Michiel Holley  
North Section Chief  
U.S. Army Corps of Engineers  
Alaska District Regulatory Division  
P.O. Box 6898  
JBER, Alaska 99506-0898


Dear Mr. Holley,

This document transmits the U.S. Fish and Wildlife Service’s (Service) final Biological Opinion (BO) on a proposal by the U.S. Army Corps of Engineers Alaska District (USACE) to issue permits under section 404 of the Clean Water Act (33 U.S.C. 1344) for wetland impacts resulting in expansion of gravel infrastructure on the North Slope of Alaska.

Coverage of proposed actions under this programmatic BO is limited to:

1. Projects located north of 70° 00' N on the North Slope of Alaska, between the Colville and Sagavanirktok rivers;
2. Projects involving gravel extraction or placement for construction or expansion of infrastructure; and,
3. Projects applying for section 404 Clean Water Act permits within the 2014 and 2015 calendar years.

Projects with new production facilities, or those consuming more than 30% of the total estimated impact area (1.2 km²), do not meet the conditions of this BO and require separate ESA consultation. Furthermore, to minimize impacts to ESA listed species and other wildlife, USACE will include the following non-discretionary Minimization Measures in permit authorizations for each project covered under this programmatic BO:

- Ground disturbing activity will not occur from June 1 through July 31;
- Project components will not include overhead wires or guyed towers;
- Design features will be incorporated into facility lighting (shielding to reduce outward-radiating light) to decrease the potential for bird strikes;
• Applicants will be required to develop and have in place, appropriate spill prevention and response plans; and
• A project-specific wildlife interaction plan, including polar bear avoidance and interaction guidelines, will be developed; or the applicant agrees to adopt the Service’s Polar Bear Interaction Guidelines (attached; Appendix I) prior to conducting field activities.

This BO describes the effects of these actions on threatened spectacled eiders (Somateria fischeri), Alaska-breeding Steller’s eiders (Polysticta stelleri), polar bears (Ursus maritimus), and the candidate species, Yellow-billed Loon (Gavia adamsii), pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.).

The Service has determined the proposed action may affect, but is not likely to adversely affect Steller’s eiders or polar bears, and is not likely to jeopardize the continued existence of the yellow-billed loon. Following review of the status and environmental baseline of spectacled eiders, and analysis of the potential effects of the proposed action to this species, the Service has concluded the proposed action is not likely to jeopardize the continued existence of spectacled eiders.

A complete administrative record of this consultation is on file at the Fairbanks Fish and Wildlife Field Office, 101 12th Avenue, Fairbanks, Alaska, 99701. If you have comments or concerns regarding this BO, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office at (907) 456-0441.

Sincerely,

Ted Swem
Branch Chief
Endangered Species

cc: Mary Romero, USACE, Anchorage
Janet Post, USACE, Anchorage
PROGRAMMATIC BIOLOGICAL OPINION

for

WETLAND IMPACTS FOR NORTH SLOPE PROJECTS BETWEEN THE COLVILLE AND SAGAVANIRKTOK RIVERS: 2014 and 2015

Consultation with
U.S. Army Corps of Engineers
Alaska District
Anchorage, Alaska

Prepared by:
Fairbanks Fish and Wildlife Field Office
U.S. Fish and Wildlife Service
101 12th Ave, Room 110
Fairbanks, AK 99701

May 5, 2014
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1. INTRODUCTION

This document transmits the U.S. Fish and Wildlife Service’s (Service) Biological Opinion (BO) on a proposal by the U.S. Army Corps of Engineers Alaska District (USACE) to issue permits under section 404 of the Clean Water Act (33 U.S.C. 1344) for wetland impacts resulting in expansion of gravel infrastructure on the North Slope of Alaska. This BO describes the effects of these actions on threatened spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller’s eiders (*Polysticta stelleri*), polar bears (*Ursus maritimus*), and the candidate species, Yellow-billed Loon (*Gavia adamsii*), pursuant to section 7 of the Endangered Species Act of 1973 (ESA), as amended (16 U.S.C. 1531 et seq.). We used information provided in previous BOs; communications with USACE; other Service documents; and published and unpublished literature to develop this BO.

Although this BO meets the obligation for consultation under the ESA, it does not preclude the requirement for project-specific assessment and appropriate compensatory mitigation under section 404 of the Clean Water Act. Therefore, USACE maintains responsibility for evaluating project-specific wetland impacts through discussions with the Service’s Conservation Planning Assistance branch, and determining appropriate compensatory mitigation for individual permit applications under the 404 program.

Coverage of proposed actions under this programmatic BO is limited to:

1. Projects located north of 70° 00’ N on the North Slope of Alaska, between the Colville and Sagavanirktok rivers;
2. Projects involving gravel extraction or placement for construction or expansion of infrastructure; and,
3. Projects applying for section 404 Clean Water Act permits within the 2014 and 2015 calendar years.

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

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

The Service has determined the proposed action may affect, but is not likely to adversely affect Steller’s eiders or polar bears, and is not likely to jeopardize the continued existence of the yellow-billed loon.

Following review of the status and environmental baseline of spectacled eiders, and analysis of the potential effects of the proposed action to this species, the Service has concluded the proposed action is not likely to jeopardize the continued existence of spectacled eiders.

If you have comments or concerns regarding this BO, please contact Ted Swem, Endangered Species Branch Chief, Fairbanks Fish and Wildlife Field Office at (907) 456-0441.
2. DESCRIPTION OF THE PROPOSED ACTION

Background
Section 7(a)(2) of the ESA, (16 U.S.C. § 1531 et seq.), requires that Federal agencies shall insure any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any threatened or endangered species, or result in the destruction or adverse modification of critical habitat. When the actions of a Federal agency may adversely affect a protected species, that agency (i.e., the action agency) is required to consult with either the National Marine Fisheries Service (NMFS) or the Service, depending upon the protected species that may be affected.

For the actions described in this document, the action agency is the USACE. USACE will be authorizing activities described in this BO, which is the federal nexus for consultation. Due to the protected species involved, the Service is the consulting agency.

Numerous minor projects are permitted by USACE each year involving wetland impacts, through either extraction or placement of gravel fill, for expansion of infrastructure in oil and gas fields on Alaska’s North Slope. Individually, these small-scale, routine actions result in impacts to wetland habitat that are so minor, adverse effects to listed species are not anticipated. However, due to the repetitive nature of these projects, the cumulative effects of habitat loss and disturbance are likely under evaluated. Therefore, this programmatic BO was developed to 1) better quantify impacts to listed species from routine projects involving wetland impacts; 2) facilitate more logical monitoring of these impacts; 3) develop appropriate minimization measures that lead to better conservation of listed species; and 4) streamline consultation and permitting workloads. The timeframe for this BO is April 2014 through December 2015.

Action Area
The action area includes lands north of 70° 00’N on the North Slope of Alaska, east of the Colville River and west of the westernmost branch of the Sagavanirktok River (Figure 2.1).

Proposed Action
The total maximum extent of wetland impacts to be evaluated and authorized under this BO was estimated based upon activities that took place in the action area in 2012 and 2013. This area, 725 acres or 3.4 km², was then adjusted to allow for interannual variation and/or a slight increase in the rate of development over time, for a total affected area of 1000 acres (4.7 km²). In estimating this value, we took into consideration the need to: 1) identify a reasonable approximation of growth based on past activities; 2) incorporate interannual variation; 3) assume some level of increased activity; and 4) reduce the likelihood for re-initiation; while 5) maintaining confidence in the determination of non-jeopardy. Projects with new production facilities, or those consuming more than 30% of the total estimated impact area (1.2 km²), do not meet the conditions of this BO and require separate ESA consultation. Specific activities that meet the criteria of this BO include

- New gravel pads, access roads, or driveways;
- Expansion of existing gravel pads, access roads, or driveways;
- Development of gravel mine sites;
• Ice roads associated with construction of gravel infrastructure;
• On-pad construction, including:
  o Industry components for support of existing development;
  o Un-guyed structures;
  o Equipment modules;
  o Facility lighting components;
• Off-pad construction, including:
  o Flowlines for water, oil, or natural gas;
  o Vertical support members; and,
  o Installation of culverts;

Minimization Measures
To minimize impacts to ESA listed species and other wildlife, USACE would include the following non-discretionary stipulations in permit authorizations for each project covered under this programmatic BO:

• Ground disturbing activity will not occur from June 1 through July 31;
• Project components will not include overhead wires or guyed towers;
• Design features will be incorporated into facility lighting (shielding to reduce outward-radiating light) to decrease the potential for bird strikes;
• Applicants will be required to develop and have in place, appropriate spill prevention and response plans; and
• A project-specific wildlife interaction plan, including polar bear avoidance and interaction guidelines, would be developed; or the applicant agrees to adopt the Service’s Polar Bear Interaction Guidelines (attached; Appendix I) prior to conducting field activities.

Figure 2.1. The geographic area covered by this BO includes lands north of 70° 00’ N on the North Slope, east of the Colville River and west of the Sagavanirktok River.
3. EFFECT DETERMINATION FOR STELLER’S EIDER, POLAR BEAR, AND YELLOW-BILLED LOON

Steller’s eider
In Alaska, Steller’s eiders breed almost exclusively on the Arctic Coastal Plain (ACP), migrating to the breeding grounds in late spring and remaining in the region as late as mid-October. However, nesting is concentrated in tundra wetlands near Barrow, Alaska and Steller’s eiders occur at very low densities elsewhere on the ACP (Larned et al. 2010). USFWS aerial surveys for breeding eiders conducted annually on the ACP from 1992–2010 reported only 5 observations of Steller’s eiders east of the Colville River, with the most recent observation in 1998 (USFWS Alaska Region Migratory Bird Management, unpublished data). Because available data indicate Steller’s eiders are unlikely to nest near or migrate through the project area, we conclude that adverse effects would be discountable and that the proposed action is not likely to adversely affect Alaska-breeding Steller’s eiders.

Polar bear
The Service listed the polar bear as a threatened species under the ESA on May 15, 2008 (73 FR 28212). Polar bears may occasionally pass through or den in the area, although their density is low and encounters are expected to be infrequent. Transient (non-denning) bears that enter the action area could be disturbed by the presence of humans or equipment noise. However, we expect disturbances would be minor and temporary because transient bears would be able to respond to human presence or disturbance by departing the area. Furthermore, the Service expects potential effects to transient polar bears would be reduced by adherence to either the Service’s (attached) or applicant’s Wildlife and Polar Bear Interaction Guidelines and by the applicant’s compliance with existing and future authorizations issued under the Marine Mammal Protection Act, such as Letters of Authorization issued under the Beaufort Sea Incidental Take Regulations (USFWS 2011a and 2011b).

In addition to transient animals, female polar bears may occasionally den near the action area. However, because topographic relief throughout the area is minor and preferred denning habitat is characterized by steep, stable slopes that accumulate snow, we would expect polar bears denning within the project area, particularly inland from the coast, to be rare.

Because (1) the density of polar bears in the action area is low; (2) encounters with polar bears are expected to be infrequent; (3) behavioral effects to transient bears would be minor and temporary; (4) mitigation measures are included in the Service’s or applicant’s interaction guidelines would minimize potential impacts in the event that transient polar bears are encountered; and (5) the low probability of polar bears denning in the action area, we expect effects of the proposed action on polar bears would be insignificant.

Yellow-billed loon
On March 25, 2009, the Service designated the yellow-billed loon a candidate for protection under the ESA because of the species’ small population range-wide, concerns about levels of subsistence harvest, and other potential impacts to the species (74 FR 12932). Although rare, yellow-billed loons may be present in the action area from early June through September where they nest and rear broods in tundra ponds and lakes on Alaska’s ACP. It is possible some
nesting or brooding yellow-billed loons may be disturbed by the predicted activities. While
disturbance associated with the predicted wetland impacts may cause birds to flush, we expect
this response to be insignificant as the disturbance would likely cause minor and temporary
changes in behavior. Because available data indicate yellow-billed loons do not nest in high
densities within the action area, and disturbances to nesting, feeding, or migrating birds would be
temporary and minor, the Service concludes that adverse effects of the expected activities would
be insignificant. Therefore, the proposed action is not likely to jeopardize the continued
existence of the yellow-billed loon by reducing appreciably the likelihood of survival and
recovery of this species in the wild by reducing its reproduction, numbers, and distribution.

4. STATUS OF THE SPECIES

This section presents biological and ecological information relevant to the BO. Appropriate
information on species’ life history, habitat and distribution, and other factors necessary for their
survival is included for analysis in later sections.

Spectacled eider
Spectacled eiders (Figure 4.1A) were listed as threatened throughout their range on May 10,
1993 (USFWS 1993) based on indications of steep declines in the two Alaska-breeding
populations. There are three primary spectacled eider populations, corresponding to breeding
grounds on Alaska’s North Slope, the Yukon–Kuskokwim Delta (YK-delta), and northern
Russia. The YK-delta population declined 96% between the early 1970s and 1992 (Stehn et al.
1993). Data from the Prudhoe Bay oil fields (Warnock and Troy 1992) and information from
Native elders at Wainwright, Alaska (R. Suydam, pers. comm. in USFWS 1996) suggested
concurrent localized declines on the North Slope, although data for the entire North Slope
breeding population were not available. Spectacled eiders molt in several discrete areas (Figure
4.1B) during late summer and fall, with birds from different populations and genders apparently
favoring different molting areas (Petersen et al. 1999). All three spectacled eider populations
overwinter in openings in pack ice of the central Bering Sea, south of St. Lawrence Island
(Petersen et al. 1999; Figure 4.2), where they remain until March–April (Lovvorn et al. 2003).

Life History
Breeding – In Alaska, spectacled eiders breed primarily on the North Slope (ACP) and the YK-
delta. On the ACP, spectacled eiders breed north of a line connecting the mouth of the Utukok
River to a point on the Shaviovik River about 24 km (15 mi) inland from its mouth, with
breeding density varying across the ACP (Figure 4.2). Although spectacled eiders historically
occurred throughout the coastal zone of the YK-delta, they currently breed primarily in the
central coast zone within about 15 km (9 mi) of the coast from Kigigak Island north to Kokechik
Bay (USFWS 1996). However, sightings on the YK-delta have also occurred both north and
south of this area during the breeding season (R. Platte, USFWS, pers. comm. 1997).

Spectacled eiders arrive on the ACP breeding grounds in late May to early June. Numbers of
breeding pairs peak in mid-June and decline 4–5 days later when males begin to depart from the
breeding grounds (Smith et al. 1994, Anderson and Cooper 1994, Anderson et al. 1995, Bart and
Earnst 2005). Mean clutch size reported from studies on the Colville River Delta was 4.3 (Bart
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Spectacled eider clutch size near Barrow has averaged 3.2–4.1, with clutches of up to eight eggs reported (Quakenbush et al. 1995, Safine 2011). Incubation lasts 20–25 days (Kondratev and Zadorina 1992, Harwood and Moran 1993, Moran and Harwood 1994, Moran 1995), and hatching occurs from mid- to late July (Warnock and Troy 1992).

Nest initiation on Kigigak Island on the YK-delta occurs from mid-May to mid-June (Lake 2007). Incubation lasts approximately 24 days (Dau 1974). Mean spectacled eider clutch size is higher on the YK-delta compared to the ACP. Mean annual clutch size ranged from 3.8–5.4 in coastal areas of the YK-delta (1985–2011; Fischer et al. 2011), and 4.0–5.5 on Kigigak Island (1992–2011; Gabrielson and Graff 2011), with clutches of up to eight eggs reported (Lake 2007).

On the breeding grounds, spectacled eiders feed on mollusks, insect larvae (craneflies, caddisflies, and midges), small freshwater crustaceans, and plants and seeds (Kondratev and Zadorina 1992) in shallow freshwater or brackish ponds, or on flooded tundra. Ducklings fledge approximately 50 days after hatch, when females with broods move from freshwater to marine habitat prior to fall migration.

Survivorship – Nest success is highly variable and thought to be primarily influenced by predators, including gulls (Larus spp.), jaegers (Stercorarius spp.), and red (Vulpes vulpes) and arctic foxes (Alopex lagopus). In arctic Russia, apparent nest success was estimated to be < 2% in 1994 and 27% in 1995; low nest success was attributed to predation (Pearce et al. 1998). Apparent nest success in 1991 and 1993–1995 in the Kuparuk and Prudhoe Bay oil fields on the ACP was also low, varying from 25–40% (Warnock and Troy 1992, Anderson et al. 1998). On Kigigak Island in the YK-delta, nest survival probability ranged from 6–92% from 1992–2007 (Lake 2007); nest success tended to be higher in years with low fox numbers or activity (i.e., no denning) or when foxes were eliminated from the island prior to the nesting season. Bowman et al. (2002) also reported high variation in nest success (20–95%) of spectacled eiders on the YK-delta, depending on year and location.
Figure 4.1. (A) Male and female spectacled eiders in breeding plumage. (B) Distribution of spectacled eiders. Molting areas (green) are used July –October. Wintering areas (yellow) are used October –April. The full extent of molting and wintering areas is not yet known and may extend beyond the boundaries shown.
Figure 4.2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km$^2$ of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010 (Larned et al. 2011).

Available data indicate egg hatchability is high for spectacled eiders nesting on the ACP, in arctic Russia, and at inland sites on the YK-delta, but considerably lower in the coastal region of the YK-delta. Spectacled eider eggs that are addled or that do not hatch are very rare in the Prudhoe Bay area (Declan Troy, TERA, pers. comm. 1997), and Esler et al. (1995) found very few addled eggs on the Indigirka River Delta in Arctic Russia. Additionally, from 1969 to 1973 at an inland site on the Yukon Delta National Wildlife Refuge, only 0.8% of spectacled eider eggs were addled or infertile (Dau 1974). In contrast, 24% of all nests monitored in a coastal region of the YK-delta during the early to mid-1990s contained inviable eggs and ~10% of eggs in successful nests did not hatch due to either embryonic mortality or infertility (Grand and Flint 1997). This relatively high occurrence of inviable eggs near the coast of the YK-delta may have been related to exposure to contaminants (Grand and Flint 1997). It is unknown whether hatchability of eggs in this region has improved with decreased use of lead shot in the region and gradual settling of existing lead pellets (Flint and Schamber 2010) in coastal YK-delta wetlands.

Recruitment rate (the percentage of young eiders that hatch, fledge, and survive to sexual maturity) of spectacled eiders is poorly known (USFWS 1999) because there is limited data on juvenile survival. In a coastal region of the YK-delta, duckling survival to 30 days averaged 34%, with 74% of this mortality occurring in the first 10 days, while survival of adult females during the first 30 days post hatch was 93% (Flint and Grand 1997).

Fall migration and molting – As with many other sea ducks, spectacled eiders spend the 8–10 month non-breeding season at sea. Satellite telemetry and aerial surveys led to the identification of spectacled eider migrating, molting, and wintering areas. These studies are summarized in Petersen et al. (1995 and 1999) and Larned et al. (1995). Results of more recent satellite telemetry research (2008–2011) are consistent with earlier studies (Matt Sexson, USGS, pers. comm.).
Phenology, spring migration and breeding, including arrival, nest initiation, hatch, and fledging, is 3–4 weeks earlier in western Alaska (YK-delta) than northern Alaska (ACP); however, phenology of fall migration is similar between areas. Individuals depart breeding areas July–September, depending on breeding status and success, and molt in September–October (Matt Sexson, USGS, pers. comm.).

Males generally depart breeding areas on the ACP when females begin incubation in late June (Anderson and Cooper 1994, Bart and Earnst 2005). Use of the Beaufort Sea by departing males is variable. Some appear to move directly to the Chukchi Sea over land, while the majority move rapidly (average travel of 1.75 days), over nearshore waters from breeding grounds to the Chukchi Sea (TERA 2002). Of 14 males implanted with satellite transmitters, only four spent an extended period of time (11–30 days) in the Beaufort Sea (TERA 2002). Males appeared to prefer areas near large river deltas such as the Colville River where open water is more prevalent in early summer when much of the Beaufort Sea is still frozen. Most adult males marked with satellite transmitters in northern and western Alaska in a recent satellite telemetry study migrated to northern Russia to molt (USGS, unpublished data). Results from this study also suggest that male eiders likely follow coast lines but also migrate straight across the northern Bering and Chukchi seas en route to northern Russia (Matt Sexson, USGS, pers. comm.).

Females generally depart the breeding grounds later, when more of the Beaufort Sea is ice-free, allowing more extensive use of the area. Females spent an average of two weeks in the Beaufort Sea (range 6-30 days) with the western Beaufort Sea the most heavily used (TERA 2002). Females also appeared to migrate through the Beaufort Sea an average of 10 km further offshore than males (Petersen et al. 1999). The greater use of the Beaufort Sea and offshore areas by females was attributed to the greater availability of open water when females depart the area (Petersen et al. 1999, TERA 2002). Recent telemetry data indicate that molt migration of failed/non-breeding females from the Colville River Delta through the Beaufort Sea is relatively rapid, 2 weeks, compared to 2–3 months spent in the Chukchi Sea (Matt Sexson, USGS, pers. comm.).

Spectacled eiders use specific molting areas from July to late October/early November. Larned et al. (1995) and Petersen et al. (1999) found spectacled eiders show strong preference for specific molting locations, and concluded that spectacled eiders molt in four discrete areas (Table 4.1). Females generally used molting areas nearest their breeding grounds. All marked females from the YK-delta molted in nearby Norton Sound, while females from the North Slope molted in Ledyard Bay, along the Russian coast, and near St. Lawrence Island. Males did not show strong molting site fidelity; males from all three breeding areas molted in Ledyard Bay, Mechigmenskiy Bay, and the Indigirka/Kolyma River Delta. Males reached molting areas first, beginning in late June, and remained through mid-October. Non-breeding females, and those that nested but failed, arrived at molting areas in late July, while successfully-breeding females and young of the year reached molting areas in late August through late September and remained through October. Fledged juveniles marked on the Colville River Delta usually staged in the Beaufort Sea near the delta for 2–3 weeks before migrating to the Chukchi Sea.
### Table 4.1. Important staging and molting areas for female and male spectacled eiders from each breeding population.

<table>
<thead>
<tr>
<th>Population and Sex</th>
<th>Known Major Staging/Molting Areas</th>
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<tbody>
<tr>
<td>Arctic Russia Males</td>
<td>Northwest of Medvezhni (Bear) Island group</td>
</tr>
<tr>
<td></td>
<td>Mechigmenskiy Bay</td>
</tr>
<tr>
<td></td>
<td>Ledyard Bay</td>
</tr>
<tr>
<td>Arctic Russia Females</td>
<td>unknown</td>
</tr>
<tr>
<td>North Slope Males</td>
<td>Ledyard Bay</td>
</tr>
<tr>
<td></td>
<td>Northwest of Medvezhni (Bear) Island group</td>
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<td></td>
<td>Mechigmenskiy Bay</td>
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<tr>
<td>North Slope Females</td>
<td>Ledyard Bay</td>
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<tr>
<td></td>
<td>Mechigmenskiy Bay</td>
</tr>
<tr>
<td></td>
<td>West of St. Lawrence Island</td>
</tr>
<tr>
<td>YK-delta Males</td>
<td>Mechigmenskiy Bay</td>
</tr>
<tr>
<td></td>
<td>Northeastern Norton Sound</td>
</tr>
<tr>
<td>YK-delta Females</td>
<td>Northeastern Norton Sound</td>
</tr>
</tbody>
</table>

Avian molt is energetically demanding, especially for species such as spectacled eiders that complete molt in a few weeks. Molting birds require adequate food resources, and apparently benthic community of Ledyard Bay (Feder et al. 1989, 1994a, 1994b) provides this for spectacled eiders. Large concentrations of spectacled eiders molt in Ledyard Bay using this food resource; aerial surveys on 4 days in different years counted 200 to 33,192 molting spectacled eiders in Ledyard Bay (Petersen et al. 1999; Larned et al. 1995).

**Wintering** — Spectacled eiders generally depart molting areas in late October/early November (Matt Sexson, USGS, pers. comm.), migrating offshore in the Chukchi and Bering seas to a single wintering area in pack-ice lead complexes south/southwest of St. Lawrence Island (Figure 4.1B). In this relatively shallow area, > 300,000 spectacled eiders (Petersen et al. 1999) rest and feed, diving up to 230 ft (70 m) to eat bivalves, other mollusks, and crustaceans (Cottam 1939, Petersen et al. 1998, Lovvorn et al. 2003, Petersen and Douglas 2004).

**Spring migration** — Recent information indicates spectacled eiders likely make extensive use of the eastern Chukchi spring lead system between departure from the wintering area in March and April and arrival on the North Slope in mid-May or early June. Limited spring observations in the eastern Chukchi Sea have documented dozens to several hundred common eiders (*Somateria mollissima*) and spectacled eiders in spring leads and several miles offshore in relatively small openings in rotting sea ice (W. Larned, USFWS; J. Lovvorn, University of Wyoming, pers. comm.). Woodby and Divoky (1982) documented large numbers of king (*Somateria spectabilis*) and common eiders using the eastern Chukchi lead system, advancing in pulses during days of favorable following winds, and concluded that an open lead is probably requisite for spring eider passage in this region. Preliminary results from an ongoing satellite telemetry study conducted by the USGS Alaska Science Center (Figure 4.3; USGS, unpublished data) suggest that spectacled eiders also use the lead system during spring migration.

Adequate foraging opportunities and nutrition during spring migration are critical to spectacled eider productivity. Like most sea ducks, female spectacled eiders do not feed substantially on the breeding grounds, but produce and incubate eggs while living primarily off body reserves.
Clutch size, a measure of reproductive potential, was positively correlated with body condition and reserves obtained prior to arrival at breeding areas (Coulson 1984, Raveling 1979, Parker and Holm 1990). Body reserves must be maintained from winter or acquired during the 4-8 weeks (Lovvorn et al. 2003) of spring staging, and Petersen and Flint (2002) suggest common eider productivity on the western Beaufort Sea coast is influenced by conditions encountered in May to early June during migration through the Chukchi Sea (including Ledyard Bay). Common eider female body mass increased 20% during the 4-6 weeks prior to egg laying (Gorman and Milne 1971, Milne 1976, Korschgen 1977, Parker and Holm 1990). For spectacled eiders, average female body weight in late March in the Bering Sea was $1,550 \pm 35$ g ($n = 12$), and slightly (but not significantly) more upon arrival at breeding sites ($1,623 \pm 46$ g, $n = 11$; Lovvorn et al. 2003), suggesting that spectacled eiders maintain or enhance their physiological condition during spring staging.

Abundance and trends
The most recent rangewide estimate of abundance of spectacled eiders was 369,122 (364,190–374,054 90% CI), obtained by aerial surveys of the known wintering area in the Bering Sea in late winter 2010 (Larned et al. 2012). Comparison of point estimates between 1997 and 2010 indicate an average of 353,051 spectacled eiders (344,147-361956 90% CI) in the global population over that 14-year period (Larned et al. 2012).

Figure 4.3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown. Eiders were tagged on the North Slope during the 2009 and 2010 breeding seasons. Data provided by Matt Sexson, USGS Alaska Science Center (USGS, unpublished).
Population indices for North Slope-breeding spectacled eiders prior to 1992 are unavailable. However, Warnock and Troy (1992) documented an 80% decline in spectacled eider abundance from 1981 to 1991 in the Prudhoe Bay area. Since 1992, the Service has conducted annual aerial surveys for breeding spectacled eiders on the ACP. The 2010 population index based on these aerial surveys was 6,286 birds (95% CI, 4,877–7,695; unadjusted for detection probability), which is 4% lower than the 18-year mean (Larned et al. 2011). In 2010, the index growth rate was significantly negative for both the long-term (0.987; 95% CI, 0.974–0.999) and most recent 10 years (0.974; 95% CI, 0.950–0.999; Larned et al. 2011). Stehn et al. (2006) developed a North Slope-breeding population estimate of 12,916 (95% CI, 10,942–14,890) based on the 2002–2006 ACP aerial index for spectacled eiders and relationships between ground and aerial surveys on the YK-delta. If the same methods are applied to the 2007–2010 ACP aerial index reported in Larned et al. (2011), the resulting adjusted population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI).

The YK-delta spectacled eider population is thought to have declined by about 96% from the 1970s to 1992 (Stehn et al. 1993). Evidence of the dramatic decline in spectacled eider nesting on the YK-delta was corroborated by Ely et al. (1994), who found a 79% decline in eider nesting near the Kashunuk River between 1969 and 1992. Aerial and ground survey data indicated that spectacled eiders declined 9–14% per year from 1985–1992 (Stehn et al. 1993). Further, from the early 1970s to the early 1990s, the number of pairs on the YK-delta declined from 48,000 to 2,000, apparently stabilizing at that low level (Stehn et al. 1993). Before 1972, an estimated 47,700–70,000 pairs of spectacled eiders nested on the YK-delta in average to good years (Dau and Kistchinski 1977).

Fischer et al. (2011) used combined annual ground-based and aerial survey data to estimate the number of nests and eggs of spectacled eiders on the coastal area of the YK-delta in 2011 and evaluate long-term trends in the YK-delta breeding population from 1985 to 2011. In a given year, the estimated number of nests reflects the minimum number of breeding pairs in the population and does not include non-nesting individuals or nests that were destroyed or abandoned (Fischer et al. 2011). The total number of spectacled eider nests on the YK-delta in 2011 was estimated at 3,608 (SE 448), the second lowest estimate over the past 10 years. The average population growth rate based on these surveys was 1.049 (90% CI = 0.994–1.105) in 2002–2011 and 1.003 (90% CI = 0.991–1.015) in 1985–2011 (Fischer et al. 2011). Log-linear regression based solely on the long-term YK-delta aerial survey data indicate positive population growth rates of 1.073 (90% CI = 1.046–1.100) in 2001–2010 and 1.070 (90% CI = 1.058–1.081) in 1988–2010 (Platte and Stehn 2011).

Spectacled eider recovery criteria
The Spectacled Eider Recovery Plan (USFWS 1996) presents research and management priorities with the objective of recovery and delisting so that protection under the ESA is no longer required. Although the cause or causes of the spectacled eider population decline is/are not known, factors that affect adult survival are likely to be the most influential on population growth rate. These include lead poisoning from ingested spent shotgun pellets, which may have contributed to the rapid decline observed in the YK-delta (Franson et al. 1995, Grand et al. 1998), and other factors such as habitat loss, increased nest predation, over harvest, and
disturbance and collisions caused by human infrastructure. Under the Recovery Plan, the species will be considered recovered when each of the three recognized populations (YK-delta, North Slope of Alaska, and Arctic Russia): 1) is stable or increasing over 10 or more years and the minimum estimated population size is at least 6,000 breeding pairs, or 2) number at least 10,000 breeding pairs over 3 or more years, or 3) number at least 25,000 breeding pairs in one year. Spectacled eiders do not currently meet these recovery criteria.

5. ENVIRONMENTAL BASELINE

The environmental baseline provides an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species, their habitat, and ecosystem in the action area.

Spectacled eider

Status of spectacled eiders within the action area

Spectacled eiders are present in the action area from late May through late October. In summer, spectacled eiders are widely distributed near lakes or coastal margins throughout this area with a trend toward higher abundance towards the coast and within the Colville River Delta. Within the project area, spectacled eiders nest primarily in non-patterned wet meadows within wetland complexes containing emergent grasses and sedges (Anderson and Cooper 1994, Anderson et al. 2009). After hatching, spectacled eider hens and broods occupy deep Arctophila and shallow Carex habitat (Safine 2011).

Factors which may have contributed to the current status of spectacled eiders in the action area include but are not limited to long-term habitat loss through development and disturbance, environmental contaminants, increased predator populations, collisions with structures, research, and climate change. These impacts are occurring throughout much of the species’ range, including within the action area.

Habitat loss through development and disturbance

Destruction or modification of listed eider nesting habitat on the North Slope has been limited, and is not believed to have contributed substantially to population declines of spectacled eiders. However, development and disturbance have likely impacted listed eiders through loss of nesting habitat.

For example, existing oil and gas industry developments in the Kuparuk River Unit have resulted in long-term loss of spectacled eider breeding habitat in the action area directly through gravel fill and indirectly through disturbance from oilfield activities. Oil and gas development has also progressed westward across the ACP into the National Petroleum Reserve – Alaska (NPR-A). Given industry interest in the action area, expressed in lease sales, seismic surveys, and exploratory wells, expansion of industrial development is likely to continue. Due to the extent of development, it is likely that eiders in the area have experienced some loss of reproductive potential resulting from direct and indirect habitat loss. However, the degree to which spectacled eiders can reproduce in disturbed areas or move to other less disturbed areas to reproduce, and the potential population level consequences of existing human development near the action area, are unknown.
**Environmental contaminants**

Deposition of lead shot in tundra wetlands and shallow marine habitat where eiders forage is considered a threat to listed eiders. Lead poisoning of spectacled eiders has been documented on the Y-K Delta (Franson et al. 1995, Grand et al. 1998) and in Steller’s eiders on the ACP (Trust et al. 1997; Service unpublished data). Waterfowl hunting with lead shot is prohibited in Alaska, and for hunting all birds on the North Slope. Although the use of lead shot appears to be declining, residual lead shot will presumably be present in the environment, and available to waterfowl, for some unknown period into the future.

Other contaminants, including petroleum hydrocarbons from local sources or globally distributed heavy metals, may also affect listed eiders. For example, spectacled eiders wintering near St. Lawrence Island exhibited high concentrations of metals as well as subtle biochemical changes (Trust et al. 2000). Additionally, spectacled eiders breeding and staging on the Colville River Delta may have experienced a variety of exposure to petroleum hydrocarbons, heavy metals, and other contaminants from nearby industrial development. However, risk of contaminant exposure and potential affects to listed eiders in the action area are unknown.

**Increased predator populations**

Predator and scavenger populations have likely increased near villages and industrial infrastructure on the ACP in recent decades (Eberhardt et al. 1983, Day 1998, Powell and Bakensto 2009). Reduced fox trapping, anthropogenic food sources in villages, and an increase in availability of nesting/denning sites at human-built structures may have resulted in increased numbers of arctic foxes (*Alopex lagopus*), common ravens (*Corvus corax*), and glaucous gulls (*Larus hyperboreus*) in developed areas of the ACP (Day 1998). For example, ravens are highly efficient egg predators (Day 1998), and have been observed depredating Steller’s eider nests near Barrow (Quakenbush et al. 2004). Ravens also appear to have expanded their breeding range on the ACP by using manmade structures for nest sites (Day 1998). Therefore, as the number of structures and anthropogenic attractants associated with development increase, reproductive success of listed eiders may decrease.

**Collisions with structures**

Migratory birds suffer considerable mortality from collisions with man-made structures (Manville 2004) including light poles, buildings, drill rigs, guyed towers or poles, and overhead powerlines. Birds are particularly at risk of collision when visibility is impaired by darkness or inclement weather (Weir 1976). There is also evidence that lights on structures increase collision risk (Reed et al. 1985, Russell 2005, numerous authors cited by Manville 2000). Anderson and Murphy (1988) monitored bird behavior and strikes to a 12.5 km power line in the Lisburn area (the southern portion of the Prudhoe Bay oil fields) during 1986 and 1987. They observed 25 different species of birds including spectacled eiders. Results indicated that strike rate was related to flight behavior, in particular the height of flight. Johnson and Richardson (1982) in their study of migratory bird behavior along the Beaufort Sea coast reported that 88% of eiders flew below an estimated altitude of 10 m (32 ft) and well over half flew below 5 m (16 ft). This tendency to fly low puts eiders at risk of striking even relatively low objects in their path.
Although several factors confound accurate collision estimates for spectacled eiders, including: 1) temporal changes in eider density and distribution; 2) lack of understanding how feature configurations contribute to avian collisions; and 3) how variations in weather and lighting conditions effect probability of collisions, an unknown level of collision risk remains over the life of man-made project features. However, some design considerations may reduce or eliminate collision risk for listed eiders, including shielded lighting to limit outward-radiating light and minimize potential disorienting effects to eiders, and avoidance of guyed towers or overhead lines).

Research
Field-based scientific research has also increased on the ACP in response to interest in climate change and its effects on Arctic ecosystems. While some activities have no impact on listed eiders (e.g., project timing occurs when eiders are absent, or employs remote sensing tools), aerial surveys, on-tundra activities, or remote aircraft landings may disturb listed eiders. Many of these activities are considered in intra-Service consultations, or under a programmatic consultation with the BLM for summer activities in nearby NPR-A.

Climate change
High latitude regions, such as Alaska’s North Slope, are thought to be especially sensitive to effects of climate change (Quinlan et al. 2005, Schindler and Smol 2006, Smol et al. 2005). While climate change will likely affect individual organisms and communities, it is difficult to predict with certainty how these effects will manifest. Biological, climatological, and hydrologic components of the ecosystem are interlinked and operate on varied spatial, temporal, and organizational scales with feedback between components (Hinzman et al. 2005).

There are a wide variety of changes occurring across the circumpolar Arctic. Arctic landscapes are dominated by freshwater wetlands (Quinlan et al. 2005), which listed eiders depend on for forage and brood rearing. As permafrost thaws, some water bodies are draining (Smith et al. 2005, Oechel et al. 1995), or drying due to increased evaporation and evapotranspiration during prolonged ice-free periods (Schindler and Smol 2006, and Smol and Douglas 2007). In addition, productivity of some lakes and ponds is increasing in correlation with elevated nutrient inputs from thawing soil (Quinlan et al. 2005, Smol et al. 2005, Hinzman et al. 2005, and Chapin et al. 1995) and other changes in water chemistry or temperature are altering algal and invertebrate communities, which form the basis of the Arctic food web (Smol et al. 2005, Quinlan et al. 2005).

With reduced summer sea ice coverage, the frequency and magnitude of coastal storm surges has increased. During these events, coastal lakes and low lying wetlands are often breached, altering soil/water chemistry as well as floral and faunal communities (USGS 2006). When coupled with softer, semi-thawed permafrost, reductions in sea ice have significantly increased coastal erosion rates (USGS 2006), which may reduce available coastal tundra habitat over time.

Changes in precipitation patterns, air and soil temperatures, and water chemistry are also affecting terrestrial communities (Hinzman et al. 2005, Prowse et al. 2006, Chapin et al. 1995), and the range of some boreal vegetation species is expanding northward (Callaghan et al. 2004). Climate-induced shifts in distributions of predators, parasites, and disease vectors may also have
significant effects on listed and un-listed species. Climate change may also cause mismatched phenology among listed eider migration, development of tundra wetland invertebrate stocks, fluctuation of small mammal populations, and corresponding abundance of predators (Callaghan et al. 2004).

While the impacts of climate change are on-going and the ultimate effects on listed eiders within the action area are unclear, species with small populations are more vulnerable to the impacts of environmental change (Crick 2004). Some species may adapt and thrive under changing environmental conditions, while others decline or suffer reduced biological fitness.

**Regional activities requiring formal section 7 consultation**

Activities on the eastern ACP that required formal section 7 consultations, and the estimated associated incidental take of listed eiders, is presented in Table 5.1. The table illustrates the number and diversity of actions that have required consultation in the region. We believe these estimates have overestimated, possibly significantly, actual take. Actual take is spread over the life-span of a project, and is dominated by the potential loss of eggs/ducklings, which we expect to have substantially lower population-level effects compared to adult mortality for this species (see further discussion *Effects of the Action on Listed Species*).

Table 5.1 - Activities on the Arctic Coastal Plain that required formal section 7 consultations and the amount of incidental take authorized. Listed activities include those where effects to listed eiders may occur in the Colville River Delta east to the Sagavanirktok River.

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Impact Type</th>
<th>Estimated Incidental Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-Service, Issuance of Section 10 permits for spectacled eider (2000)</td>
<td>Disturbance</td>
<td>10 spectacled eiders</td>
</tr>
<tr>
<td></td>
<td>Collection</td>
<td>10 spectacled eider eggs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 spectacled eiders</td>
</tr>
<tr>
<td>Alpine Development Project (2004)</td>
<td>Habitat loss</td>
<td>4 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td></td>
<td>Collisions</td>
<td>3 adult spectacled eiders</td>
</tr>
<tr>
<td>ABR Avian Research/USFWS Intra-Service Consultation (2005)</td>
<td>Disturbance</td>
<td>5 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Pioneer’s Oooguruk Project (2006)</td>
<td>Habitat loss</td>
<td>3 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td></td>
<td>Collisions</td>
<td>3 adult spectacled eiders</td>
</tr>
<tr>
<td>Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2006)</td>
<td>Disturbance</td>
<td>7 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>KMG Nikaichuq Project (2006)</td>
<td>Habitat loss</td>
<td>2 spectacled eiders/year</td>
</tr>
<tr>
<td></td>
<td>Collisions</td>
<td>7 adult spectacled eiders</td>
</tr>
<tr>
<td>BP 69kV powerline between Z-Pad and GC 2 (2006)</td>
<td>Collisions</td>
<td>10 adult spectacled eiders</td>
</tr>
<tr>
<td>BP Liberty Project (2007)</td>
<td>Habitat loss</td>
<td>2 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td></td>
<td>Collisions</td>
<td>1 adult spectacled eider</td>
</tr>
<tr>
<td>Intra-service on Subsistence Hunting Regulations (2007)</td>
<td>No estimate of incidental take provided</td>
<td></td>
</tr>
<tr>
<td>Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2007)</td>
<td>Disturbance</td>
<td>6 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Intra-service on Subsistence Hunting Regulations (2008)</td>
<td>No estimate of incidental take provided</td>
<td></td>
</tr>
<tr>
<td>BLM Programmatic on Summer Activities in NPR-A (2008)</td>
<td>Disturbance</td>
<td>56 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Project/Study</td>
<td>Incidence Type</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>BLM Northern Planning Areas of NPR-A (2008)</td>
<td>Disturbance</td>
<td>87 spectacled eider eggs/ducklings/year</td>
</tr>
<tr>
<td></td>
<td>Collision</td>
<td>&lt; 1 adult Steller’s eider</td>
</tr>
<tr>
<td>MBM/USFWS Intra-Service, Shorebird studies and white-fronted goose banding in</td>
<td>Disturbance</td>
<td>21 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>NPR-A (2008)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BP Alaska’s Northstar Project (2009)</td>
<td>Collisions</td>
<td>≤ 2 adult spectacled eiders/year</td>
</tr>
<tr>
<td>Intra-Service, Section 10 permit for USGS telemetry research on spectacled</td>
<td>Loss of</td>
<td>130 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>eider use of the Bering, Chukchi, and Beaufort Seas (2009; North Slope field</td>
<td>Production</td>
<td></td>
</tr>
<tr>
<td>sites)</td>
<td>Capture/surgery</td>
<td>4 adult spectacled eiders</td>
</tr>
<tr>
<td>Intra-service on Subsistence Hunting Regulations (2009)</td>
<td></td>
<td>No estimate of incidental take provided</td>
</tr>
<tr>
<td>BLM Programmatic on Summer Activities in NPR-A (2009)</td>
<td>Disturbance</td>
<td>49 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Minerals Management Service Beaufort and Chukchi Sea Program Area Lease Sales</td>
<td>Collision</td>
<td>12 adult spectacled eiders</td>
</tr>
<tr>
<td>(2009)</td>
<td></td>
<td>&lt;1 adult Steller’s eider</td>
</tr>
<tr>
<td>Intra-Service, Migratory Bird Subsistence Hunting Regulations (2010)</td>
<td></td>
<td>No estimate of incidental take provided</td>
</tr>
<tr>
<td>Intra-Service, Section 10 permit for USGS telemetry research on spectacled</td>
<td>Loss of</td>
<td>130 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>eider use of the Bering, Chukchi, and Beaufort Seas (2010; North Slope field</td>
<td>Production</td>
<td></td>
</tr>
<tr>
<td>sites)</td>
<td>Capture/handling/</td>
<td>7 adult/juvenile spectacled eiders (lethal take)</td>
</tr>
<tr>
<td>surgery</td>
<td></td>
<td>108 adult/juvenile spectacled eiders (non-lethal take)</td>
</tr>
<tr>
<td>BLM Programmatic on Summer Activities in NPR-A (2010)</td>
<td>Disturbance</td>
<td>32 Spectacled eider eggs</td>
</tr>
<tr>
<td>Intra-Service, USFWS Migratory Bird Management goose banding on the North</td>
<td>Disturbance</td>
<td>4 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Slope of Alaska (2010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-Service, Section 10 permit for ABR Inc.’s eider survey work on the North</td>
<td>Disturbance</td>
<td>35 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Slope and at Cook Inlet (2010)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-Service, Migratory Bird Subsistence Hunting Regulations (2011)</td>
<td>Shooting</td>
<td>400 adult spectacled eiders (lethal take)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 adult Steller’s eiders (lethal take)</td>
</tr>
<tr>
<td>Intra-Service, Section 10 permit for ABR Inc.’s eider survey work on the North</td>
<td>Disturbance</td>
<td>20 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Slope and at Cook Inlet (2011)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intra-Service, Section 10 permit for USGS telemetry research on spectacled</td>
<td>Capture/handling/</td>
<td>65 juvenile + 13 adult spectacled eiders (non-lethal take)</td>
</tr>
<tr>
<td>eider use of the Bering, Chukchi, and Beaufort Seas (2011; Colville River</td>
<td>surgery</td>
<td>7 adult/juvenile spectacled eiders (lethal take)</td>
</tr>
<tr>
<td>Delta field site)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ConocoPhillips Alaska, Inc’s CD-5 Project (Alpine reinitiation; 2011)</td>
<td>Habitat loss</td>
<td>59 spectacled eider eggs/ducklings</td>
</tr>
<tr>
<td>Intra-Service, Migratory Bird Subsistence Hunting Regulations (2012)</td>
<td>Shooting</td>
<td>400 adult spectacled eiders (lethal take)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 adult Steller’s eiders (lethal take)</td>
</tr>
<tr>
<td>CPAI DS-2S Development (2013)</td>
<td>Habitat loss</td>
<td>8 spectacled eider eggs</td>
</tr>
<tr>
<td></td>
<td>Collisions</td>
<td>≤ 5 adult spectacled eiders (lethal take)</td>
</tr>
<tr>
<td>Kuukpik Nuiqsut Spur Road (2013)</td>
<td>Habitat loss</td>
<td>47 spectacled eider eggs</td>
</tr>
<tr>
<td></td>
<td>Shooting</td>
<td>≤ 4 adult spectacled eiders (lethal take)</td>
</tr>
</tbody>
</table>
6. EFFECTS OF THE ACTION ON LISTED SPECIES

This section of the BO provides an analysis of the effects of the action on listed species and, where appropriate, critical habitat. Both direct effects (effects immediately attributable to the action) and indirect effects (effects that are caused by or will result from the proposed action and may be later in time, but are still reasonably certain to occur) are considered. Interrelated and interdependent effects of the action are also discussed.

Our analyses of the effects of the action on species listed under the ESA include consideration of ongoing and projected changes in climate. The terms “climate” and “climate change” are defined by the Intergovernmental Panel on Climate Change (IPCC). “Climate” refers to the mean and variability of different types of weather conditions over time, with 30 years being a typical period for such measurements, although shorter or longer periods also may be used (IPCC 2007). The term “climate change” thus refers to a change in the mean or variability of one or more measures of climate (e.g., temperature or precipitation) that persists for an extended period, typically decades or longer, whether the change is due to natural variability, human activity, or both (IPCC 2007). Various types of changes in climate can have direct or indirect effects on species. These effects may be positive, neutral, or negative and they may change over time, depending on the species and other relevant considerations, such as the effects of interactions of climate with other variables (e.g., habitat fragmentation) (IPCC 2007). In our analyses, we use our expert judgment to weigh relevant information, including uncertainty, in our consideration of various aspects of climate change.

Effects to spectacled eiders
Adverse effects to spectacled eiders could occur through long-term habitat loss, and loss of production; each of these factors is evaluated below.

Long-term habitat loss
Direct, permanent habitat loss would result from the extraction or placement of gravel fill impacting up to 1,000 acres (4.7 km²) of wetlands. We do not anticipate significant long-term habitat loss from ice road operations associated with winter gravel work. Research indicates that damage from ice roads occurs on higher, drier sites with little or no damage in wet or moist tundra areas (Pullman et al. 2003) when ice roads are used. Jorgenson (1999) found impacts were limited to isolated patches of scuffed high mirosites and crushed tussocks. McKendrick (2003) studied several riparian willow areas and found although some branches were damaged, the affected plants survived. Because listed eiders prefer to nest in low moist tundra areas (Anderson and Cooper 1994, Anderson et al. 2009), we anticipate limited damage in higher drier tundra habitat from ice roads would not adversely affect spectacled eiders.

We also anticipate indirect habitat loss via disturbance will occur within a 200 m (656.17 ft) zone of influence surrounding new development from on-pad activities, road operations, and maintenance activities. The two principal mechanisms through which disturbance can adversely affect eiders on their breeding grounds are:

1. Displacing adults and/or broods from preferred habitats during pre-nesting, nesting, brood rearing, and migration; and
2. Displacing females from nests, exposing eggs or small young to inclement weather and predators.

Loss of production
In the discussion below, we provide an assessment of potential loss of spectacled eider production resulting from estimated wetland impacts associated with predicted expansion of gravel infrastructure on the North Slope. This assessment uses estimates of spectacled eider density on the ACP from waterfowl breeding population survey data from the region (Larned et al. 2011). These estimates were developed at a coarse regional scale and are not site- or habitat-specific; however, they reflect the best available data on the density of breeding spectacled eiders in the action area. Distribution on a local scale may vary based on the availability of preferred habitats.

Habitat loss could occur through direct or indirect effects. Including a possible increase in projects involving extraction or placement of gravel from the previous two years (2012-2013), direct loss of habitat is expected to occur by impacts to approximately 1000 acres (4.7 km²) of tundra wetlands for projects occurring in the 2014 and 2015 calendar years. In addition, indirect habitat loss may occur through displacement of eiders from surrounding areas affected by disturbance. Assuming this affect may occur over 200 m, the area of total habitat loss, including direct habitat loss and a 200 m zone of influence, is estimated to be 2,625 acres (10.6 km²).

Spectacled eider density polygons constructed from data collected during the 2007–2010 waterfowl breeding population survey of the ACP (Larned et al. 2011) provide our best estimate of spectacled eider nest density in the action area. Estimated spectacled eider density between the Colville and Sagavanirktok rivers on the North Slope ranged from 0 to 1.531 birds/km² (Larned et al. 2011). To estimate the number of spectacled eider pairs potentially displaced by projects involving wetland impacts, we applied the intermediate estimated density category (> 0.112 - ≤ 0.236) and multiplied its median (0.174 birds/km²) by the total estimated affected area (10.6 km²). We assume the estimated number of pairs displaced is equivalent to the number of nests or broods that may be affected. We also assume that spectacled eiders will be present and attempt to nest annually in the action area. Finally, we assume that displaced pairs will not move and successfully nest elsewhere, which is an unproven and conservative assumption. The potential loss of production in terms of numbers of eggs or ducklings lost was based on an average clutch size of 3.9 for spectacled eiders in northern Alaska (Petersen et al. 2000, Bart and Earnst 2005, Johnson et al. 2008). Applying these assumptions and this logic, we estimate the proposed action would cause the failure of 28 spectacled eider nests over 30 years of estimated infrastructure life:

\[
0.174 \text{ birds/km}^2 \times 0.5 \text{ nests/pair} \times 10.6 \text{ km}^2 = 0.92 \text{ nests annually}
\]

\[
0.92 \text{ nests annually} \times 30 \text{ years} = 27.7 \text{ spectacled eider nests}
\]

Based on an average clutch size of 3.9 eggs for spectacled eiders (Petersen et al. 2000, Bart and Earnst 2005, Johnson et al. 2008), we estimate up to 108 eggs could be lost due to nest abandonment.
27.7 nests × 3.9 eggs or ducklings per nest = 107.9 eggs lost

Loss of eggs is of much lower significance for survival and recovery of the species than the death of an adult bird. For example, when nest success, fledging success, over-winter survival, and annual survival are taken in context, we estimate roughly 1-7 out of every 100 spectacled eiders hatched on the Y-K Delta would enter the breeding population (Grand and Flint 1997, Flint et al. 2000, Grand et al. 1998, and Flint pers. comm.). Similarly, we would expect only a small proportion of spectacled eider eggs or ducklings hatched on the North Slope to survive to recruit into the breeding population.

Because the most recent population estimate for North Slope-breeding spectacled eiders is 14,814 (13,501–16,128, 90% CI; Stehn et al. 2013), and recruitment into the breeding population is very low, we would not anticipate population level effects from the loss of 108 eggs from 28 abandoned nests as a result of disturbance associated with projects involving wetland impacts occurring in the 2014 and 2015 calendar years.

7. CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. 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 ESA. When analyzing cumulative effects of a proposed action, it is important to define both the spatial (geographic), and temporal (time) boundaries. Within these boundaries, the types of actions that are reasonably foreseeable are considered.

Future development by the State of Alaska or the North Slope Borough may occur in the area through developments like improved roads, transportation facilities, utilities, or other infrastructure. However, the entire action area, and the undeveloped surrounding lands are wetlands, and are therefore subject to section 404 permitting requirements by the USACE. This permitting process would serve as a federal nexus, and hence trigger a review of any major state or borough construction project in the area.

8. CONCLUSION

Regulations (51 CFR 19958) that implement section 7(a)(2) of the ESA define “jeopardize the continued existence of” as “to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.”

Spectacled eider
In evaluating impacts of the proposed project to spectacled eiders, the Service identified potential adverse effects from direct and indirect long-term habitat loss. Using methods explained in the Effects of the Action section, the Service estimates potential loss of production of up to 108 eggs from 28 nests. Given that this loss would occur over an estimated 30 year infrastructure life, and the estimated loss of potential production (< 1 nest per year) is an extremely small proportion of
the estimated North Slope-breeding population of spectacled eiders (13,501–16,128, 90% CI; Stehn et al. 2013), we believe spectacled eider loss that may result from projects involving wetland impacts occurring in the 2014 and 2015 calendar years would not significantly affect the likelihood of survival and recovery of the species. Therefore, after reviewing the current status of the species, environmental baseline, and effects of the action, the Service concludes that the proposed action is not likely to jeopardize the continued existence of the spectacled eider by reducing appreciably its reproduction, numbers, or distribution, thereby reducing the likelihood of its survival and recovery in the wild.

Future Consultation
This BO’s determination of non-jeopardy is based on the assumption that the USACE and their agents will consult with the Service on future activities related to industry expansion on the North Slope that are not evaluated in this document (e.g., new oil and gas developments).

In addition to listed eiders, the area affected by the proposed action may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered. The Service, through future consultation, may recommend alternatives to future development within the project area to prevent activity that will contribute to a need to list such a species or their habitat. The Service may require alternatives to proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species, or result in the destruction or adverse modification of designated or proposed critical habitat. The Federal action agencies should not authorize any activity that may affect such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended (16 U.S.C. 1531 et seq.), including completion of any required procedure for conference or consultation.

9. INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and Federal regulations pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or 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 that 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 section 7(o)(2), taking that is incidental to and not intended as part of the agency action, is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

USACE has a continuing duty to regulate the activity covered by this ITS. If USACE (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 ITS through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse.
**Spectacled Eider**
The activities described and assessed in this BO may adversely affect spectacled eiders through direct and indirect long-term habitat loss. Methods used to estimate spectacled eider take from habitat loss are described in the *Effects of the Action* section. Based on these estimates, the Service authorizes *loss of production from 28 nests lost* as a result of the proposed action.

While the incidental take statement provided in this consultation satisfies the requirements of the ESA, it does not constitute an exemption from the prohibitions of take of listed migratory birds under the more restrictive provisions of the Migratory Bird Treaty Act. However, the Service will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703–712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668–668d), if such take is in compliance with the terms and conditions specified herein.

**10. REASONABLE AND PRUDENT MEASURES**

These reasonable and prudent measures (RPMs) and their implementing terms and conditions aim to minimize the incidental take anticipated from activities described in this BO. As described in the *Effects of the Action* and *Incidental Take Statement*, activities authorized by USACE are anticipated to lead to incidental take of spectacled eiders through direct and indirect long-term habitat loss.

RPM A – Minimize impacts to nesting females by avoiding gravel placement on undisturbed tundra during the nesting period of spectacled eiders; and

RPM B – Work with the Service to ensure all effects of proposed activities have been considered prior to authorizing those activities.

**11. TERMS AND CONDITIONS**

To be exempt from the prohibitions of Section 9 of the Act, USACE and their agents must comply with the following terms and conditions, which implement the RPMs described above. These terms and conditions are non-discretionary.

*T&C 1* – USACE will not permit ground disturbing activity from June 1 through July 31; and

*T&C 2* – To ensure all effects of proposed activities have been considered, prior to authorizing activities, USACE must provide the Service’s Endangered Species Branch with project descriptions a minimum of 30 days prior to the applicant’s anticipated start date.

Prior to authorizing a project, USACE will contact the Service with a description of proposed activities. The Service will review this information to ensure the activities are within the scope of this programmatic BO. This information will be recorded in a table which will be maintained and updated by the Service upon notification from USACE regarding individual projects that
would meet the conditions for coverage under this BO. In addition to facilitating an analysis of project-specific impacts, this information will:

- Assist in determining if the programmatic consultation adequately assessed effects (e.g., if activities are concentrated in specific areas then a more region specific density estimate may be appropriate); and,

- Determine if the number and types of activities that actually occurred were accurately estimated and help evaluate the benefit of a programmatic approach for USACE and the Service in terms of work load and responsiveness to applicants.

12. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs federal agencies to use their authorities to further the purposes of the ESA 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. We recommend the following actions be implemented:

1. While collisions between spectacled eiders and features associated with infrastructure expansion projects are not anticipated, the Service recommends reporting all sea duck collisions to the Endangered Species Branch, Fairbanks Fish and Wildlife Field Office to improve our understanding of collision risks to eiders in the project area. Contact Shannon Torrence at 907-455-1871 for information on how to report bird collisions.

13. REINITIATION NOTICE

This concludes formal consultation for predicted wetland impacts from projects involving extraction or placement of gravel fill occurring in the 2014 and 2015 calendar years north of 70° 00’ N on the North Slope of Alaska, between the Colville River and Sagavanirktok River. As provided in 50 CFR 402.16, re-initiation 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 for spectacled eiders is exceeded;
   a. More than 108 spectacled eider eggs over the period covered by this BO;
2. The total directly impacted wetland area exceeds 1000 acres (4.7 km²);
3. New information reveals effects of the action that may affect listed species in a manner or to an extent not considered in this opinion;
4. The agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat not considered in this opinion; or
5. A new species is listed or critical habitat is designated that may be affected by the action.
14. LITERATURE CITED


Wetland Impacts
Programmatic BO
USACE 2014


15. APPENDIX 1: POLAR BEAR INTERACTION GUIDELINES

These Polar Bear Interaction Guidelines (Guidelines) were developed to ensure that activities are conducted in a manner that avoids conflicts between humans and polar bears. Polar bears are protected under the Marine Mammal Protection Act (MMPA), and were listed as a threatened species under the Endangered Species Act (ESA) in 2008. The MMPA and ESA both prohibit the “take” of polar bears without authorization. Take includes disturbance/harassment, as well as physical injury and killing of individuals.

In addition to sea ice, polar bears use marine waters and lands in northern Alaska for resting, feeding, denning, and seasonal movements. They are most likely to be encountered within 25 miles of the coastline, especially along barrier islands during July-October. Polar bears may also be encountered farther inland, especially females during the denning period (October-April). Polar bears may react differently to noise and human presence. The general methods for minimizing human-bear conflicts are to: 1) avoid detection and close encounters; 2) minimize attractants; and 3) recognize and respond appropriately to polar bear behaviors. These Guidelines provide information for avoiding conflicts with polar bears during air, land, or water-based activities.

Unusual sightings or questions/concerns can be referred to: Susanne Miller or Craig Perham, Marine Mammals Management Office (MMM Office), 1-800-362-5148; or to Sarah Conn (907) 456-0499 of the Fairbanks Fish & Wildlife Field Office (FFWFO).

**When operating aircraft:**

- If a polar bear(s) is encountered, divert flight path to a minimum of 2,000 feet above ground level or ½ mile horizontal distance away from observed bear(s) whenever possible.

**When traveling on land or water:**

- Avoid surprising a bear. Be vigilant—especially on barrier islands, in river drainages, along bluff habitat, near whale or other marine mammal carcasses, or in the vicinity of fresh tracks.

- Between October and April special care is needed to avoid disturbance of denning bears. If activities are to take place in that time period the MMM Office should be contacted to determine if any additional mitigation is required. In general, activities are not permitted within one mile of known den sites.

- Avoid carrying bear attractants (such as strongly scented snacks, fish, meat, or dog food) while away from camp; if you must carry attractants away from camp, store foods in airtight containers or bags to minimize odor transmission until you return them to “bear-resistant” containers.*
• If a polar bear(s) is encountered, remain calm and avoid making sudden movements. Stay downwind if possible to avoid allowing the bear to smell you. Do not approach polar bears. Allow bears to continue what they were doing before you encountered them. Slowly leave the vicinity if you see signs that you’ve been detected. Be aware that safe viewing distances will vary with each bear and individual situation. Remember that the closer you are to the animal, the more likely you are to disturb it.

• If a bear detects you, observe its behavior and react appropriately. Polar bears that stop what they are doing to turn their head or sniff the air in your direction have likely become aware of your presence. These animals may exhibit various behaviors:

  ➢ *Curious* polar bears typically move slowly, stopping frequently to sniff the air, moving their heads around to catch a scent, or holding their heads high with ears forward. They may also stand up.

  ➢ *A threatened or agitated* polar bear may huff, snap its jaws together, stare at you (or the object of threat) and lower its head to below shoulder level, pressing its ears back and swaying from side to side. These are signals for you to begin immediate withdrawal by backing away from the bear. If this behavior is ignored, the polar bear may charge. Threatened animals may also retreat.

  ➢ In rare instances you may encounter a *predatory* bear. It may sneak or crawl up on an object it considers prey. It may also approach in a straight line at constant speed without exhibiting curious or threatened behavior. This behavior suggests the bear is about to attack. Standing your ground, grouping together, shouting, and waving your hands may halt the bear’s approach.

• If a polar bear approaches and you are in the bear’s path—or between a mother and her cubs—get out of the way (without running). If the animal continues to approach, stand your ground. Gather people together in a group and/or hold a jacket over your head to look bigger. Shout or make noise to discourage the approach.

• If a single polar bear attacks, defend yourself by using any deterrents available. If the attack is by a surprised female defending her cubs, remove yourself as a threat to the cubs.

*When camping:*

• Avoid camping or lingering in bear high-use areas such as river drainages, coastal bluffs and barrier islands.

• Store food and other attractants in “bear-resistant” containers*. Consider the use of an electric fence as additional protection. Do not allow the bear to receive food as a reward in your camp. A food-rewarded bear is likely to become a problem bear for you or someone else in the future.
• Maintain a clean camp. Plan carefully to: minimize excess food; fly unnecessary attractants out on a regular basis (i.e. garbage, animal carcasses, excess anti-freeze or petroleum products); locate latrines at least ¼ mile from camp; and wash kitchen equipment after every use.

• If a polar bear approaches you in camp, defend your space by gathering people into a large group, making noise and waving jackets or tarps. Continue to discourage the bear until it moves off. Have people watch the surrounding area in case it returns later, keeping in mind that polar bears are known to be more active at night. Additional measures to protect your camp, such as electric fences or motion sensors can be used.

Harassment of polar bears is not permissible, unless such taking (as defined under the MMPA) is imminently necessary in defense of life, and such taking is reported to FWS within 48 hours.

*Containers must be approved and certified by the Interagency Grizzly Bear Committee as "bear-resistant." Information about certified containers can be found at http://www.igbconline.org/html/container.html.