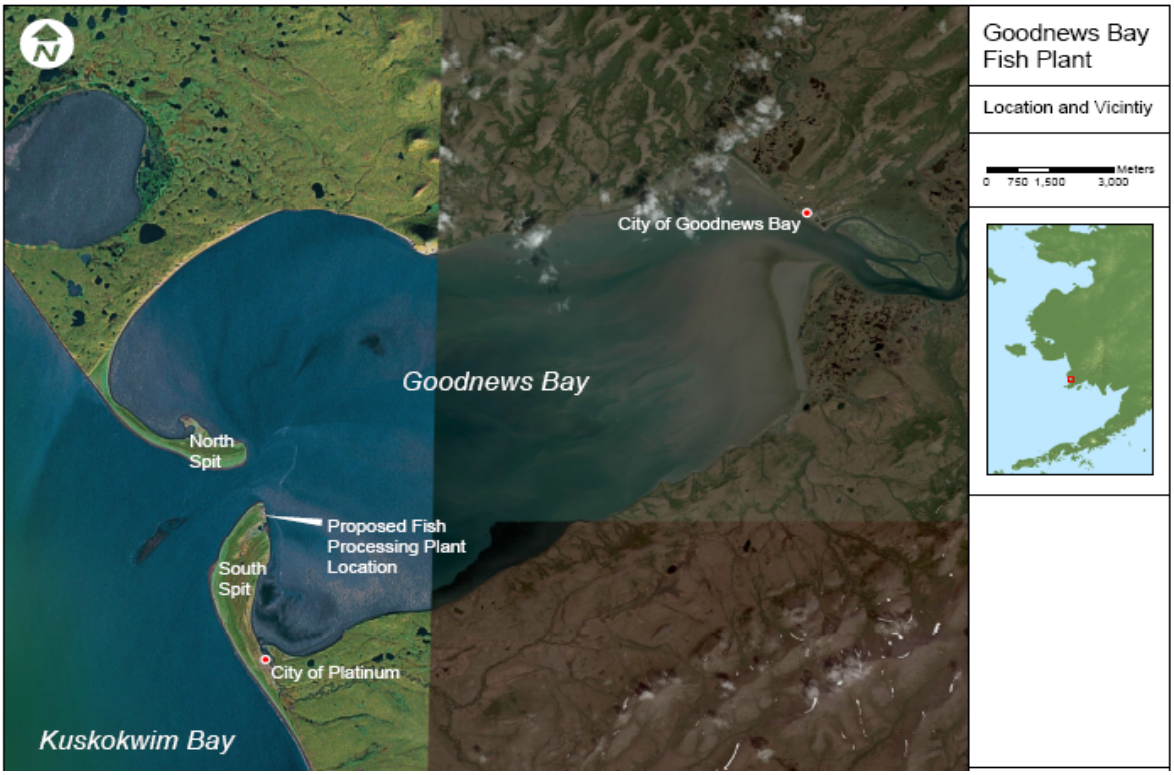
BIOLOGICAL OPINION 7

DESCRIPTION OF PROPOSED ACTION 7

As part of National Marine Fisheries Service (NMFS), Community Development Program which manages the Community Development Quota, the Coastal Villages Region Fund (CVRF) is proposing to develop a 10-acre salmon processing facility at the mouth of Goodnews Bay in Western Alaska. CVRF has applied for a Department of the Army permit from the U.S. Army Corps of Engineers, Alaska District, for work in waters of the United States. The proposed action will also require a National Pollution Discharge and Elimination System (NDES) permit from the U.S. Environmental Protection Agency (EPA). Plant construction activities would begin in summer 2008 and end in fall 2008. The plant is expected to be operational beginning in June 2009. 7

The proposed salmon processing facility is located on the northern end of the South (Platinum) Spit at the mouth of Goodnews Bay, approximately 3.2 km (two mi) north of the City of Platinum (Section 17, Township 12 South, and Range 75 West; Figure 1). Goodnews Bay is an inlet from Kuskokwim Bay on the west coast of Alaska, approximately 290 km (180 mi) northwest of the Alaska Peninsula and 100 miles south of the mouth of the Kuskokwim River. The proposed project lies at approximately 59.0458° north latitude and 161.8211° west longitude. The City of Platinum is located approximately 18 km (11 mi) southwest of the village of Goodnews Bay in southwest Alaska 7

Figure 1. Project Location. 7



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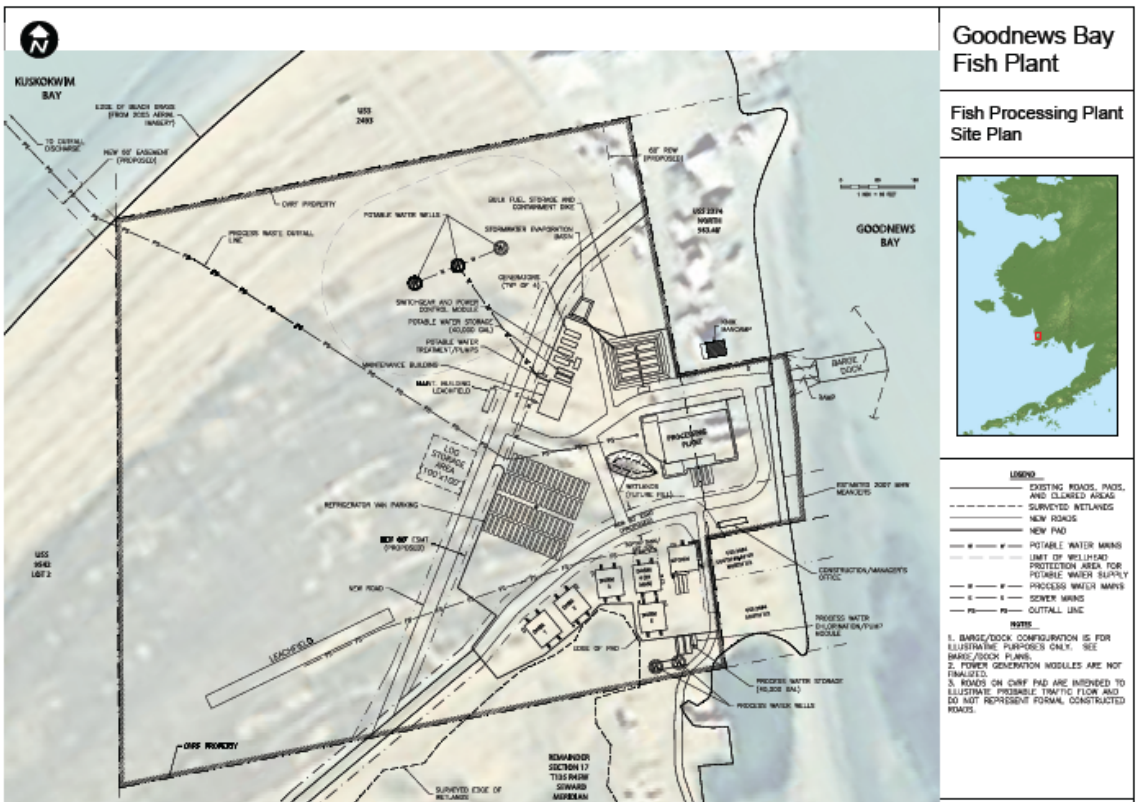
The purpose of the salmon processing plant in Platinum is: to provide additional processing capacity for the region; to provide economic development for the region; to create access markets for local seafood stocks: and to make beneficial use of an underutilized fishery resource. The Alaska Department of Fish and Game has reported that the local salmon fisheries have been experiencing low exploitation. Although the bio-mass is capable of sustaining additional harvest by commercial fishermen, the fishing opportunities are constrained by a lack of processing capacity in the region. (HDR Alaska, Inc. 2007a)..... 8

The proposed salmon processing plant includes a large processing plant building, roads, a diesel generation power system, a bulk fuel storage area, water and wastewater system, an offal discharge pipe, a storage yard for refrigeration vans, a mechanic shop, and temporary housing and dining hall for up to 130 people. A 76 meter (250 ft) long, anchored and tethered barge will serve as a seasonal dock for unloading fish and servicing the tender. This dock will be removed to an offsite location at the close of the fishing season. There are no permanent fill or structures in the intertidal area for the seasonal dock. Approximately 16.2 m^2 (0.04 acre) of wetlands will be filled during site development. An estimated 386 m^3 (505 yd^3) of gravel will be delivered from an upland source to fill the small wetland area. (HDR Alaska, Inc. 2007a) 8

Local community representatives from Platinum recommended the proposed site for the processor due to its prior use as a commercial operation, lack of subsistence use on the property, and minimal potential to impact wildlife in the area. The site has been used as a commercial transportation center since the 1930s and has both air and water transportation

access. Past facilities have been removed, and a majority of the proposed project site has already been 8

Figure 2. Project Site Plan. 8



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disturbed by past commercial operations. The site is accessible at all tides. An existing road that services Knik Construction Companies gravel operation at the end of the spit will be rerouted around the west side of the salmon processing facility (HDR Alaska, Inc. 2007a)... 9

The proposed salmon processing plant will operate 77 days per year from June 15 to August 30. During the open season, the facility will operate 24 hours a day, 7 days a week. Salmon processing capacity at the proposed facility is designed to set approximately 150,000 pounds of salmon per opener. Approximately 3,000,000 fish will be processed at the proposed facility during the open season. Approximately 75% of the fish will be used as finished product, and 25% of the fish will become waste product. Fish will be delivered by tenders and local fishermen in skiffs at the tethered barge and hauled to the plant by forklift for processing. The majority of the processed fish will be headed and gutted, however depending on species, some fish may be filleted. Processed fish will be held in freezers that will be transferred to a shipping barge. (HDR Alaska, Inc. 2007a) 9

During the annual operational period, which is scheduled to last 77 days, approximately 240 skiff deliveries and 64 tender deliveries will be made to the floating barge. A typical tender

is approximately 15 meters (50 ft) wide and 24 meters (79 ft) long, and typical skiffs are approximately 1.4 meters (4-5 ft) wide and 5-6 meters (16-20 ft) long. Additionally, the proposed facility will have two fuel barge deliveries during the open-water season and two freight barges during the operational period of the plant. Fuel will be delivered via the facility's marine header located on the east side of the property. Fuel tank levels will be monitored by personnel stationed at the tank during fuel delivery. A tote with emergency spill response equipment will be stationed near the barge dock for easy access. Vessels will travel on the Kuskokwim Bay side of the south spit, through the mouth of Goodnews Bay, and approach the processing plant from the north end of South Spit on the Goodnews Bay side of the spit. (HDR Alaska, Inc. 2007a)..... 9

The outfall line will carry finely chopped fish offal and spent processing water via a buried six-inch diameter high-density polyethylene outfall line towards the northwest shore of the South Spit approximately 427 meters (1,400 ft) away. At the gravel beach, the outfall line would transition to heavy-wall steel pipe and remain buried through the tidal zone. Below the tidal zone, the outfall line will rest directly on the seabed. The outfall line will extend approximately 91 meters (300 ft) beyond the mean lower low water (MLLW) line into waters approximately 12 meters (40 ft) deep at MLLW. The outfall line will be designed to extend beyond an existing back-eddy current located at the north end of South Spit. The terminus of the outfall will be anchored to prevent the pipe from moving in the strong tidal currents at the discharge location. CVRF will submit an application to the U.S. Environmental Protection Agency (EPA) for a Seafood Processing General Permit prior to commencing operations. 9

Process waste will be ground per the EPA and Alaska Department of Environmental Conservation (ADEC) requirements and discharged via the permanent process waste outfall line on the northwest side of the spit into Kuskokwim Bay. Fish waste is required to be ground to one-half inch or smaller in any dimension prior to discharge. Approximately one to one-and-one-half gallons of water will be used to process each gross pound of salmon, resulting in about four to six gallons of water per pound of fish offal in the discharge. Over the season, an average of 4,418 kilograms (9,740 lbs) of fish offal entrained in 143,800 to 223,300 liters (38,000 to 59,000 gals) of water will be discharged daily through the outfall line during all tide cycles throughout the processing season. (HDR Alaska, Inc. 2007a)..... 9

All electrical and communications lines will be run underground. No towers, hanging wires, or guy wires will be constructed at the site. All outdoor lighting will be downward shielded. Power supply will be provided by diesel generation. Diesel fuel for the generators and other needs will be supplied from a bulk fuel facility which will receive fuel twice annually from a commercial fuel barge. The bulk fuel facility storage capacity is 530,000 liters (140,000 gals) of diesel and 75,710 liters (20,000 gals) of gasoline in eight 75,710 liter (20,000 gal) horizontal skid-mounted duel containment tanks, located within a dike and lined tertiary containment area. During the off-season, a local-hire will perform daily security and leak checks on the facility. The bulk fuel facility, appurtenances, and operation plans will conform to current U.S. Coast Guard, EPA, and ADEC regulations, including the development of a Spill Prevention, Containment and Countermeasures (SPCC) Plan for the project..... 10

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BIOLOGICAL OPINION
On the Effects of the Goodnews Bay Salmon Processing Plant Project
on Steller's Eiders (*Polysticta stelleri*)

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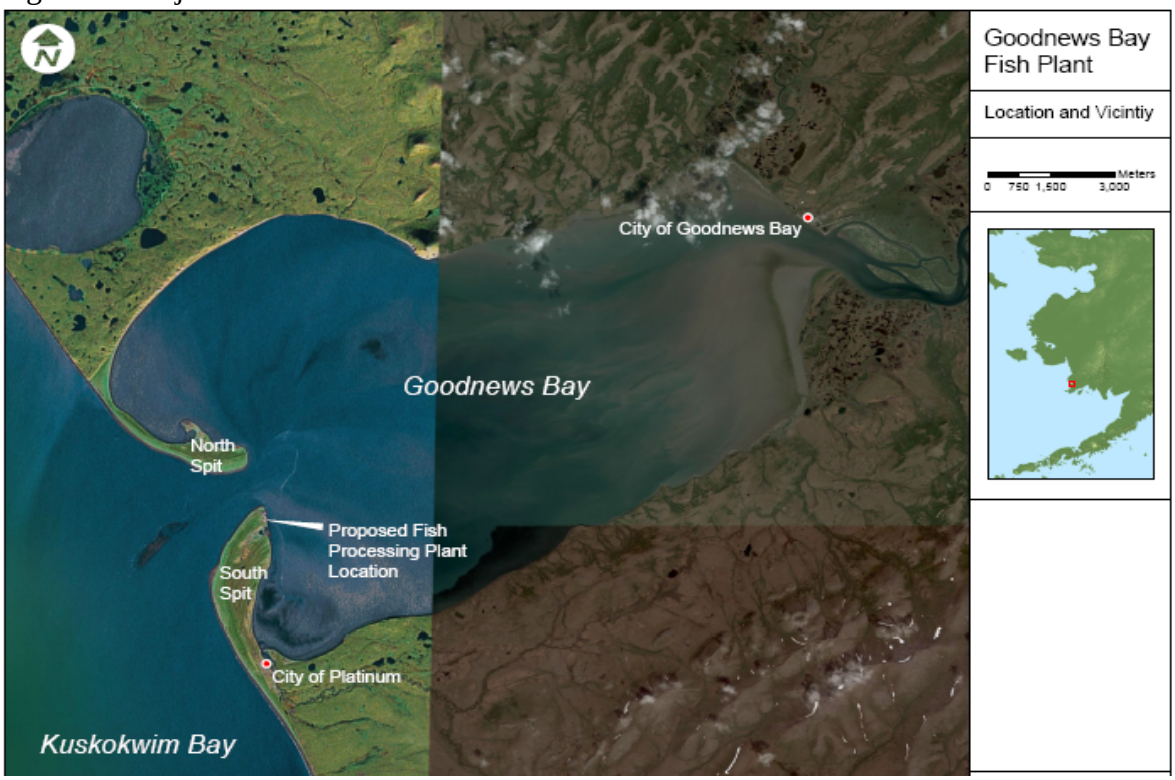

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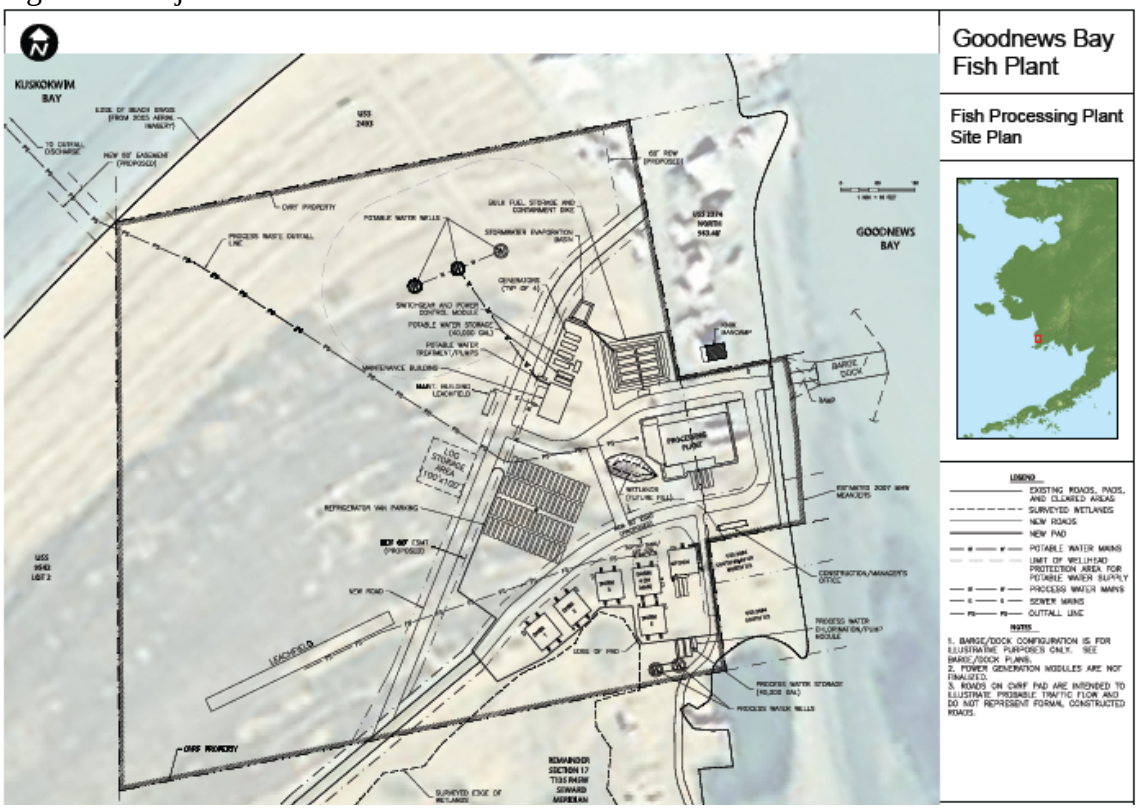

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STATUS OF THE SPECIES - Steller's eider (*Polysticta stelleri*)

Species Description

The Steller's eider was listed as a threatened species on June 11, 1997 (62 FR 31748). Critical habitat was designated for the Steller's eider on February 6, 2001 (65 FR 13262). The Steller's eider is the smallest of the eiders. The average weight of adult male and female Steller's eiders is 0.88 kilograms (1.94 lbs) (Bellrose 1980). Adult male Steller's eiders in breeding plumage have a black back, white shoulders, and a chestnut brown breast and belly. The males have a white head with black eye patches; they also have a black chin patch and a small greenish patch on the back of the head. Females and juveniles are mottled dark brown.

Life History

Longevity

Steller's eiders are long lived, with individuals known to have lived at least as long as 21 years and 4 months in the wild (band number 647-66747). Other ages recorded for this species in the wild are 20 years, 4 months (band numbers 647-66757 and 1077-13265), 19 years, 3 months (band number 647-64547), and 16 years (band numbers 1157-01787 and 1157-01876)(Chris Dau, US Fish and Wildlife Sevice, Migratory Bird Management Division, pers. comm.).

Energetics

Goudie and Ankney (1986) suggest that small-bodied sea ducks such as harlequin (*Histrionicus histrionicus*) and long-tailed ducks (*Clangula hyemalis*) that winter at northern latitudes do so near the limits of their energetic threshold. These species have little flexibility in regards to caloric consumption or in their opportunity to rely on caloric reserves. Under this life history strategy, such species are vulnerable to perturbations within their winter habitat. Because the Steller's eider is relatively small-bodied, being intermediate in size to the harlequin and long-tailed ducks (Bellrose 1980), and because it overlaps with harlequins and long-tailed ducks in its choice of foraging areas and prey items, the species may, like the harlequin and long-tailed ducks, exist near its energetic limits. Unlike other larger eiders, Steller's eiders must continue to feed upon reaching their nesting areas, to build up enough energy reserves to breed (D. Solovieva, Zoological Institute, Russian Academy of Science, pers. comm.). In addition, female Steller's

eiders must continue to feed during incubation. Spectacled eiders, a larger bodied sea duck, apparently do not exist so close to their energetic threshold; they arrive on the nesting grounds fit enough to fast through egg laying and incubation.

Age to Maturity
Sexual maturity is believed to be deferred to the second year (Bellrose 1980).

Reproductive Strategy
Johnsgard (1994) indicated that pair formation for most sea ducks occurs in fall and spring. Metzner (1993) hypothesized that Steller's eiders at Izembek Lagoon and Cold Bay paired in the spring because they were apparently too preoccupied with feeding during the fall and winter to form pair bonds. The length of time that Steller's eiders remain paired is unknown. However, long-term pair bonds have been documented in other ducks (Bengtson 1972, Savard 1985).

Pairs of Steller's eiders arrive at Point Barrow as early as June 5 (Bent 1987). While nesting, Steller's eiders often occupy shallow coastal wetlands in association with tundra (Bent 1987, Quakenbush and others 1995, Solovieva 1997), although we have records of aerial observations of Steller's eider pairs well inland on the Arctic Coastal Plain (ACP). This species establishes nests near shallow ponds or lakes, usually close to water.

Clutch size has been reported to range from two to ten eggs (Bent 1987, Bellrose 1980, Quakenbush and others 1995). The average clutch size of successful nests near Barrow is reported as 4.6 (n = 8). Solovieva (1997) found that clutch size for Steller's eiders on the Lena Delta varied between five and eight eggs with an average of 6.1 (n = 32). Nesting success near Barrow (percent of nests where eggs hatch) is variable (Quakenbush and others 1995). In 1991, five of six nests hatched while in 1993, only four of 20 nests hatched. During some years, the species apparently does not even attempt to nest near Barrow (Quakenbush and others 1995).

Recruitment
Steller's eider recruitment rate (the percentage of fledged birds that reach sexual maturity) is unknown. However, there is limited information regarding Steller's eider fledging rate. Near Barrow, 83.3 percent (five of six) of Steller's eiders nests with eggs hatched in 1991, 20.0 percent (four of 20) hatched in 1993 (Quakenbush and others 1995), and 15 percent (three of 20) hatched in 2000 (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm.). In other years, Steller's eiders do not even attempt to breed near Barrow (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm., Quakenbush and others 1995). We conclude that the annual recruitment rate for this species is likely variable.

Seasonal Distribution Patterns
<u>Banded and Satellite-Tagged Alaskan Breeding Birds</u>: Little is known of the distribution of Alaska breeding Steller's eiders outside of the breeding season. A few band recoveries indicate that birds that breed near Barrow undergo molt in Izembek Lagoon. A satellite telemetry study was initiated in 2000 to investigate the molting and wintering locations of the Alaskan population of Steller's eiders. Satellite transmitters were placed on four Steller's eiders captured in Barrow. Two Steller's eiders (one male and one female) spent the molting season on the Kuskokwim Shoals, while a third (a male) molted near the Seal Islands (Philip Martin, US Fish and Wildlife

Service, Fairbanks Fish and Wildlife Field Office, pers. comm.). Both birds that molted at Kuskokwim Shoals moved on to the Hook Bay portion of Bechevin Bay in November. The male remained in Hook Bay at least until late December when his transmitter stopped working. The female remained at Hook Bay until early February, at which time she returned to Izembeck Lagoon and remained there into spring. The bird that molted near the Seal Islands moved west to Nelson Lagoon in October. After spending approximately 3 weeks at Nelson Lagoon, this bird moved west to Sanak Island at the end of November. The bird remained at Sanak Island for 3 months. During this time his use area was small, only a few square kilometers. By March 4, he had moved back to Izembek Lagoon in the vicinity of his November locations (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm.).

Breeding Distribution - The exact historical breeding range of the Alaska-breeding population of Steller's eiders is not clear. The historical breeding range may have extended discontinuously from the eastern Aleutian Islands to the western and northern Alaska coasts, possibly as far east as the Canadian border. In more recent times, breeding occurred in two general areas, the Arctic Coastal Plain (ACP), and western Alaska, primarily on the Yukon-Kuskokwim (Y-K) Delta. Currently, Steller's eiders breed on the western ACP in northern Alaska, from approximately Point Lay east to Prudhoe Bay, and in extremely low numbers on the Y-K Delta.

On the ACP, anecdotal historical records indicate that the species occurred from Wainwright east, nearly to the Alaska-Canada border (Anderson 1913; Brooks 1915). There are very few nesting records from the eastern ACP, however, so it is unknown if the species commonly nested there or not. Currently, the species predominantly breeds on the western ACP, in the northern half of the National Petroleum Reserve - Alaska (NPR-A). The majority of sightings in the last decade have occurred east of the mouth of the Utukok River, west of the Colville River, and within 90 km (56 mi) of the coast. Within this extensive area, Steller's eiders generally breed at very low densities.

The Steller's eider was considered a locally "common" breeder in the intertidal, central Y-K Delta by naturalists early in the 1900s (Murie 1924; Conover 1926; Gillham 1941; Brandt 1943), but the bird was reported to breed in only a few locations. By the 1960s or 70s, the species had become extremely rare on the Y-K Delta, and only six nests have been found in the 1990s (Flint and Herzog 1999). One to two nests continue to be found each year during the course of extensive ground-based waterfowl research and surveys. Given the paucity of early-recorded observations, only subjective estimates can be made of the Steller's eider's historical abundance or distribution on the Y-K Delta.

A few Steller's eiders were reportedly found nesting in other locations in western Alaska, including the Aleutian Islands in the 1870s and 80s (Gabrielson and Lincoln 1959), Alaska Peninsula in the 1880s or 90s (Murie and Scheffer 1959), Seward Peninsula in the 1870s (Portenko 1972), and on Saint Lawrence Island as recently as the 1950s (Fay and Cade 1959). It is unknown how regularly these areas were used or whether the species ever nested in intervening areas.

Post-Breeding Distribution and Fall Migration - Following breeding, males and some females with failed nests depart their Russian nesting area and return to marine waters (Solovieva 1997). We know little of Steller's eiders use of marine waters adjacent to Alaska's ACP and along the west and southwest coast of Alaska during late summer and fall migration. Historical

observations made by Murdoch (1885 as in Bent 1987) indicate that birds that have bred near Point Barrow begin to return to the coast from the first to the middle of July. In addition, he indicated that they disappear from the Barrow area from the first to the middle of August. Steller's eiders arrived at St. Michael around 21 September (Bent 1987). Late date of departure was as follows: Point Barrow, September 17; St. Michael, October 5; and Ugashik, November 28 (Bent 1987).

Over 15,000 Steller's eiders were observed on September 27, 1996, in Kuskokwim Bay (Larned and Tiplady 1996). Most (nearly 14,000) were located along the mainland side of barrier islands while about 1,100 were detected further offshore. Despite this species' apparent preference for near-shore habitats, several groups were detected over 10 kilometers (km) from shore and two groups were over 30 km from shore.

In late summer and fall, large numbers of Steller's eiders molt in a few lagoons located on the north side of the Alaska Peninsula (i.e., Izembek and Nelson Lagoon/Port Moller Complex, Seal Islands) (Petersen 1980, 1981). Recent observations of over 15,000 Steller's eiders in Kuskokwim Bay, and the observation of two out of three satellite-tagged birds from Barrow molting there suggests that Kuskokwim Bay may also be a notable molting area for this species and for the listed entity (Larned and Tiplady 1996; Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm.). Following the molt, large numbers of Steller's eiders are known to over winter in near-shore marine waters of the Alaska Peninsula, Aleutian Islands, Kodiak Archipelago, and the Kenai Peninsula (e.g., within Kachemak Bay).

Molt Distribution - After breeding, Steller's eiders move to marine waters where they undergo a flightless molt for about 3 weeks. The majority is thought to molt in four areas along the Alaska Peninsula: Izembek Lagoon (Metzner 1993; Dau 1991; Laubhan and Metzner 1999), Nelson Lagoon, Herendeen Bay, and Port Moller (Gill and others 1981; Petersen 1981). Additionally, smaller numbers are known or thought to molt in a number of other locations along the western Alaska coast, around islands in the Bering Sea, along the coast of Bristol Bay, and in smaller lagoons along the Alaska Peninsula (Swarth 1934; Dick and Dick 1971; Petersen and Sigman 1977; Wilk and others 1986; Dau 1987; Petersen and others 1991).

During brief surveys in 2007, molting Steller's eiders were documented in Goodnews Bay in June and July. A total of 181 Steller's eiders were observed; the majority of observations were located on the east side of South Spit, near a small estuary and on the north end of South Spit (HDR Alaska, Inc. 2007b). In June, 89 Steller's eiders were observed at the north end of South Spit and on the inside of South Spit near the estuary just south of the proposed fish processing plant. The majority of the eiders were in small flocks composed of subadults and molting adult males. The 92 Steller's eiders counted during the July survey were more dispersed, but still present in highest densities at the north end of South Spit and on the east side of South Spit near the estuary. In addition, Steller's eiders were observed south of and inside North Spit. The majority of the eiders in the July survey were molting adult females. During both surveys, the eiders were observed actively feeding near the estuary and in open water east of the proposed fish processing plant and roosting on the shoreline at the north end of South Spit. (HDR Alaska, Inc. 2007b)

Winter Distribution - Following the molt many, but not all, Steller's eiders disperse from major molting areas to other portions of the Alaska Peninsula and Aleutian Islands. Winter ice formation

often temporarily forces birds out of shallow protected areas such as Izembek and Nelson Lagoons. During the winter, this species congregates in select near-shore waters throughout the Alaska Peninsula and the Aleutian Islands, around Nunivak Island, the Pribilof Islands, the Kodiak Archipelago, and in Kachemak Bay (Larned 2000a, Bent 1987, Agler and others 1994, Larned and Zwiefelhofer 1995).

Larned (2000b) did not see Steller's eiders along most of the Alaska Peninsula coastline he surveyed during winter. Most of the birds were concentrated within relatively small portions of the coastal waters. Much of the population, detected during spring migration, was not detected on this winter survey. We believe this was because many Steller's eiders winter farther west in the Aleutian Islands and/or along the south side of the Alaska Peninsula.

Spring Migration - In the spring, Steller's eiders form large flocks along the north side of the Alaska Peninsula and move east and north (Larned and others 1993, Larned 1998, Larned 2000b). Spring migration usually includes movement along the coast, although birds may take shortcuts across water bodies such as Bristol Bay (William Larned, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm.). Interestingly, despite many daytime aerial surveys, Steller's eiders have never been observed during migratory flights (William Larned, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm.). Larned (1998) concluded that Steller's eiders show strong site fidelity to "favored" habitats during migration, where they congregate in large numbers to feed before continuing their northward migration.

The number of Steller's eiders observed in each site during migration surveys should be considered a minimum estimate of the number of eiders that actually use these sites during migration. These data represent eider use during a snapshot in time, when in reality, a stream of eiders likely flows into and out of these sites throughout the migration season. The spring migration survey was not intended to document the intensity of use of any particular site by Steller's eiders, but was designed to monitor the entire population of Steller's eiders and other sea ducks during the spring migration.

Because the spring Steller's eider aerial survey was not intended to quantify use of any particular area by Steller's eiders during spring migration, care must be taken in interpreting the results with this purpose in mind. For example, Steller's eider use of habitat near Ugashik and Egegik Bays was documented in 1992, 1993, 1997, and 1998 (Larned and others 1993, Larned 1998). However, in 2000, no Steller's eiders were observed there (Larned 2000b). In fact, no Steller's eiders were observed from the Cinder River Sanctuary to Cape Constantine; an expanse of approximately 110 miles of coastline which encompasses these bays and which has had several thousand Steller's eiders documented in previous years (Larned and others 1993, Larned 1998). However, 15,000 Steller's eiders were observed south of this area and were distributed between Port Heiden and Port Moller (Larned 2000b). Three days later, about 43,000 Steller's eiders were observed south of Port Moller (Larned 2000b). The birds were, in essence, stacking up behind Port Moller, or were otherwise phenologically late in their migration relative to the previous few years. Regardless, survey results from that year suggested low use of habitats north of Port Moller, even though the birds that were counted south of Port Moller presumably used those more northerly habitats following the conclusion of the spring aerial survey.

Several areas receive consistent use by Steller's eiders during spring migration, including Bechevin Bay, Morzhovoi Bay, Izembek Lagoon, Nelson Lagoon/Port Moller Complex, Cape Seniavin, Seal Islands, Port Heiden, Cinder River State Critical Habitat Area, Ugashik Bay, Egegik Bay, Kulukak Bay, Togiak Bay, Nanwak Bay, Kuskokwim Bay, Goodnews Bay, and the south side of Nunivak Island (Larned and others 1993, Larned 1998, and Larned 2000b).

Summer Distribution in Southern Alaska - A small number of Steller's eiders are known to remain along the Alaska Peninsula and Kachemak Bay during the summer; approximately 100 have been observed in Kachemak Bay, while a few may spend the summer at Izembek Lagoon (Chris Dau, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm.).

Site Fidelity

Steller's eiders appear to show site fidelity at different spatial scales during different times of the year. There is good evidence of fidelity to molting sites in this species. About 95 percent of recaptured molting Steller's eiders are recaptured at the same site at which they were banded (Flint and others 2000). Flocks of Steller's eiders make repeated use of certain areas between years (Larned 1998), although it is unknown to what extent individuals display repeated use of these areas.

Female philopatry to breeding grounds in waterfowl species is high. Female waterfowl tend to return to the area where they hatched for their first nesting effort, and subsequently tend to return to the same area to breed in the following years (Anderson and others 1992). Despite having had only a few opportunities to observe Steller's eiders breeding on the Y-K Delta, we have observed philopatry displayed by a female Steller's eider there; one individual chose nest sites in two consecutive years that were about 124 meters (407 ft) apart (Paul Flint, US Geological Survey, Alaska Science Center, pers. comm.). Banding data from the Barrow area suggests some level of site fidelity for Steller's eiders breeding there as well (Quakenbush and others 1995; Phillip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm.). Interestingly, natal philopatry has not been observed in Steller's eiders nesting in Russia (D. Solovieva, Zoological Institute, Russian Academy of Science, pers. comm.).

Further evidence of breeding site fidelity is found in other sea ducks. Female spectacled eiders did not move between general nesting areas (coastal versus interior) between years (Scribner and others 2000). In addition, mitochondrial DNA analysis indicates that female spectacled eiders tend to return to their natal breeding area once they are recruited to the breeding population (Scribner and others 2000). Natal, breeding, and winter philopatry in other sea ducks has also been documented (Dow and Fredga 1983, Savard and Eadie 1989, Robertson 1997, Robertson and others 1999).

Preliminary data from radio transmitters placed on 23 Steller's eiders captured in Captain's Bay and around Amaknak Island (near Dutch Harbor) in spring 2001 also reveal that eiders show site fidelity to general wintering areas (USGS 2001). Steller's eiders remained in the general vicinity from which they were initially captured from mid-February to mid-March 2001 when the radio transmitters stopped working (Paul Flint, US Geological Survey, Alaska Science Center, pers. comm.). The birds marked in Captain's Bay were never detected outside of the area that the flock was observed using. Birds marked around Amaknak Island remained in the general area, but

appeared to use a larger home range. Satellite telemetry data indicated that two tagged Steller's eiders used an area of only a few square kilometers from November through Feburary (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers.comm.). Although further investigation is needed, preliminary studies suggest that Steller's eiders show high site fidelity at over wintering sites, at least within one winter season. Whether Steller's eiders show fidelity to over wintering sites between years remains unknown.

We note that site fidelity has been observed in wintering harlequin ducks; they showed strong site fidelity for short stretches (5 km) of coastline (Cooke and others 2000). Robertson and others (1999) concluded that strong site tenacity suggests that local knowledge of an area is valuable and may help ensure high survival of individuals remaining in a familiar site. They suggest that site fidelity would be expected of long-lived species that are sensitive to adult mortality and depend, at least in part, upon habitat stability for survival.

Population Structure

Genetic analysis of vertebrate populations suggests that there are often genetic gradients or differences that correspond to the geographic distribution of the species (Lande and Barrowclough 1987). The Alaska breeding population of Steller's eiders may contain unique geographic sub-populations because of: (1) the distance between breeding populations on the Y-K Delta and the ACP [about 804 kilometers (500 miles)], and (2) the anticipated site fidelity of nesting adult females (Anderson and others 1992). The similarly distributed North Slope and Y-K Delta populations of spectacled eiders possess distinct mitochondrial DNA markers, implying limited maternal gene flow between these two areas for that species (Scribner and others 2000).

Food Habits

Steller's eiders employ a variety of foraging strategies that include diving to a maximum depth of at least 9 meters (30 feet), bill dipping, body tipping, and gleaning from the surface of water, plants, and mud. During the fall and winter, Steller's eiders forage on a variety of invertebrates that are found in near-shore marine waters (Metzner 1993, Petersen 1981, Bustnes and others 2000). Esophageal contents from 152 Steller's eiders collected at Izembek Lagoon, Kinzarof Lagoon, and Cold Bay, Alaska, indicate Steller's eiders forage on a wide variety of invertebrates (Metzner 1993). According to Metzner (1993), marine invertebrates accounted for the majority of the Steller's eider diet (92%, aggregate dry weight). In addition, occurrence of shell-free prey (e.g., Crustacea, Polychaeta) predominated, compared to that of food items with shells (Metzner 1993). Metzner (1993) concluded that Steller's eiders were opportunistic generalists, foraging primarily on fauna associated with eelgrass beds in Izembek Lagoon and Kinzarof Lagoon, and infauna, epibenthos, and highly mobile fauna. During molt, Steller's eiders were found to have consumed blue mussel (*Mytilus edulis*), other bivalves (e.g. *Macoma balthca*), and amphipods (a small crustacean). They were also found to have consumed more blue mussels while growing wing-feathers (Petersen 1981).

In northern Norway, 31 species were identified as Steller's eider winter food items; 13 species of gastropods (68.4% of total number of items), four species of bivalves (18.5%); 12 species of crustaceans (13%); and two species of echinoderms (0.1%; Bustnes and others 2000). Juveniles sampled in this study fed more on crustaceans (x=61% aggregate wet weight) than did adults (x=26% aggregate wet weight). Examination of female Steller's eiders found dead near Barrow

showed they had consumed mostly Chironomid larvae, which are the predominant macrobenthic invertebrate in arctic tundra ponds (Quakenbush and others 1995).

Predators

Predators of Steller's eiders include snowy owls (*Nyctea scandiaca*), short-eared owls (*Asio flammeus*), peregrine falcons (*Falco peregrinus*), gyrfalcon (*Falco rusticolus*), pomarine jaegers (*Stercorarius pomarinus*), rough-legged hawks (*Buteo lagopus*), common raven (*Corvus corax*), glaucous gulls (*Larus hyperboreus*), arctic fox (*Alopex lagopus*), and red fox (*Vulpes vulpes*). Quackenbush and others (1995) reported five adult male and three adult female Steller's eiders taken by avian predators in 4 years near Barrow. Predators included peregrine falcons, gyrfalcons, and snowy owls. In addition, pomarine jaegers preyed on Steller's eider eggs. On the Y-K Delta, Steller's eider nests have been destroyed by gulls (Paul Flint, US Geological Survey, Alaska Science Center, pers. comm.). In fall, winter, and spring predation can be attributed primarily to avian predators, such as bald eagles (*Haliaeetus leucocephalus*) and gyrfalcons (Chris Dau, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm.).

Population Dynamics

Population Size

Population sizes are only imprecisely known. The Pacific wintering population is estimated to be about 80,000 birds (Larned 2005). The threatened Alaska-breeding population is thought to number in the hundreds on the ACP (Larned and others 2006), and possibly tens on the Yukon-Kuskokwim Delta (USFWS, Anchorage Fish and Wildlife Field Office, Unpublished data).

<u>Yukon-Kuskokwim Delta</u> - Estimating the size of the Steller's eider breeding population in Alaska has proved difficult. Due to the low counts and high variation in counts between years during systematic surveys, an accurate/precise statistical estimate is unavailable. Aerial surveys that included the Y-K Delta but did not include the ACP indicated that the population sizes of eiders (*Polysticta stelleri* and *Somateria* spp.) had declined by 90% since 1957 (Hodges and Eldridge 1996). For the 1950s and early 1960s, the upper limit of the population, excluding the North Slope, had been estimated to be approximately 3,500 pairs (Kertell 1991). Kertell noted, however, that the population might have been smaller due to the potential restriction of nesting Steller's eiders to specific habitats. Kertell concluded that the Steller's eider had been extirpated from the Y-K Delta prior to 1990.

Since publication of Kertell (1991), a few pairs of Steller's eiders have nested on the Y-K Delta (Table 1; Paul Flint, US Geological Survey, Alaska Science Center, pers. comm. 1999; Brian McCaffery, US Fish and Wildlife Service, Y-K Delta National Wildlife Refuge, pers. comm. 2005). In no single year have biologists found more than three nests, despite extensive ground-based nest search efforts throughout nearly all of the Steller's eider critical habitat area.

Because extensive ground investigations occur over at least 1.4% of Steller's eider critical habitat on the Y-K Delta each year (Tim Bowman, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm), with additional searching occurring by crews walking to and from study sites, and because these searches have not revealed more than two Steller's eider nest in any given year, we believe the estimate of hundreds of Steller's eiders on the Y-K Delta is optimistic.

Table 1. Recent sightings of Steller's eiders on the Y-K Delta

Year	General Location	Number of Pair	Nest Detected	Number of Eggs	Fate of Nest
1994	Kashunuk River near Hock Slough	1	1	7	Destroyed by Gulls
1996	Tutakoke River	1	1	6	Unknown
1997	Tutakoke River	2	0	NA	NA
1997	Kashunuk River	1	1	6	Hatched
1998	Tutakoke & Kashunuk Rivers	2;1	2; 1	Unk.; 7	Destroyed; Hatched
1999	Kigigak Island	2	2	unknown	unknown
2000	Kigigak Island	2	2	unknown	unknown
2004	Kigigak Island (south central)	1	1	7	Hatched
2005	Kigigak Island (south central and west coastal)	2 probable	1	6; unknown	Abandoned; 2 ducklings observed

Arctic Coastal Plain/North Slope - Aerial surveys provide the best estimate of Steller's eider population size in northern Alaska; though caution must be used when interpreting results. Neither the surveys conducted by Mallek and others (2006) nor Larned and others (2006) were designed to estimate Steller's eider populations (Table 2). It is a low density species in this area and surveys are not typically flown at the optimum time for observing Steller's eiders.

The actual numbers of Steller's eider present on the North Slope during spring is probably underestimated in most years because an unknown proportion of birds are missed during aerial surveys or because the birds have not yet arrived. Conversely, the data may over estimate population size due to the periodic presence of non-breeding birds or failed breeders from other areas. For example, the second highest count from the ACP Breeding Bird Survey from 1986-2005 (2,524) occurred in 1994 when the species failed to nest in the Barrow area and remained in terrestrial (non-marine) habitats until mid-July (Quakenbush and others 2001).

The problem of Steller's eider population estimation results from the species dispersal across a huge landscape at very low densities. In addition, the number of Steller's eiders present on the ACP may fluctuate dramatically from year to year. Aerial surveys optimized to detect eiders have been conducted on the North Slope since 1992 (Larned and others 2006), and indicate Steller's eiders occur at very low densities across the ACP, with a higher density in the vicinity of Barrow. Standardized ground surveys for eiders near Barrow have been conducted since 1999, and have found an average density near Barrow of 0.66 birds/ km2 (Rojek 2006). The Barrow vicinity supports the largest known concentration of nesting Steller's eiders in North America.

Because Alaska-breeding Steller's eiders occur at very low densities, there is not sufficient information to estimate population size or detect population trends. The mean 1992-2006 aerial-survey generated population index[1] was 116 (n=15, standard deviation sd = 204), but the range of indices in these years ranged from 20 (calculated in a year when no birds were seen) to 785 (Larned and others 2006). The most recent index (2002-2006) was 112 (n=5, sd=98). However, aerial surveys likely undercount Steller's eiders for several reasons. An unknown number are simply missed when observers count from aircraft; this proportion varies by species and is unknown for Steller's eiders.

Additionally, because observations at Barrow indicate that many Steller's eiders vacate nesting habitat early in non-nesting years, it is possible that aerial surveys fail to detect some individuals that were present early in the season, at least in some years. Further, the concentration area at Barrow, which contains a significant proportion of Steller's eiders detected on the entire ACP in most years, may be under-sampled because: 1) the scale of the concentration is too small to be adequately represented in the sampling regime; and 2) a portion of the concentration area is excluded because the area near the Barrow airport cannot be flown due to aviation safety concerns. Due to these biases, we cannot precisely estimate Steller's eider abundance on the North Slope, but the best available information leads the Service to estimate that roughly several hundred Steller's eiders occupy the North Slope in most years. For purposes of this consultation, such as estimating incidental take, we assume that there are 500 North Slope-breeding Steller's eiders.

Population Variability

Variability in the abundance of the Alaska breeding population of Steller's eiders is not well understood. The sampling errors around our population estimates are large enough to obscure large annual population fluctuations. However, ground-based efforts in the Barrow area suggest that the local breeding populations there fluctuate dramatically (Quakenbush and others 1995). Indeed, during some years, as in 2000 and 2002, Steller's eiders completely forego nesting in this area (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm.).

[1] We present only an index (no population abundance estimate, as with spectacled eiders) because no aerial survey-ground survey correction factor has been created for Steller's eiders on the North Slope.

Table 2. Aerial population estimates for Steller's eiders, from the North Slope (Mallek and others 2006; Larned and others 2006).

Year	Population Estimate 1986 - 2005 (Mallek and others 2006)	Population Estimate 1992 - 2006 (Larned and others 2006)	Nesting Status near Barrow 1991 – 1999
1986	0	-	-
1987	0	-	-
1988	0	-	-
1989	2002	-	-
1990	534	-	-
1991	1118	-	Nesting[1]
1992	954	0	Non-nesting[1]
1993	1313	262	Nesting[1]
1994	2524	47	Non-nesting[1]
1995	931	281	Nesting[1]
1996	2543	0	Nesting[1]
1997	1295	189	Nesting[1]
1998	281	0	Non-nesting[1]
1999	1250	785	Nesting[1]
2000	563	0	Nesting[2]
2001	176	288	Non-nesting[2]
2002	0	0	Non-nesting[2]
2003	0	93	Non-nesting[2]
2004	0	48	Non-nesting[2]
2005	110	99	Non-nesting[2]
2006	96[3]	112	Nesting[2]

[1] Quakenbush and others 2001
[2] Nora Rojek, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm. November 2, 2005
[3] Ritchie and others 2006

Population Stability
The Steller's eider is a relatively long-lived species. Such species do not typically display highly variable populations. That Steller's eiders completely forego nesting in some years near Barrow is consistent with the reproductive strategy for a long-lived species (Begon and Mortimer 1986). However, mortality factors may be undermining this species' ability to maintain a stable population.

The population of Steller's eiders molting and wintering along the Alaska Peninsula appears to be declining (Flint and others 2000, Larned 2000b). From spring migration surveys in southwest Alaska, the 1992-2007 trend indicates a 2.8 percent average annual decline ($R^2 = 0.30$) in Steller's eider estimates (Larned 2007). In addition, comparison of banding data from 1975 -1981 to 1991-1997 indicates a reduction in Steller's eider survival over time (Flint and others 2000). Population models for other waterfowl applied to this species indicate that the observed reduction in annual survival over time would have a substantial negative effect on populations (Schmutz and others 1997, Flint and others 2000). If this decline is caused by something in the marine environment, it is reasonable to conclude that the Alaska breeding population and Asia breeding population are being affected similarly.

Status and Distribution
Reasons for Listing
The Alaska breeding population of Steller's eiders was listed as a threatened species on June 11, 1997 (USFWS 1997). It was listed due to (1) its recognition as a distinct vertebrate population segment, (2) a substantial decrease in the species' nesting range in Alaska, (3) a reduction in the number of Steller's eiders nesting in Alaska, and (4) the vulnerability of the remaining breeding population to extirpation (USFWS 1997).

Habitat Loss - The direct and indirect effects of future gas/oil development within the National Petroleum Reserve-Alaska, and future village expansion (e.g., at Barrow), were cited as potential threats to the Steller's eider (USFWS 1997). Within the marine distribution of Steller's eiders, perceived threats include marine transport, commercial fishing, and environmental pollutants (USFWS 1997).

Hunting - Although not cited as a cause in the decline of Steller's eiders, the take of this species by subsistence hunters was cited as a threat to the population of Steller's eiders near Barrow in the final rule (USFWS 1997). However, the gathering of subsistence harvest information similar to that collected from Native residents of the Y-K Delta has met with resistance from Native organizations on the ACP.

Predation - Increased predation by arctic foxes resulting from the concurrent crash of goose populations is cited as a possible contributing factor to the decline of the Steller's eider on the Y-K Delta (USFWS 1997). The potential for increased predation near villages resulting from the villages' associated gull and raven populations was also cited as a potential threat to this species (USFWS 1997).

Lead Poisoning - The presence of lead shot in the nesting environment on the Y-K Delta was cited as a continuing potential threat to the Steller's eider. The Service is progressing in its efforts to enforce a nationwide ban on lead shot on the ACP (USFWS 1997).

Ecosystem Change - Direct and indirect changes in the marine ecosystem caused by increasing populations of Pacific walrus (*Odobenus rosmarus*), gray whale (*Eschrichtius robustus*), and sea otter (*Enhydras lutris*), were cited as potential causes of the decline of Steller's eiders. Subsequent declines in sea otter populations (65 FR 67343) and continuing declines in Steller's eider populations suggest that otters were not responsible for a decline in eider numbers.

In addition, changes in the commercial fishing industry were also cited as perhaps causing a change in the marine ecosystem with possible effects upon eiders (USFWS 1997). However, we are unaware of any link between changes in the marine environment and contraction of the eider's breeding range in Alaska (USFWS 1997).

Range-wide Trend

Populations of Steller's eiders molting and wintering along the Alaska Peninsula have declined since the 1960s (Kertell 1991), and appear to be in continued decline (Flint and others 2000, Larned 2002). Annual spring aerial surveys provide an index of the Pacific Steller's eider population. These long term survey data indicate a 2.8 percent average annual decline ($R^2 = 0.30$; Larned 2007). In addition, comparison of banding data from 1975 -1981 to 1991-1997 indicates a reduction in Steller's eider survival over time (Flint and others 2000).

The Steller's Eider Recovery Plan (USFWS 2002) establishes criteria for reclassifying the species from threatened to endangered as follows:

> "The Alaska-breeding population will be considered for reclassification from Threatened to Endangered when:
>
> - The population has $\geq$ 20% probability of extinction in the next 100 years for 3 consecutive years; OR
> - The population has $\geq$ 20% probability of extinction in the next 100 years and is decreasing in abundance."

IUCN status: Based on the IUCN (2001), the North American breeding population of Steller's eiders belongs in the category of Endangered (EN). In the nomenclature used by IUCN, the following is the justification for this categorization: EN A1b+A2+B1b(v)c(iv)+C1 (Figure 2).

Threats Not Assessed At the Time Of Listing

Chronic Petroleum Spills - The chronic release of petroleum products near large concentrations of Steller's eiders is not a new threat as much as it is a newly realized threat. The gregarious behavior of Steller's eiders during a spill event may result in acute and/or chronic toxicity in large numbers of birds. Indeed, Larned (2000b), expressed concern for the survival and reproductive success of the large number of Steller's eiders observed in harbors.

A life-history strategy of long life and low annual reproductive effort would be expected to evolve under conditions of predictable and stable non-breeding environments (Sterns 1992). The life history strategy of the Steller's eider seems to fit this model. That is, the Steller's eider is long-lived, has low annual recruitment, and winters in apparently productive and reasonably stable near-shore marine environments. Because the Steller's eider is relatively small bodied and winters at northern latitudes, it may do so near the limits of its energetic threshold. Harlequin ducks and

long-tailed ducks exist near their energetic limit in such climates (Goudie and Ankney 1986), and the Steller's eider is intermediate in size to these two species. Therefore, environmental perturbations that reduce prey availability or increase the species energetic needs may result in harm.

Alaska harbors and bays from the eastern Aleutian Islands to the Cook Inlet shelter large numbers of wintering Steller's eiders (Larned 2000b) and some populations winter in protected bays that support heavy maritime traffic. Maritime activities in these areas likely increase the probability of exposure to contaminants, particularly petroleum-based products. Seaducks, including Steller's eiders, may be affected by harmful levels of polycyclic aromatic hydrocarbons (PAHs) at seaports near the Arctic (Miles and others 2007). Fuels and oils are toxic to Steller's eiders (Holmes and others 1978, Holmes and others 1979, McEwan and Whitehead 1980, Leighton and others 1983, Holmes 1984, Leighton 1993, Rocke and others 1984, Yamato and others 1996, Glegg and others 1999, Esler and others 2000, Trust and others 2000) and their prey (e.g., amphipods and snails; Newey and Seed 1995 as in Glegg and others 1999, Finley and others 1999). Therefore, we believe that spilled petroleum is likely to adversely affect Steller's eiders.

Figure 3. IUCN justification for the EN categorization for Steller's eiders

A. Reduction in population size based on any of the following:

1. An estimated population size reduction of $\geq$ 70% over the last three generations (for Steller's eiders, three generations equals about 25.5 years).

a. An index of abundance appropriate to the taxon.

Evidence: Larned and others (2003) reported a 61% decline over 10 years in the wintering population of Steller's eiders. Extrapolating this 10 year / 61% decline back in time would imply that the population declined by at least 70% in the past 25.5 years. We believe recent survey data suggests that this criterion for classification as endangered is satisfied.

A. Reduction in population size based on any of the following:

2. An observed, estimated, inferred or suspected population size reduction of 50% over the last three generations.

Evidence: Based on population models (USFWS, Anchorage Fish and Wildlife Field Office, unpublished data 2003), and using a beginning population of 1106 Steller's eiders (mean of past 10 years breeding surveys) and a population decline of 7.6% annually (Larned 2002), we expect an 86% decline in the next 25 years. We believe recent survey data suggests that this criterion for classification as endangered is satisfied. If current population trends hold, Steller's eiders will have exceeded the 50% loss criterion in just 10 years.

B. Geographic range in the form of either extent of occurrence or area of occupancy.

1. Extent of occurrence estimated to be less than 5000 km^2 and at least two of a-c:

b. Continuing decline, observed, inferred or projected in any of the following

i. number of mature individuals

c. Extreme fluctuations in any of the following:

ii. number of mature individuals

Evidence: Because of the large geographic extent over which this species breeds, it is unlikely that the North American Breeding population of Steller's eiders will satisfy this classification criterion unless their breeding range becomes or is determined to be restricted to the "Barrow Triangle". Ritchie and King (2002) reported that the area of the Barrow triangle is approximately 2757 km^2. We believe that available evidence suggests that the majority of Alaska breeding Steller's eiders do nest within the Barrow triangle. However, we also acknowledge occasional nesting records outside of this area.

C. Population size estimated to number fewer than 2500 mature individuals and either:

1 An estimated continuing decline of at least 20% within five years or 2 generations (17 years).
.

Evidence: The current population estimate for Alaska breeding Steller's eiders (1106) is an average of counts from the last 10 years of surveys of the Arctic Coastal Plain during the nesting season. In the past 10 years there has been a 55% decline in wintering Steller's eiders (Larned 2002). We believe recent survey data suggests that this criterion for classification as endangered is satisfied.

Seafood Processor Organic Waste - Discharge from seafood processors may affect the water column, sea floor, or shore directly or indirectly through burial and smothering, putrification and decay, foul smells, surface scum, deoxygenation, nutrient loading, and alteration of habitats, aquatic communities and food webs. Although wave action and current in shallow, near shore habitat may keep particles suspended and prevent waste deposition, contaminants, parasites, viruses, and other pathogens may be present and/or concentrated in these wastes and may bio-accumulate in prey items consumed by eiders. As stated earlier, during molt, Steller's eiders consume blue mussel (*Mytilus edulis*), other bivalves (e.g. *Macoma balthca*), and amphipods (a small crustacean) all of which are filter feeders that would be exposed to any seafood processing waste suspended in the water column.

Increased Risk of Lead Poisoning – Because the Steller's eider continues feeding near the nesting site before and during incubation (D. Solovieva, Zoological Institute, Russian Academy of Science, pers. comm.), it may be subjected to an increased risk of exposure to lead shot over other waterfowl species that largely forego feeding at this time. For comparison, spectacled eiders do not seem to engage in feeding activities as much as Steller's eiders once breeding has commenced, however, spectacled eiders have been observed to have higher rates of exposure to lead than any species sampled on the Y-K Delta (Flint and others 1997). The proportion of spectacled eiders on the Y-K Delta's lower Kashunuk River drainage that contained lead shot in their gizzards was high (11.6%, n = 112) compared to other waterfowl in the lower 48 states from 1938-1954 (8.7%, n = 5,088) and from 1977-1979 (8.0%, n = 12,880). Blood analyses of spectacled eiders indicated elevated levels of lead in 13% of pre-nesting females, 25.3% of females during hatch, and 35.8% of females during brood rearing. Nine of 43 spectacled eider broods (20.9%) contained one or more ducklings exposed to lead by 30 days after hatch (Flint and others 1997). Thus, if spectacled eiders have experienced population level effects on the Y-K Delta due to lead poisoning, then Steller's eiders may have experienced similar, or even greater lead-induced effects.

Collisions with Manmade Structures - Steller's eiders have been documented to collide with wires, communication towers, boats, and other structures (Table 3). During a 4-year period near Barrow, at least one adult Steller's eider female died from striking a wire and another adult

Steller's eider was suspected to have died from striking a radio tower (Quakenbush and others 1995). In addition, large numbers of Steller's eiders are known to have collided with communication towers in the wintering area along the Alaska Peninsula.

"Bird storms" are a well-documented occurrence within the commercial crab fishery fleet, a result of their use of bright lights during inclement nighttime weather. In December 1980 or 1981, "at least 150" dead eiders (species unknown) were reported to be on the deck of the M/V *Northern Endeavor* the morning after the vessel, with crab lights illuminated, anchored on the Bering Sea side of False Pass (USFWS, Anchorage Fish and Wildlife Field Office, unpublished data). Based on the time of year and location, we assume these to be Steller's eiders. Two Steller's eiders died after striking the crab lights of the P/V *Wolstad* on February 15, 1994; no additional information was provided with this report. One male Steller's eider landed on the deck of the *Elizabeth F* on February 14, 1997, at 11:36 pm; another male Steller's eider struck the vessel and died the following day at 5:00 pm. Three spectacled eiders died after striking a Coast Guard cutter conducting sampling in the Bering Sea in March 2001.

Between September 26, 2001, and October 29, 2001, the Northstar facility on the North Slope of Alaska experienced 18 sea duck mortalities and one sea duck injury due to collisions with facility infrastructure. Sixteen dead eiders of unknown species were found on October 28, 2001, on the Endicott spur-drilling island. The actual number of birds injured and killed through collisions with manmade structures is likely higher; many injured and killed birds are believed to go undetected, unreported, or become scavenged before humans detect them. Preliminary data from a scavenging trial in Cold Bay, Alaska suggests that carcass removal rate from scavengers could be as high as 50% per 24 hours (USFWS, Anchorage Fish and Wildlife Field Office, Unpublished data, 2007).

Table 3. Summary of known collisions of eiders with structures and vessels (USFWS, Anchorage Fish and Wildlife Field Office, Unpublished data, 2007).

SEASON/ YEAR	TYPE	NUMBER OF BIRDS DEAD OR INJURED	LOCATION	COMMENTS
December 1980	Collision with vessel M/V Northern Endeavor	At least 150 Steller's eiders	False Pass (Bering Sea side)	Crab lights illuminated, stormy night
February, 1991	Collision with vessel P/V Wolstad (State Protection Patrol Vessel	Two Steller's eiders	Unknown	Crab lights illuminated
February, 1997	Collision with vessel Elizabeth F	Two Steller's eiders	Unknown	One bird struck vessel on Feb. 14 and the second struck the vessel on Feb. 15.
April, 2003	Collision with power line	One Steller's eider	Bristol Bay Coast, near the intersection of the road to lake	Rainy with low ceiling. Biologist in the area believe this happens much more

			Camp and the road to Rapids Camp	than is seen or reported.
September /October, 2001	Collision with oil rigs	19 Sea Ducks (king and common eiders and long-tailed ducks) and 16 eiders (species unknown)	North Slope	At Endicott spur drilling island, foxes had already been on the eiders (approximately 24 hours post-collision)
Pre 1974 and 1983	Collision with Grant Point DEW site tower	90 and 38 (respectively) Steller's eiders	Izembek Lagoon, Alaska Peninsula	Strikes occurred during low viability events and storms, primarily in winter. More individual strike of Steller's eiders anecdotally reported from this site.
Unknown	Collision with vessel	Many Steller's eiders	Nelson Lagoon, Alaska Peninsula	Villager reported to AFWFO personnel that he recalls sweeping Steller's eiders off the deck of his fishing boat.
Unknown	Collision with power line	150 Steller's eiders	Pilot Point, Alaska Peninsula	Pilot Point resident, responsible for erecting power line, recalls that shortly after he put it up about 150 Steller's eiders flew into it and died. The power line runs approximately 600 feet along the shoreline.
October, 2002	Collision with vessel F/V Sea Storm	6 sea birds, 2 positively identified as spectacled eiders	Eastern Bering Sea: 62 59.741N 172 30.366W	Stormy weather conditions, blowing snow and whiteout conditions. Wind was 25-30 knots. AFWFO personnel skinned one of the recovered carcasses and noted massive internal injuries throughout neck and torso. Leg and wing broken.

Stochastic Events - The small population size of the Steller's eiders on the Y-K Delta and the ACP may put them at risk of the deleterious effects of demographic and environmental stochasticity. Demographic stochasticity refers to random events that affect the survival and reproduction of individuals (e.g., shifts in sex ratios, striking wires, being shot, oil/fuel spills; Goodman 1987). Environmental stochasticity is due to random, or at least unpredictable, changes in factors such as weather, food supply, and populations of predators (Shaffer 1987). As discussed by Gilpen (1987), small populations will have difficulty surviving the combined effects of demographic and environmental stochasticity. The risk of local extirpation is probably highest for Steller's eiders nesting on the Y-K Delta due to the low number of birds that breed there.

The world population of Steller's eiders is probably not at high risk of extinction due to environmental stochasticity alone. Local groups of wintering birds, however, may be vulnerable to starvation due to stochastic events (e.g., unusually heavy ice-cover i n their feeding habitats).

Allee Effect - "Allee effect" refers to the destabilizing tendency associated with inverse density-dependence as it relates to population size and birth rate. One form of this occurs when the ability to find a mate is diminished (Begon and Mortimer 1986). For example, if the sex ratio of a population significantly shifts from a normal condition for a species, the ability of adults to produce young may diminish. For the Steller's eider, the higher mortality rate of males (Flint and others 2000) may result in a lower number of pairs returning to nest (i.e., adult females unable to find a mate are effectively removed from the breeding population).

The annual survival rate for Steller's eiders molting and wintering in Alaska is estimated to be 0.899 ± 0.032 for females and 0.765 ± 0.044 for males (Flint and others 2000). At this estimated annual survival rate, about 39 percent of the females of a cohort will reach 10 years of age, while only about 7% of the males will survive for 10 years.

The observed difference in annual survival between sexes may be manifested in a skewed sex ratio. Female Steller's eiders notably out-numbered male eiders on winter surveys of three areas during January, February, and March (Lanctot and King 2000a). In waters off Unalaska and False Pass, female Steller's eiders comprised 63 and 69 percent, respectively, of Steller's eiders observed (N = 2,053 and 114 respectively) (John Burns, U.S. Army Corp of Engineers, pers. comm.; Lanctot and King 2000b). At Akutan Harbor, the combined female to male sex ratio for all surveys was approximately 3 to 1 (n = 590; Lanctot and King 2000b). Band recoveries reported by Dau and others (2000) also suggest a shift in Steller's eider sex ratios through time (Table 4), however, in photographs taken of over 13,000 Steller's eiders at Izembek Lagoon in January, 2002, 61% were classified as males (Chris Dau, US Fish and Wildlife Service, Migratory Bird Management Division, pers. comm.). Furthermore, females represented only 38% and 21% of Steller's eiders captured at Nelson Lagoon over a 3-year period (Flint and others 2000). This suggests that spatial segregation among sexes, during winter, may lead to assumptions of skewed sex ratio depending on areas surveyed.

Observations of a skewed sex ratio in Steller's eiders are inconsistent across the range of the species (Table 5). However, if Dau's time series data from Izembek Lagoon are correct, then the skew towards females are in stark contrast to that which is typical for many other Anatinae, where an excess of males is the norm (Johnsgard 1994). If an excess of females does exists throughout the species range (as opposed to just at some locations) then the biased sex ratio may have

implications regarding reproductive potential. Although our limited observations and Dau and others's (2000) banding data suggest that a biased sex ratio exists for this species, we do not know if this biased sex ratio exists range wide, nor do we know what may be causing it.

Table 4. Shifting sex ratio of Steller's eiders at sample area No. 1 in Izembek Lagoon. Data used are from Dau and others (2000).

Years	Female	Male	Sample Size	Percent Male
1961-1966	271	566	837	68%
1968	60	85	145	59%
1974-1981	3576	2197	5773	38%
1991-1997	5971	708	6779	11%

Table 5. Observed sex ratios of Steller's eiders in their fall and winter range.

Location	n	Female	Male	Year
Unalaska	2,053	63	37	2000
False Pass	114	69	31	2000
Akutan	590	67	33	2000
Izembek	52 flocks	39	61	2002
Nelson Lagoon	11,961	38	62	1995-1997
Nelson Lagoon	14,940	21	79	1995-1997

ENVIRONMENTAL BASELINE

The "environmental baseline" section summarizes the effects of past and present human and natural phenomena on the current status of threatened and endangered species and their habitat in the action area. The information presented here establishes the baseline condition for natural resources, human usage, and species usage in the action area that will be used as a point of comparison for evaluating the effects of the proposed action.

Assumptions Used in Analysis of Past, Present and Future Effects

Proportion of Wintering Steller's Eiders from Listed Population

We calculate that 0.7% of all Steller's eiders observed on the wintering grounds (including Goodnews Bay) in Alaska in 2007 are from the listed Alaska breeding population (Table 2). This estimate is derived by taking the recent North Slope breeding bird estimate, adding 1 for the Y-K Delta population, and then dividing by the most recent population estimate of wintering Steller's eiders (79,022; Larned 2005). Thus, 501 ÷ 79,022 = (0.006956 * 100) = 0.7%.

Life of the Project

The expected design life of the facility is 15 to 20 years (pers. com. M. Bird, RVCF). We will assume the life of the project is 20 years.

Determination of Action Area

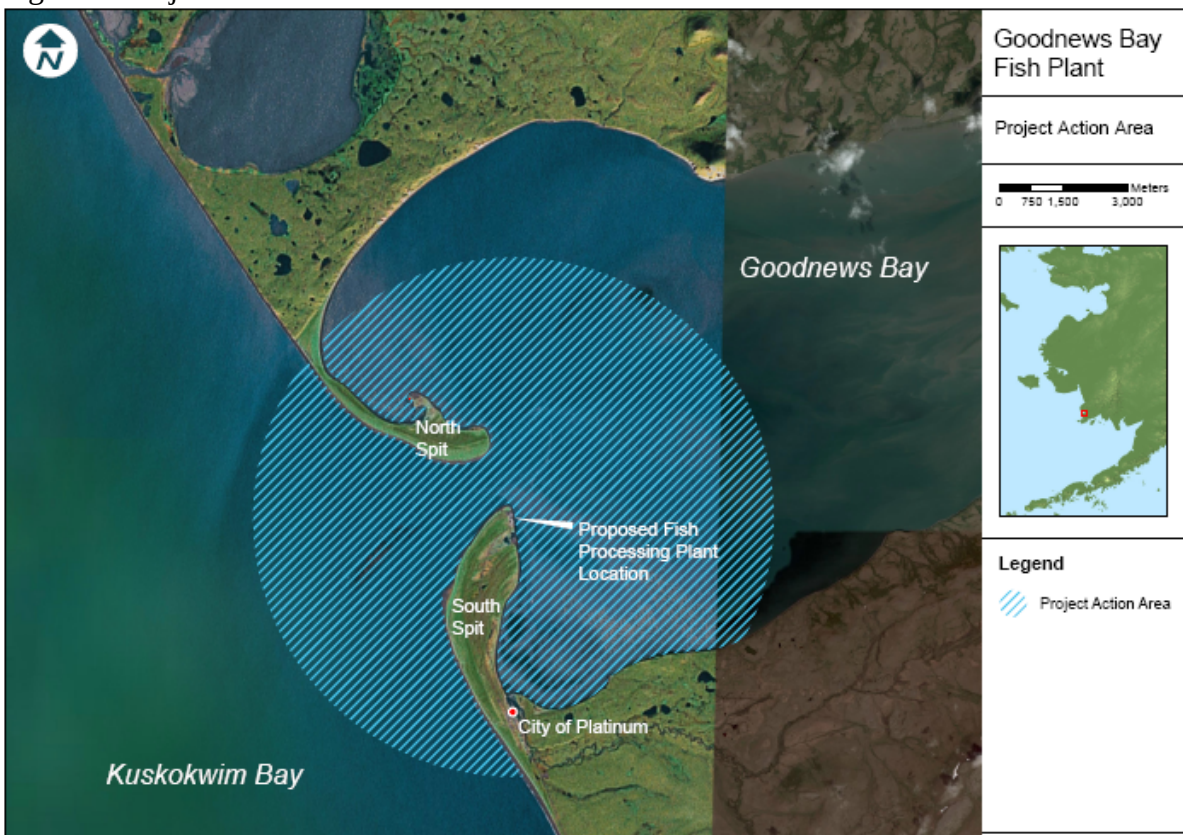
The action area includes all areas affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. Project components that pose potential impacts to Steller's eiders include construction noise, vessel operation, effluent discharge, and exposure to petroleum compounds. These are expected from increased activity levels over the baseline conditions. The Project Area for this biological opinion is an approximately 3 nautical mile radius around the proposed fish plant as this area encompasses water bodies that could be impacted from construction activity, vessel traffic, effluent discharge and the distance a potential spill could travel on a flood tide from the facility (Figure 3).

Status of the Species within the Action Area

Steller's eiders

Annual spring aerial surveys in southwest Alaska have been conducted by the USFWS since 1992 to assess and monitor populations of Steller's eiders and other migratory waterfowl. Goodnews Bay is included in these aerial survey routes and data was obtained on Steller's eider observations through out this time period, most near the mouth of the bay. Approximately 2,317 Steller's eiders were documented in Goodnews Bay on April 19, 2000 (Larned 2000). A survey on April 24, 2002 documented 1,635 Steller's eiders in Goodnews Bay (Larned 2002). Aerial surveys conducted 27 April through 2 May 2006 recorded 1,133 Steller's eiders in the coastal habitat near the mouth of Goodnews Bay (Dau and Malleck 2006). Steller's eider spring migration surveys recorded 779 Steller's eiders at Goodnews Bay in April 2007 (Larned 2007).

Figure 3. Project Action Area



Recent summer survey data suggests that the nearshore areas of North and South Spit provide a molting area for non-breeding and possibly failed breeding Steller's eiders. Surveys conducted by the University of Alaska Museum and Bureau of Land Management in July 2004 documented at least 100 molting Steller's eiders in Goodnews Bay (Shaw and others 2004).

Additional surveys to index Steller's eider distribution and relative abundance were conducted in Goodnews Bay by HDR Alaska, Inc (2007b) with assistance from CVRF and the USFWS in June and July 2007. The results from these surveys are available in a report prepared for Paug-Vik Services, LLC. A total of 181 and 89 molting Steller's eiders were observed in Goodnews Bay during June and July 2007, respectively (Figures 4 & 5). The majority of the eiders observed in June were subadults and adult males and the majority of eiders observed in July were adult females. All eiders observed during the surveys were in various stages of molt. Eiders were consistently observed using nearshore habitat (areas within 100 m of the shoreline), and only two flocks were observed in open water habitat (greater than 100 m from shore).

Eiders were observed resting and preening onshore on the north end of South Spit and on the inside of South Spit. Approximately 41 Steller's eiders were observed on shore during the June surveys and 37 were observed on shore during the July surveys. Eiders resting on shore were at least 120 meters from the main processing plant and dock. The main road is located approximately 300 meters from areas where eiders were observed resting onshore. The locals drive ORV's along the shoreline of the spit on a regular basis. The eiders would respond to

Figure 4. Steller's Eider Molting Survey, June 2007.

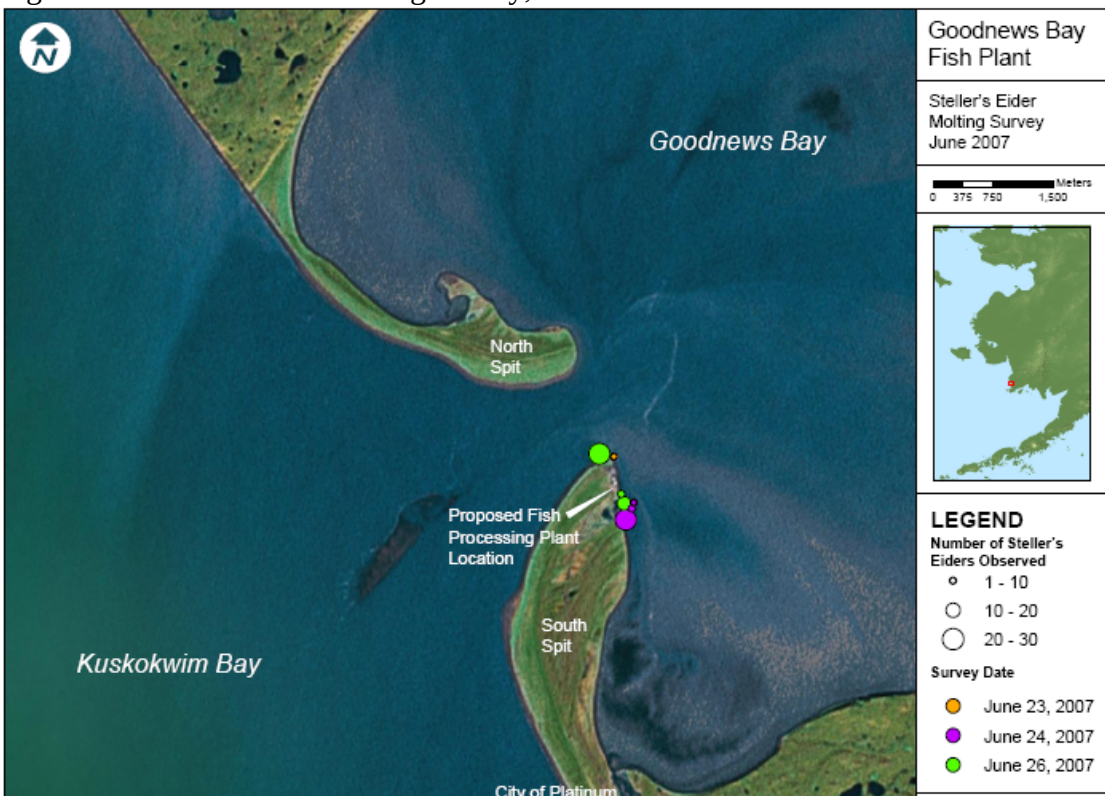
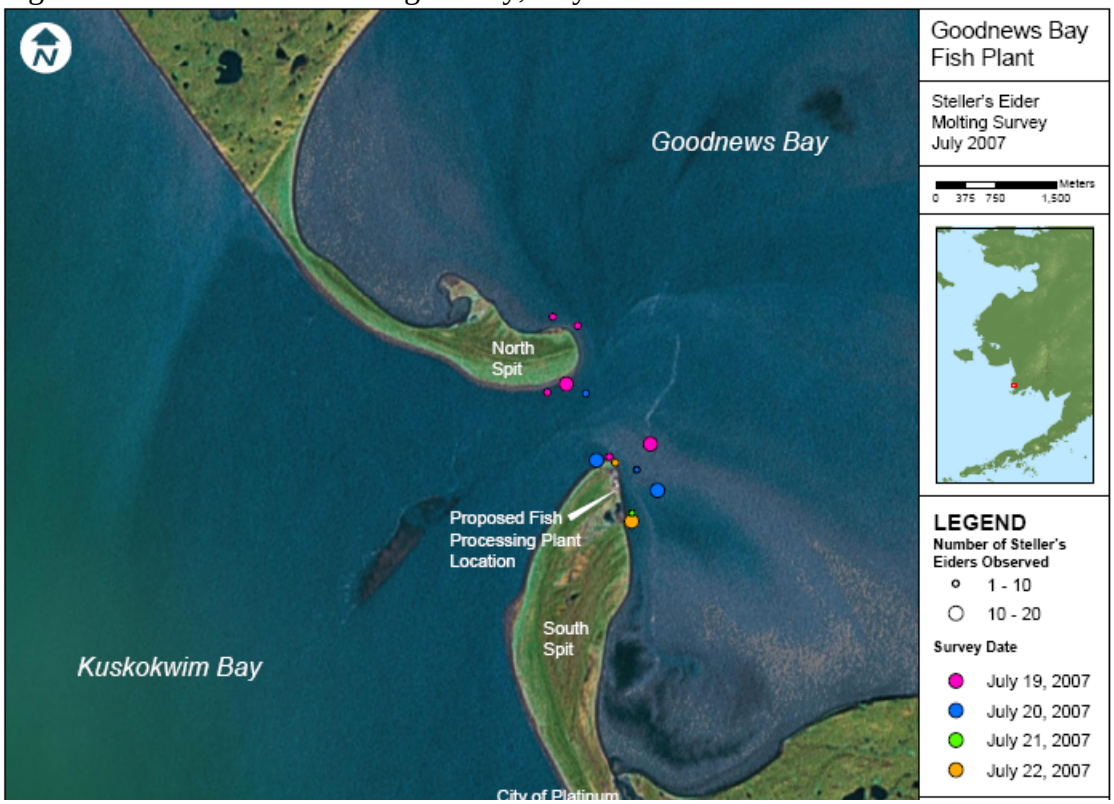


Figure 5. Steller's Eider Molting Survey, July 2007.



observers or locals on ORV's by walking or flying into the marine water and swimming away from the shore. As the disturbance passed, the eiders would swim back and haul out on the shore (HDR Alaska 2007b). The specific location of the Steller's eider flocks appeared to change daily, most likely to take advantage of foraging opportunities and protection from wind and waves.

Vessel based surveys conducted by the Alaska Department of Fish and Game on 11 June 2007 documented between 95 and 130 Steller's eiders in Goodnews Bay on the inside of North and South Spits. The majority of the eiders observed during this survey were molting. The eiders were observed in nearshore habitat (Rosenberg 2007).

Factors Affecting Species' Environment in the Action Area

Gravel Storage/Transport Operations
The Platinum South Spit currently supports the Knik Construction commercial gravel storage and transport facility that barges gravel from Platinum to project sites throughout southwest Alaska. The gravel facility operates during ice-free times of the year. Gravel is loaded onto an existing barge loading dock and gravel conveyor system where it is barged to various locations in southwest Alaska. The quantity and timing of barges varies depending on the number of projects occurring in southwest Alaska that require the use of gravel. During busy summer months, barges may pick up gravel several times a week. Active loading of the barges usually takes a couple hours and the barge will often overnight at the loading dock before heading out with the gravel shipment. The spit area historically supported a barge-landing site for trans-shipment of fuel to support the Platinum mine. Up until the early 1950s when above ground fuel storage tanks were constructed on the spit, fuel was reportedly transported in 55-gallon drums.

Large and Small Vessel Traffic
Large vessels/barges currently travel into Goodnews Bay three to four times per week during ice-free months to bring in supplies and equipment to Knik Construction, the City of Platinum, and the City of Goodnews Bay. While in transit, vessels displace Steller's eiders and other sea ducks within their path and wake. It is common for vessels to anchor in the Bay's protective waters during storms and other periods of bad weather.

Recreational skiffs and small fishing boats regularly travel between the City of Goodnews Bay and the City of Platinum. Goodnews Bay and Platinum residents transit the Bay along the main Goodnews Bay channel for recreational and subsistence purposes. Skiffs travel and tend salmon gillnets between the mouth of the Bay and head of the Bay on a daily basis (HDR Alaska 2007b).

Petroleum Spills
Petroleum spills of various types have been associated with the operation of vessels in and around Goodnews Bay. Approximately 15 spills were reported to have occurred in or near Goodnews Bay between 1997 and 2007, the largest being approximately 200 gallons. Diesel fuel appears to be the most common product spilled, however, aviation fuel was also reported. Operator error and equipment failure accounted for the majority of the spills (ADEC 2007).

Incidental Take Of Steller's Eiders Permitted For Other Federal Actions

Harbor Construction and Improvements - Construction of new, or improvements to existing, harbor facilities within eider wintering habitat are associated with an increase in acute and chronic exposure to spilled petroleum compounds, and with an increase in collision potential for eiders with associated infrastructure. The Service has consulted on four harbor construction or improvement projects since 2000. Over the 50-year life of these harbor projects, we estimate lethal and sub-lethal take of 29 listed Steller's eiders. We estimate take in the form of displacement of one listed Steller's eider. Annual lethal take of listed birds is estimated to be 0.58 individuals (Table 8).

Table 8. Take of Steller's eiders anticipated from actions for which formal Section 7 consultation has been completed. (*Includes all wintering birds.)

ACTION	YEAR	PROJECT LIFE	TAKE TYPE	TAKE LISTED	TOTAL TAKE*
False Pass Harbor	2000	50	Petroleum-sublethal	4	146
NPDES-GP	2000	5	Strikes-lethal	1	33
Chignik Lagoon Tank Farm	2001	40	Petroleum-sublethal	8	264
Sandpoint Harbor	2002	50	Strikes-lethal	1	30
Sandpoint Harbor	2002	50	Petroleum-sublethal	11	367
Sandpoint Harbor	2002	50	Displacement	1	30
Chignik Dock	2002	35	Petroleum-sublethal	4	150
Chignik Tank Farm	2002	30	Petroleum	5	170
Fairweather Exploration	2003	1 year	Disturbance	66	1570
Nelson Lagoon Tank Farm	2003	40	Petroleum - sublethal	20	476
Nelson Lagoon Tank Farm	2003	40	Strikes	1	24
Spring Subsistence	2003	annually	Lethal	7	17
Akutan Airport Hovercraft	2007	20 years	Disturbance	20	1,000
Research		annually	Lethal	2	2

Commercial Fishing Industry - Within the commercial fishing industry, seafood processors operating under individual permits are likely to have an adverse effect on the Steller's eider. Anticipated past and present impacts include: 1) the degradation of habitat due to the release of organic waste into near shore marine waters; 2) the addition of large quantities of organic material to bays causing ecological changes that we believe are to the detriment of Steller's eiders; 3) the

supplying of fuel to fishing vessels, and associated accidental releases of fuels into the marine environment; and 4) the processor-induced concentration of vessels near flocks of eiders, such that the birds are placed at heightened risk of coming into contact with environmental pollutants.

Information from studies currently be conducted through the Alaska Sealife Center (USFWS 2008, in progress) suggests that Steller's eiders, other waterfowl, and seabirds may be attracted to the discharge offal from seafood processors, which may affect the species through exposure to disease pathogens. Data is not yet available to indicate whether there are direct effects to the species. If Steller's eiders do congregate near processor waste outfalls, it may result in an increased risk of contact with spilled petroleum, solvents, as well as to pathogens and parasites not normally encountered by the species.

According to the EPA, discharge from seafood processors may affect the water column, sea floor, or shore directly or indirectly through burial and smothering, putrification and decay, deoxygenation, nutrient loading and eutrophication, and alteration of habitats, aquatic communities and food webs. In addition, the growth of noxious or toxic phytoplankton or bacteria may be promoted by the discharges. As such, foraging areas of Steller's eider may be degraded by the temporary or long-term deposition of organic waste from seafood processors and the birds may be subsequently harmed.

In addition, vessels associated with the commercial fishing industry are occasionally struck by flying Steller's eiders. Such vessel strikes often result in bird deaths. The Service has consulted on one Statewide General Permit and four individual National Pollutant Discharge Elimination System permits for seafood processing since 2000. We estimated lethal take of 1 listed Steller's eider due to strikes with infrastructure, and take in the form of displacement of 25 listed Steller's eiders. Annual lethal take of listed birds is estimated to be 0.2 individuals for the 5-year life of the permit (Table 8).

Bulk Fuel Facilities - While upgrades to bulk fuel facilities greatly reduce the likelihood of catastrophic spills and chronic contamination originating at bulk fuel storage facilities, Steller's eiders occupying habitat in the vicinity of these facilities are at continued risk of acute and chronic exposure to spilled petroleum compounds. Facilities with associated marine fueling stations pose a greater risk of discharging oil into marine waters. We estimate take in the form of harm of 33 listed Steller's eiders, and lethal take of one listed Steller's eider as a result of three bulk fuel facility upgrades and expansions consulted on since 2001. Yearly lethal take of listed birds is estimated to be 0.85 birds for the 40-year life of these projects (Table 8).

Spring Subsistence Waterfowl Harvest - In 2002, the Service proposed to open a spring/summer harvest of migratory birds, which has been allowed under the amended treaty protocols with Canada and the United Mexican States. The harvest would occur within the constraints imposed by the treaties and to the extent possible, legalize the customary and traditional subsistence harvest practices of Alaskan indigenous inhabitants. The term "indigenous" has been interpreted to mean all permanent rural inhabitants regardless of race. Subsistence harvest areas have been defined to include most village areas within the Alaska Peninsula, Kodiak Archipelago, the Aleutian Islands, and areas north and west of the Alaska Range. Accidental take of adult breeding and non-breeding Steller's eiders by subsistence hunters is anticipated as a result of this action.

Approximately seven listed Steller's eiders are anticipated to be taken annually as a result of the legalization of a spring subsistence migratory bird harvest (Table 8).

Research - We estimate that two listed Steller's eiders will be lethally taken each year as a result of research activities (Table 8).

Total lethal take resulting from all these activities is estimated to be approximately 10 listed Steller's eiders per year When this additional level of take is incorporated into a population model in an additive fashion above estimated annual decline range wide, functional extinction (125 birds) is reached by year 30, approximately 5 years prior to that predicted by the estimated annual decline alone (USFWS 2006).

EFFECTS OF THE ACTION

"Effects of the action" refers to the direct and indirect effects of the action on the species or its critical habitat. The effects of the action will be evaluated together with the effects of other activities that are interrelated or interdependent with the action. These effects will then be added to the environmental baseline in determining the proposed action's effects upon the species or its critical habitat (50 CFR Part 402.02). Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.

Factors To Be Considered

The probability of Steller's eiders being taken or harmed as a result of the construction and operation of the Goodnews Bay Fish Processing Facility is a function of many factors, including: 1) temporal and spatial overlap of their distributions within the area affected by disturbances associated with facility construction and operation; 2) the nature and duration of effects; and 3) the frequency, intensity, and severity of disturbances.

Temporal and Spatial Overlap

As many as 181 Steller's eiders molt and forage within the action area of the proposed project during the months of June and July (HDR Alaska, Inc. 2007b; Shaw 2004). Several hundred to over 1,000 Steller's eiders occur in the action area during spring migration (Larned 2007; Dau and Mallek 2006). Molting periods often extend throughout the summer and well into September; however, no data could be found regarding Steller's eiders' use of molting habitats in the vicinity of Goodnews Bay for the months of August and September. No designated critical habitat is located within the action area of the proposed project.

Within the action area, effects (e.g. disturbance, degradation of foraging habitat) resulting from the proposed activities may be localized, or may be diffuse, resulting from increased vessel traffic or the dispersal of oil within the marine environment.

During spring migration (April and May) and during molt (June and July), Steller's eiders may occupy the action area. Therefore, Steller's eiders may be present in the action area when construction of the proposed facility occurs. Once completed, the salmon processing facility will operate while Steller's eiders are present. Yearly start-up of the plant will occur in May and the operation of the salmon processing facility will occur 24 hours a day from June 15 through August 30.

Nature and Duration of Effects

Potential direct and indirect effects of the proposed action considered in this Biological Opinion include: displacement from foraging and resting habitat through disturbance, degradation of foraging habitat and reduced survivorship due to exposure to petroleum compounds and seafood waste, and injury or mortality resulting from collisions with vessels or infrastructure associated with the facility.

<u>Collisions</u>

Steller's eiders have been documented to collide with guy wires, communication towers, boats, and other structures. Eiders have been found dead from striking lights on fishing vessels at night or during adverse weather conditions. Many birds, including eiders, are attracted to bright lights

during inclement nighttime weather. Sea ducks are especially vulnerable to collisions with vessels, primarily because they tend to fly low over the water (Johnson and Richardson 1982). Most collisions occur on winter range during hours of darkness, but collisions can occur when visibility is restricted due to rain or fog (USFWS 2003).

No new guy wires or towers are proposed at the salmon processing facility. Power lines within the facility will be buried or laid on the ground to prevent effects on birds. Light radiated upward and outward from the structure could disorient flocks of eiders and other birds at night or during inclement weather when the moon is obscured. To minimize collisions of Steller's eiders, exterior lights at the proposed facility will be shielded, such that beams are directed downwards or other modifications as recommended by the USFWS.

Large fishing vessels normally operate beacons or strobes to reduce collisions with other vessels. The proposed processing plant is expected to have vessel traffic that consists mainly of small fishing skiffs, two tenders, and an occasional barge. Major vessel traffic will be located in the middle of Goodnews Bay to avoid the shallow shoals in the nearshore areas. Vessels will be traveling at less than 1-knot when they enter Goodnews Bay. Since most Steller's eiders were observed in nearshore habitat within 100 meters of the shoreline, Steller's eider are unlikely to collide with tenders or barges as they travel through the main channel of the Bay and dock at the processing facility barge-ramp. Additionally, the long daylight hours during the plant operation period will further reduce the likelihood of eiders colliding with vessels in Goodnews Bay.

Disturbance During Construction

Steller's eiders may be present in Goodnews Bay during construction activities. During the construction phase, in-water activities will be limited to the operation of a landing craft to place the marine portion of the outfall line on the west shore of the spit into the Kuskokwim Bay at a depth of 12 meters (40 ft). In addition, a temporary barge ramp will be anchored on the east shoreline of South Spit. No pile driving, dredging or removal of marine habitat would occur. The duration of in-water work is anticipated to be two days.

Crews will be operating land-based construction equipment, and will be working on the beaches where the proposed barge ramp will be anchored and where the proposed offal outfall will be constructed. Combined, these activities will cause a single-season increase in noise in the vicinity of molting Steller's eiders. Noise levels from the existing gravel operations are approximately 70 to 80 decibels during the 12 hour work day. Steller's eiders were observed resting within several hundred feet of the existing gravel operations during the June/July 2007 surveys. Construction noise from the fish plant construction activities will vary from 40 to 80 decibels depending on the type of equipment being used. Noise from the construction of the seafood processing plant is not anticipated to have an additive effect on Steller's eiders.

Disturbance During Operation

The main area of processing activity will be concentrated near the processing plant and dock. Eiders were observed resting and preening onshore on the north end of South Spit and on the inside of South Spit approximately 122 to 152 meters (400 to 500 ft) away from the processing plant and dock. Human presence, traffic, and other activities at the proposed facility can have an overall adverse effect on the normal behavior and activity of the Steller's eider during their molting period.

During full production at the proposed processing plant, some noise will be generated from vehicles, trucks, cranes, and other equipment including electrical generation, blast freezer compressors, and forklifts. The maximum noise level generated by the plant operation is estimated to be 80 decibels. However, noise generated by the proposed facility is anticipated to be minimal compared to the baseline noise in the vicinity from gravel operations and other ambient sources of noise.

Response to noise and disturbance is considered a nonlethal stimulis that is simalar to antipredator response (Frid and Dill 2002). Prey species may respond to threatening stimuli, such as loud noises and rapidly approaching objects, similar to their evolutionary response to predators. Although the corresponding flight response or increased vigilance response is non-lethal, a tradeoff between risk avoidance and energy conservation occurs. This tradeoff could lead to reduced survival and reproduction (Gill and Sutherland 2000, Frid and Dill 2002). Steller's eiders may habituate to the increased noise from vessel traffic operations, but intuitively it is clear that unavoidable disturbances will occur on a regular basis for short periods of time each day.

Hydrocarbon Contamination

Most oils spills in Alaska are caused by operator error or equipment failure and associated with fueling facilities and fuel transfer operations (Day and Pritchard 2000). The additional vessel traffic in Goodnews Bay may increase the risk of operator error and equipment failure in the vicinity of molting and migrating Steller's eiders. Spills associated with the salmon processing plant operations could occur during bulk fuel delivery, which will occur twice per season, and collisions between skiffs or barges, which could result in a direct loss of Steller's eiders in the project area through oiling.

A bulk storage fuel tank facility will be located approximately 76 meters (250 ft) west from the eastern shoreline of South Spit. The storage capacity of the double-walled fuel tank is 420,000 gallons, and it will be refueled prior to the start of the fishing season (mid-May). The tank will again be filled at the end of the season in late summer. During the off-season, a local resident at Platinum will be hired to perform daily security and leak checks on the proposed facilities.

A flood level study was conducted to determine the 100-year flood elevation at the site. The U.S. Army Corps of Engineers (COE) estimated 100-year flood elevation in Platinum is 3.6 meters (11.76 ft) above estimated mean sea level (Polarconsult, 2007). The tertiary containment dike for the bulk fuel facility will be at least two feet above this elevation to provide protection against damage due to flooding.

Molting eiders are particularly susceptible to oiling while congregating in nearshore marine waters. Degrees of effects to eiders would depend on many factors including type of fuel spilled, size of the spill, location of the spill, wind speed and direction at the time of the spill, and response time of containment operations. Direct oiling of eiders would likely result in loss of feather insulation and acute and chronic toxicity from ingestion and absorption. According to Trust et al. (2000), sea ducks are vulnerable to the potential deleterious effects of oil exposure at least 9 years following a spill.

Although oil spills may have the greatest potential effect on Steller's eiders in the project area, the risk of oil spill incidents involving the release of oil and fuel from vessels and the fuel tank facility is anticipated to be small. No unauthorized discharges from vessels and the fuel tank will be allowed. Therefore, any effects would be due to accidental discharges such as oil spill during a fuel transfer. To prevent these accidental discharges, an EPA Spill Prevention Control and Countermeasures (SPCC) plan will be implemented.

The theoretical distance an unattended fuel spill would travel from the Goodnews Bay fish processing plant dock was estimated following the formula provided by the Service: **Dnm=(th(Cnm/h ± (Wnm/h*0.03)).** Where **Dnm**, the linear distance of the spill trajectory (in nautical miles), equals **th**, the duration of oil movement (assumed to be 4 hours) multiplied by the velocity of the oil (the velocity of the current **(Cnm/h)** plus/minus the velocity of the wind **(Wnm/h)** pushing the oil at the surface (assumed to be **3%** of the wind speed). (HDR Alaska, Inc. 2007a).

The tidal current velocity measured at three transects of the alongshore channel of the Smalls River proximal to the proposed temporary fish plant dock averages 1.06 knots through the ebb tide cycle and 0.4287 with the flood tide. There is a greater volume of water flowing out of Goodnews Bay due to the tributaries that empty into it, therefore, the ebb and flood tide data should be looked at separately. (HDR Alaska, Inc. 2007a).

Tidal directions run parallel to the roughly north-south shoreline of the spit where the temporary dock is proposed to be located. Ebb tide travels north (~ 340°) approximately 0.54 nm at which point the tidal direction changes to the southwest (~ 235°) and out of the mouth of Goodnews Bay. The flood tide tracks to the southeast (~151°) at the proposed dock site, which is nearly perpendicular to the preponderance of tidal flow entering Goodnews Bay (Knudsen and Symmes 2007).

The average wind speed at Platinum, AK for the months of fish plant operation is 9.8 knots (www.city-data.com). Therefore, the theoretical linear distance oil may move in an ebb tide cycle, when the wind contributes a maximum additive influence, is 5.4 nm and 3.828 nm when it blows opposite (HDR Alaska, Inc. 2007a). The theoretical linear distance oil may move in a flood tide cycle is 2.89 nm when the wind contributes a maximum additive influence and 0.538 nm with an opposing wind (HDR Alaska, Inc. 2007a). Assumptions of this model include the constant direction of travel and angle to the wind, and constant tidal flow (Knudsen and Symmes, 2007).

Seafood Waste

In compliance with provisions of the Clean Water Act (33 U.S.C.A. § 1251) CVRF anticipates making an application to the United States Environmental Protection Agency (USEPA) and Alaska Department of Environmental Conservation (ADEC) for an authorization to discharge under the national Pollutant Discharge Elimination System (NPDES) general permit for seafood processors in Alaska. Process waste will be ground per the permit requirements and discharged via a permanent process waste outfall line on the west side of the spit into Kuskokwim Bay. To comply with available USEPA NPDES rules, fish waste will be ground to one-half inch or smaller in any dimension prior to discharge. The heavy-wall, steel pipe outfall line will be buried through the tidal zone. Below the tidal zone, the outfall line will rest directly on the seabed. The outfall line will extend approximately 91 meters (300 ft) beyond the mean lower low water

(MLLW) line into waters approximately 12 meters (40 ft) deep at MLLW. The outfall line will be designed to extend beyond an existing back-eddy current located at the north end of South Spit. The marine portion of the outfall may have anchors along its length to prevent the pipe from moving in the strong tidal currents at the discharge location. The terminus of the outfall will also be anchored to prevent undesired movement in the currents.

Approximately 3.8 to 5.7 liters (one to one and a half gallons) of water will be used to process each gross pound of salmon, resulting in about 15 to 23 liters (four to six gallons) of water per pound of fish offal in the discharge. Over the season, an average of 4,418 kg (9,740 pounds) of fish offal entrained in 143,800 liters (38,000 gal) to 223,300 liters (59,000 gal) of water will be discharged daily through the outfall line and into Kuskokwim Bay. Process waste may be discharged continually during all tide cycles throughout the processing season.

Discharging ground fish could have negative impacts on the marine environment (Thorne and others 2006) by causing changes to the nearshore environment such as discoloration of the water, foul smells, surface scum, and a build up of large piles of organic matter at the point of discharge. Other changes include high biological oxygen demand of the offal piles and methane and hydrogen sulfide eruptions, which occur regularly at low tides. It is unknown whether even minimal dispersal of seafood waste into Goodnews Bay will impact eelgrass beds since water clarity is an important habitat component for eelgrass. Loss of eelgrass beds would mean a loss in eider feeding habitat as Steller's eiders forage primarily on fauna associated with eelgrass beds (Metzner 1993).

Circulation studies conducted in July 2007 at the proposed offal discharge location in Kuskokwim Bay concluded that water velocities near the proposed outfall location were relatively strong and uniform. The total volume of water flowing past the outfall site exceeds the average flow of the entire Yukon River, two to three-fold (Knudsen and Symmes 2007). Because of this high flow, it was determined that an outfall pipe at the north end of South Spit would likely be in a location of sufficient tidal current to assure rapid dispersal of the offal discharge. However, although the water velocity at the mouth of Goodnews Bay is relatively strong, certain conditions exhibited an opposite-flowing eddy effect near the offal discharge site (Knudsen and Symmes 2007). This eddying effect could lead to the low probability that suspended seafood waste may build up in the nearshore environment or eelgrass beds on the north and east sides of the South Spit. Initially, the outfall pipe extended from the shoreline into the area of the back eddy. The Service expressed concern regarding the potential for seafood to become entrained in the back eddy and stranded on the shoreline and possibly becoming an attractive nuisance to eiders and other birds. CVRF responded to this concern by relocating the outfall pipe location to extend to the south edge of the eddy as defined in the circulation study. This location of the outfall should potentially eliminate the deposition of offal in the intertidal zone.

Disturbance Frequency, Intensity and Severity

The frequency and severity of disturbances must be related to its affect on a species recovery rate. Any disturbance event that affects the species' ability to recover through decreased survivorship or reproductive potential would be considered severe. Steller's eiders show high site fidelity (Philip Martin, US Fish and Wildlife Service, Fairbanks Fish and Wildlife Field Office, pers. comm., Paul Flint, US Geological Survey, Alaska Science Center, pers. comm.). Such life history

characteristics place Steller's eiders at increased risk of disturbance where their habitat and industrial developments overlap.

Noise Disturbance

There is limited information on noise thresholds for eiders. Steller's eiders may be present in Goodnews Bay during construction activities. Some noise will be generated from construction activities but it is unlikely to be greater than that which already occurs in the South Spit vicinity. The ambient background noise level from existing gravel operations is approximately 70 to 80 decibels, at a distance of 50 meters, during the 12 hour work day. Steller's eiders were observed resting within about 100 meters from the existing gravel operations during June and July 2007 surveys. Construction noise from the fish plant construction activities will vary from 40 to 80 decibels on site (approximately 100 meters to 300 meters from Steller's eiders) depending on the type of equipment being used (HDR Alaska, Inc. 2007a).

Steller's eiders would be subjected to vessel noise when they dive in the water. The noise intensity would depend on the proximity of the vessel and other conditions including tone, presence of thermoclines, and depth that affects propagation, and other ambient noise producers such as wind, rain, and waves. Weather conditions, sea state, air temperatures, and humidity play a significant role in how sound in the air and in water is propagated, attenuated, and perceived in the ocean environment. Wind blowing toward a sound source can bend sound waves away from potential receptors. Ambient or "background" noise varies as well depending on weather, wind, and ocean conditions. Ambient noise in Goodnews Bay could tend to dampen noise from construction or vessel operations depending on these conditions. The effects of vessel noise on Steller's eiders are not well documented, but surveys conducted in Ouzuinki, Sand Point, and Unalaska indicated that eiders were tolerant of low frequency noise produced by large and smaller commercial vessels (USACE 2000a, 2000b, 2000c).

Vessel Disturbance

Steller's eiders typically respond to an approaching vessel by swimming then flying from the area. Molting eiders are flightless for a period of up to 10 days to two weeks during the molt. This is when they would be most susceptible to disturbance from vessels. Steller's eiders regularly flush in response to vessel traffic (Lanctot and King 2000a). It is anticipated that the effects of vessel traffic associated with the salmon processing plant operation in Goodnews Bay could periodically displace Steller's eider from resting and foraging areas. In addition, suitable resting and foraging areas also occur in the nearshore areas of the north spit, away from the center of the Bay where large vessels travel.

Noise and visual presence of numerous small vessels would likely disturb molting Steller's eiders in Goodnews Bay. Based on vessel traffic for Quinahak, CVRF estimates that a total of 240 skiff deliveries to the floating barge will be made during the 77-day season. The tender will make approximately 64 deliveries to the floating barge during the season. Steller's eiders typically respond to an approaching vessel by swimming then flying from the area. Molting eiders are flightless for a period of up to 10 days to two weeks during the molt. During molt is a very high energetic period for the birds as they grow new feathers. This is when they would be most susceptible to disturbance from vessels. Steller's eiders regularly flush in response to vessel traffic (Lanctot and King 2000a, HDR Alaska Inc. 2004). It is anticipated that the effects of vessel

traffic associated with fish processing plant operation in Goodnews Bay could periodically displace Steller's eider from resting and foraging areas.

When disturbed by noise and activity, animals may respond behaviorally (e.g., escape response) or physiologically (e.g., increased heart rate, hormonal response; Harms and others 1997, Tempel and Gutierrez 2003). Either response results in a diversion from one biological activity to another. That diversion may cause stress (Goudie and Jones 2004), and it redirects energy away from fitness-enhancing activities such as feeding and molting (Frid and Dill 2002). Other changes in activities as a result of anthropogenic noise can include: increased alterness, vigilance, agonistic behavoiur, escape behaviour, temporary or permanent abandonment of an area, weakened reflexes, and lowered learning responses (Welch and Welch 1970, van Polanen Petel and others 2006). Chronic stress, caused by noise and activity, can lead to loss of immune function, decreased body weight, impared reproductive function, and abnormal thyroid function (Seyle 1979).

Goudie and Jones (2004) found that harlequin ducks exhibited intensified alert responses when noise levels exceeded 80 dBA. With the sudden onset of noise, the harlequin ducks startled and responded by flushing and panic diving. Further, agonistic behavior was observed in the harlequin ducks for up to 2 hours following the noise.

Analyses for Effects of the Action

This section analyzes the direct and indirect effects of the proposed and all interrelated and interdependent actions identified in the Environmental Baseline section. This includes a discussion of any beneficial effects anticipated to occur as a result of the proposed action.

Direct Effects

There is no expected direct loss of habitat. Collisions with the facility infrastructure are expected to be discountable. Direct effects from increased noise during the construction and operation of the Goodnews Bay salmon processing facility are anticipated to be negligible

Indirect Effects

Effects of Offal Discharge on Steller's Eider Habitat – An improved outfall design pushes the end of the outfall pipe further and deeper into the main current at the mouth of Goodnews Bay and further away from the opposite-flowing eddy effect at the north end of South Spit. **We anticipate that this risk-reducing action will further decrease the potential that offal would become entrained in the eddy and deposited along the shoreline, on eelgrass beds, and other Steller's eider foraging habitats. Therefore, the probability that these habitats will be negatively affected is considered discountable.**

Chronic Exposure to Petroleum Compounds – The probability of accidental release of fuels into Goodnews Bay from the additional vessel traffic is anticipated to increase as a result of this project (HDR Alaska, Inc. 2007a). Most oils spills in Alaska are caused by operator error or equipment failure and associated with fueling facilities and fuel transfer operations (Day and Pritchard 2000). Accidental petroleum releases can adversely affect the Steller's eiders through either contamination of feathers, direct consumption of petroleum (e.g., during preening), contamination of food resources, or reduction in prey availability, and can result in reduced survivorship and subsequent population declines. However, degradation of habitat due to chronic

exposure to petroleum compounds is difficult to quantify. The potential for direct oiling of eiders from typical chronic oiling sources (two-stroke engine discharge, drips from engine leaks, etc.) is negligible because these types of small-spill gasoline sheens disappear from the water surface fairly quickly via normal weathering processes. Levels of hydrocarbon contamination dissolved in the water column from chronic oiling would be difficult to detect due to the high volume of tidal influence and freshwater flushing (Knudsen and Symmes 2007) in Goodnews Bay. Chronic oiling from skiff traffic in the vicinity of the molting area along South Spit and the potential for contamination of eelgrass beds would be discountable.

There is an anticipated increase in probability that oil spills will occur as a result of the added vessels and the fuel tank at the facility, however, this increase will be small and would result in only a slight increase in chronic exposure to petroleum compounds. **No lethal take is anticipated because the incremental increase in petroleum compound transfer is so low that the probability of hydrocarbon contamination is considered discountable**.

Disturbance at Foraging and Resting Areas from Facility Construction and Operation, Particularly from Increased Vessel Traffic at the Site - Steller's eiders currently use the South Spit area of Goodnews Bay in the summer for molting. Vessel traffic disturbance to and from the fish processing plant may cause Steller's eiders to forage less frequently and flush from resting sites more frequently. We predict that increased disturbance from vessel traffic will cause Steller's eiders harm. **Over the life of the project, we anticipate the non-lethal take of 28 listed Steller's eiders in the form of harm due to disturbance**

Species' Responses to Proposed Action

Numbers of Individuals in the Action Area Affected
Steller's eiders - Based on the highest count of Steller's eiders during a survey (approximately 200 birds; HDR Alaska, Inc. 2007b), we estimate that 0.7%, or 1.4 birds of the listed population are present in the action area of the proposed project. Assuming that 1.4 listed birds are harmed each winter season, over the life of the project, we expect that **28 listed Steller's eiders will be harmed.**

Sensitivity to Change
Steller's eiders' behavior changes with changing environmental conditions. They have been observed foraging in close proximity to human structures, including docks, and habitation. We do not know if total abandonment of the South Spit at the mouth of Goodnews Bay and other habitats within the action area will occur, but anticipate disturbance from increased vessel traffic will increase as a result of this project.

Resilience
Little information exists regarding the resilience of this species to perturbations. The world population of Steller's eider has declined by 80% from 1,000,000 in the 1940's (Tugarinov 1941 as in Solovieva 1997), to 200,000 in 1994 (Solovieva 1997). Extensive banding efforts and aerial survey efforts over the past decade indicate that the trend for the world population continues to be negative (Flint and others 2000, Larned 2000b). Lack of resilience due to low fecundity, low recruitment, high breeding adult mortality, and other unknown causes may be contributing to their continued decline.

Recovery Rate
The natural recovery rate of Steller's eiders is not known. Long-lived species with low annual fecundity have a relatively slow recovery rate compared to short-lived species with high annual fecundity. Given the Steller's eider's observed low fecundity (i.e., small clutch sizes, high variability in nesting attempts, and generally low nest success) (Quakenbush and others 1995, D. Solovieva pers. com.), the recovery rate for this species is believed to be quite slow.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area. 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 the Act.

According to the biological assessment for the Goodnews Bay Fish Processing project (HDR Alaska, Inc. 2007a), constructing a salmon processing plant at Platinum could likely stimulate the development of other services to support the processing plant such as expansion of utility services, fueling stations, docks, and other activities that could require fill in wetlands or intertidal area. The only other known proposed project in the action area is the relocation of the existing Platinum Airport, which is located approximately two miles south of the proposed processing plant. Construction of the airport relocation project includes a new runway, access road, storage buildings, and lighting. The airport relocation is located near the City of Platinum, which is approximately two miles from the areas used by Steller's eiders for resting and feeding.

Effects on water quality from the airport construction may occur from soil erosion and runoff from roads and runways. Considering the proposed minimization measures and the dispersed nature of the Bay from this project, the incremental addition of the airport relocation project would have negligible effects on water quality.

The proposed airport relocation would improve the consistency and frequency of transportation to and from Platinum for the shipment of goods, as well as the transport of people. With more regular arrival of product shipments, the market may become more stable and accommodate the development of new businesses in Platinum. The location of new business establishments and developments would occur in Platinum, greater than 2 miles from the salmon processing facility.

Although most development is anticipated to occur on upland areas, some developments may affect Steller's eiders, particularly fueling stations, expansion of community infrastructure, and any activities directly impacting intertidal habitats. Affects of these projects may include direct habitat loss, increased risk of acute and chronic exposure to environmental contaminants, increased risk of bird strikes, and habitat degradation. Additionally, activities that increase foot traffic access to nearshore environments may result in displacement of Steller's eiders from foraging habitat.

CONCLUSION

This biological opinion assesses the direct and indirect effects of the construction and operation of a salmon processing facility on South Spit at the mouth of Goodnews Bay upon Steller's eiders. Based on this effects analysis and an analysis of the cumulative effects, the Service determines whether this proposed action is likely to jeopardize the continued existence of this species, or destroy or adversely modify designated critical habitat. A conclusion of "jeopardy" for an action means that the action could reasonably be expected to reduce appreciably the likelihood of both the survival and recovery of the Steller's eider. A conclusion of "adverse modification" means that the action could reasonably be expected to appreciably diminish the value of critical habitat for both the survival and recovery of this species. These conclusions are based on a synthesis of information provided in previous sections of this document.

The world population of Steller's eider has declined by 90%; from 1,000,000 in the 1940's, (Tugarinov 1941 as in Solovieva 1997) to 200,000 in 1994, (Solovieva 1997) to about 104,000 in 2003 (Atlantic and Pacific populations combined). The Steller's eider Alaska-breeding population is thought to number about 500 on the Arctic Coastal Plain, and perhaps dozens on the Yukon-Kuskokwim Delta. But, the high degree of variability in aerial survey data makes detecting anything but the most dramatic trends in the breeding population difficult.

The Steller's eider is a relatively long-lived, periodic non-breeder with low and variable nest success, low duckling survival, poor overall productivity, and variable annual recruitment. Reproductive parameters estimated from birds breeding in the Barrow area appear insufficient to maintain the population at current levels.

The Pacific population of Steller's eiders likely numbers 50,000 to 60,000. Populations of Steller's eiders molting and wintering along the Alaska Peninsula have declined since the 1960's. At 54,191, the 2002 Pacific population estimate by Larned and others (2002) was the lowest recorded since aerial surveys were initiated in 1992. Long-term spring survey data suggests a 6.1% annual decline in migrating Steller's eiders, and banding data from 1975 -1981 and 1991-1997 indicates a reduction in Steller's eider survival over time. At this rate of decline, the Steller's eider Alaska breeding population is projected by a simple deterministic population model to reach functional extinction (125 birds) in 35 years (USFWS 2006).

Lethal take anticipated from other Federal actions that have recently undergone section 7 consultation is estimated to be 10 listed Steller's eiders per year. When modeled (USFWS 2006), this take results in functional extinction by year 30, approximately 5 years prior to that predicted by the annual decline rate alone. Non-lethal take of Steller's eiders as a result of the construction and operation of a new salmon processing facility on the South Spit at the mouth of Goodnews Bay is estimated to be 28 listed Steller's eiders due to disturbance from increased vessel traffic over the life of the project. Although this take is assumed to be non-lethal, we believe it will result in harm and a higher likelihood of death or reduced fecundity. The nature and the level of take are not anticipated to accelerate functional extinction over the baseline model.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the COE so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The COE has a continuing duty to regulate the activity covered by this incidental take statement. If the COE (1) fails to assume and implement the terms and conditions or (2) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(a)(2) may lapse. In order to monitor the impact of incidental take, the COE or any applicant must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR 402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

We anticipate that incidental take of Steller's eiders will be difficult to document because the actual number of Steller's eiders belonging to the Alaska breeding population at this site is unknown and harm from disturbance is difficult to measure. That said, we assume that 1.4 out of 200 Steller's eiders from the listed population occur within the action area.

Displacement from Foraging and Resting Areas and Disturbance from Operation of Numerous Small Vessels

We predict that disturbance from vessel traffic associated with the operation of the salmon processing facility will cause Steller's eiders harm. **Over the life of the project, we anticipate the non-lethal take of 28 listed Steller's eiders.**

We are currently unable to distinguish between North American breeding Steller's eiders and Steller's eiders that breed elsewhere when the birds are present on their molting or wintering areas. Future research may enable us to distinguish between listed and non-listed populations. Absent such capabilities, we will consider the expected take levels associated with this Incidental Take Statement to have been exceeded if any of the following occur:

1. Greater than 2 Steller's eiders belonging to the listed Alaska breeding population are harmed as a result of the salmon processing facility operations;
2. Greater than 200 Steller's eiders (of the wintering population) are harmed as a result of salmon processing facility operations;

Effect of Take

The Service has determined that this level of anticipated take is not likely to result in jeopardy to the Steller's eider because the nature and the level of take are not anticipated to accelerate functional extinction over the baseline model.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Steller's eider:

1. The COE and/or the project sponsor shall minimize effects to Steller's eiders during operation of the salmon processing facility.
2. The COE and/or the project sponsor shall monitor effects of vessel traffic on Steller's eiders during the operation of the salmon processing facility.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the project sponsor must comply with the following terms and conditions, which implement the reasonable and prudent measures, described above, and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The following terms and conditions shall implement Reasonable and Prudent Measure No.1. "The project sponsor shall minimize effects to Steller's eiders during the operation of the salmon processing facility."

1.1 Project participants shall design, produce, and install information signs for the purpose of minimizing potential impacts of development on Steller's eiders. One sign will give background information on Steller's eiders and their use of the surrounding area and how individual boat operators can take measures to avoid harassing birds. The other sign will address the effects of oil on the marine environment, ways that the public can prevent and reduce fuel spills, and that discharging oil is illegal. Design, content, text, number, and placement of the signs will be developed in cooperation with the U.S. Fish and Wildlife Service. Signs shall be completed and installed by June 15, 2009, when the salmon processing facility is expected to become operational.

1.2 Project participants shall institute and delineate a vessel traffic channel for use by all vessels approaching the barge/dock. All traffic approaching the dock shall be instructed on the use of the marked vessel traffic channel. Information on using the channel to minimize disturbance to Steller's eiders shall be included in a fact sheet to be distributed to all barge/dock users. Design, content, and text in the fact sheet will be developed in cooperation with the U.S. Fish and Wildlife Service. Fact sheets shall be completed by June 15, 2009, when the salmon processing facility is expected to become operational.

1.3 During employee training at the beginning of each operational season at the facility, a training module will be presented with information on Steller's eiders and their use of the surrounding area and how individuals can avoid harassing birds loafing on the shoreline (beach). Content will be developed in cooperation with the Service and completed prior to June 15, 2009, when the salmon processing facility is expected to become operational.

2 The following terms and conditions shall implement Reasonable and Prudent Measure No.2. "The project sponsor shall monitor effects of vessel traffic on Steller's eiders during the operation of the salmon processing facility."

2.1 The project participant shall monitor the effects of small vessel disturbance on Steller's eiders by assessing the correlation between small vessels approaching and leaving the barge/dock and disturbance behavior of Steller's eiders resting on the beach in the vicinity and feeding or loafing on the water in the vicinity. This monitoring task shall be added to the duties assigned to the offal outfall monitor. The project participant shall work with the

USFWS prior to initiation of plant operations to develop appropriate data parameters, a data log, data collection timing and frequency, and a set of instructions for use by the monitor.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

Migratory Birds

The Service would also like to take this early opportunity to provide conservation recommendations applicable to other trust resources within the action area. Under the prohibitions of the Migratory Bird Treaty Act, it is unlawful to harm migratory birds.

1. The South Spit of Goodnews Bay is a known nesting colony of Aleutian and Arctic Terns (HDR Alaska, Inc. 2007c). People walking (sometimes with dogs) and riding ATVs through this area may disturb these breeding birds causing reproductive failure. The project sponsor shall provide information to employees at the salmon processing facility regarding the impacts of human disturbance on the tern colony and how to avoid disturbance. The project sponsor is requested to work with the Service to develop information for presentation.
2. Invasive rats are known to occur as a result of the operation of seafood processing plants. Rats have not been documented in the Goodnews Bay area, and the project sponsor should take precautionary measures to assure rats do not get to this location. (See Appendix I.) Rats can decimate birds in ground-nesting colonies and also cause problems for other wildlife and humans. More than 55 bird species have been documented on the South Spit and in Goodnews Bay during surveys in this area.

REINITIATION NOTICE

This concludes formal consultation on the proposed action. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a matter or to an extent not considered in this biological opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this biological opinion; (4) any of the non-discretionary Terms and Conditions are not implemented in a timely manner and completed by the deadlines set forth; or (5) a new species not covered by this opinion is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take should cease pending reinitiation.

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Appendix I

Rat Prevention Protocol

Rats and house mice are invasive rodents that exist on many Alaskan islands and in Alaska port towns and can cause severe problems for wildlife and people. The further spread of these pests needs to be stopped. New Alaska state regulations, effective September 13, 2007, make it illegal to "knowingly or unknowingly" harbor rats. Boaters, shippers, and others moving containers that may contain rats must be vigilant in checking for rats and in taking action to control or eradicate rats when they are found.

Goodnews Bay communities are presently free of introduced rodents. Some of the communities which support the Goodnews Bay region, (Unalaska, Kodiak, etc.) have rats and house mice. Cargo, barges, or planes could bring rodents to the Platinum area and cause an infestation. Therefore appropriate steps need to be taken to keep rodents from being introduced to this area. These should include:

1) Ongoing rodent control at the Goodnews Bay salmon processing plant, with emphasis on the dock and storage areas where rodents are most likely to get into supplies and food stores.

2) Defensive stations need to be installed and maintained at the Goodnews Bay salmon processing facility for the elimination/detection of rodents.

3) Precautionary measures must be taken during all barge dockings to avoid introduction of rodents. Rat prevention and inspection need to be done on barges before they arrive. All personnel need to be aware of the threat and what to do if rodent sign is detected.

4) An awareness campaign of the invasive threat, including instructions describing what to do, and not to do, must be conducted at the processing facility for construction workers and seafood processor employees.

5) Operators of the boats which will commute to the processing facility need to be trained in how to recognize rodents and steps they can take to avoid transporting them.

Financing for supplies and labor adequate to insure invasive rodent prevention needs to be secured and maintained throughout the life of the project.

All vessels that operate in Alaska waters may obtain a free rat prevention kit from the Alaska Maritime National Wildlife Refuge headquarters in Homer, AK.