United States Department of the Interior

U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Room 110
Fairbanks, Alaska 99701

November 1, 2013

Harry A. Baij
U.S. Army Corps of Engineers
Alaska District Regulatory Division
P.O. Box 6898
Elmendorf Air Force Base, AK 99506

Re: Biological Opinion for Nuiqsut Spur Road POA-2013-68

This document transmits the U.S. Fish and Wildlife Service's (Service) final Biological Opinion (BO) on a proposal by Kuukpik Corporation (Kuukpik), to construct a spur road between the community of Nuiqsut, Alaska and the proposed CPAI CD-5 Road

This BO describes effects of the proposed action on listed spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*), pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, 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 but may adversely affect spectacled eiders and polar bears. Following review of the species status and environmental baseline of spectacled eiders and polar bears, and analysis of the potential effects of the proposed action on these listed entities, the Service has concluded the proposed action is not likely to jeopardize the continued existence of spectacled eiders or polar bears.

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

Ted Swem
Branch Chief
Endangered Species

BIOLOGICAL OPINION

for

POA-2013-68: Nuiqsut Spur Road

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

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

November 1, 2013

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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 Kuukpik Corporation (Kuukpik), to construct a spur road between the community of Nuiqsut, Alaska and the proposed CPAI CD-5 Road. Because the project will impact waters of the United States, Kuukpik has requested a Clean Water Act, Section 404 permit from the U.S. Army Corps of Engineers (USACE). USACE submitted the Public Notice of Application for Permit (POA) for the proposed action, to the Service on June 6, 2013.

This BO describes the effects of the proposed action on listed spectacled eiders (*Somateria fischeri*), Alaska-breeding Steller's eiders (*Polysticta stelleri*), and polar bears (*Ursus maritimus*), pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). We used information provided in the POA; project-specific communications with the USFWS Alaska Region Marine Mammal Management (USFWS MMM) office; other Service documents; and published and unpublished literature to develop this BO.

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 but may adversely affect spectacled eiders and polar bears.

Following review of the status and environmental baseline of spectacled eiders and polar bears, and analysis of the potential effects of the proposed action to these listed entities, the Service has concluded the proposed action is not likely to jeopardize the continued existence of spectacled eiders or polar bears.

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

Project Description

Spur Road

A 5.8 mi (9.5 km) road would be constructed north of Nuiqsut connecting with the proposed CD-5 road (Figure 2.1). The toe of the road would be 44 ft (13.4 m) wide and require approximately 300,000 cubic yards of material fill. The proposed Spur Road would connect to the existing Dump Road and an additional 35,000 cubic yards of fill would be required for approximately 1.3 acres of improvements Dump Road (Figure 2.2). In total, the proposed Spur Road and Dump Road improvements would fill approximately 40 acres (0.16 km^2) of tundra wetlands.

Laydown Pad
A 726 x 600 ft (221.3 x 182.9 m) gravel storage pad would be constructed at the southeast corner of the proposed CD-5 road intersection (Figure 2.3). The laydown pad would cover approximately 11.0 acres (0.16 km^2) of tundra wetlands and require 120,000 cubic yards of material fill.

Material Site
Gravel material for the proposed spur road and gravel pad would be obtained from the permitted ASRC mine on the east bank of the Colville River approximately 4 mi (6.4 km) east of Nuiqsut. Gravel sourced from the ASRC mine site would be transported via an approximately 10 mi (16.1 km) ice road during winter 2013/spring 2014 and permitted freshwater lakes and ponds would be used to support ice road construction (Figure 2.4).

Schedule of Activities
The project is scheduled to begin during the winter of 2013 with estimated completion by the end of summer 2014. It is assumed that the proposed construction would be permanent with a minimum life of 50 years.

Mitigation Measures
Conservations measures that USACE plans to implement to reduce potential impacts from project modifications to listed species and other wildlife are listed below:

- Culverts would be installed to minimize drainage interruption or changes to hydrology;

- Kuukpik proposes to create a 76.5 acre conservation easement in the Fish Creek Delta (Figure 2.5) to mitigate wetland impacts as a result of gravel placement during spur road construction; and

- The Nanuq, Inc. *Polar Bear and Wildlife Interaction Plan* has been developed for the proposed spur road, and will be updated annually in accordance with regulations for the issuance of Letters of Authorization (LOAs) for incidental take under Section 101(a)(5)(A) of the Marine Mammal Protection Act (MMPA). The plan provides procedures to protect both polar bears and humans. This plan incorporates the following provisions:
  - Education of all personnel working in polar bear habitat;
  - Procedures for ice road/off-site operations including den detection and avoidance;
  - Procedures for identifying, limiting, and isolating or removing bear attractants;
  - Procedures for early detection of bears, and an effective communication system to warn workers and direct appropriate responses;
  - Procedures for responding safely to bear encounters; and

- Procedures for reporting polar bear sightings and interactions to USFWS MMM.

Action Area

The action area includes the corridor surrounding the proposed 5.8 mi (9.5 km) spur road and storage pad north of Nuiqsut, Alaska as well as the proposed ice road and ASRC material site on the east bank of the Colville River (Figures 2.2-2.5).

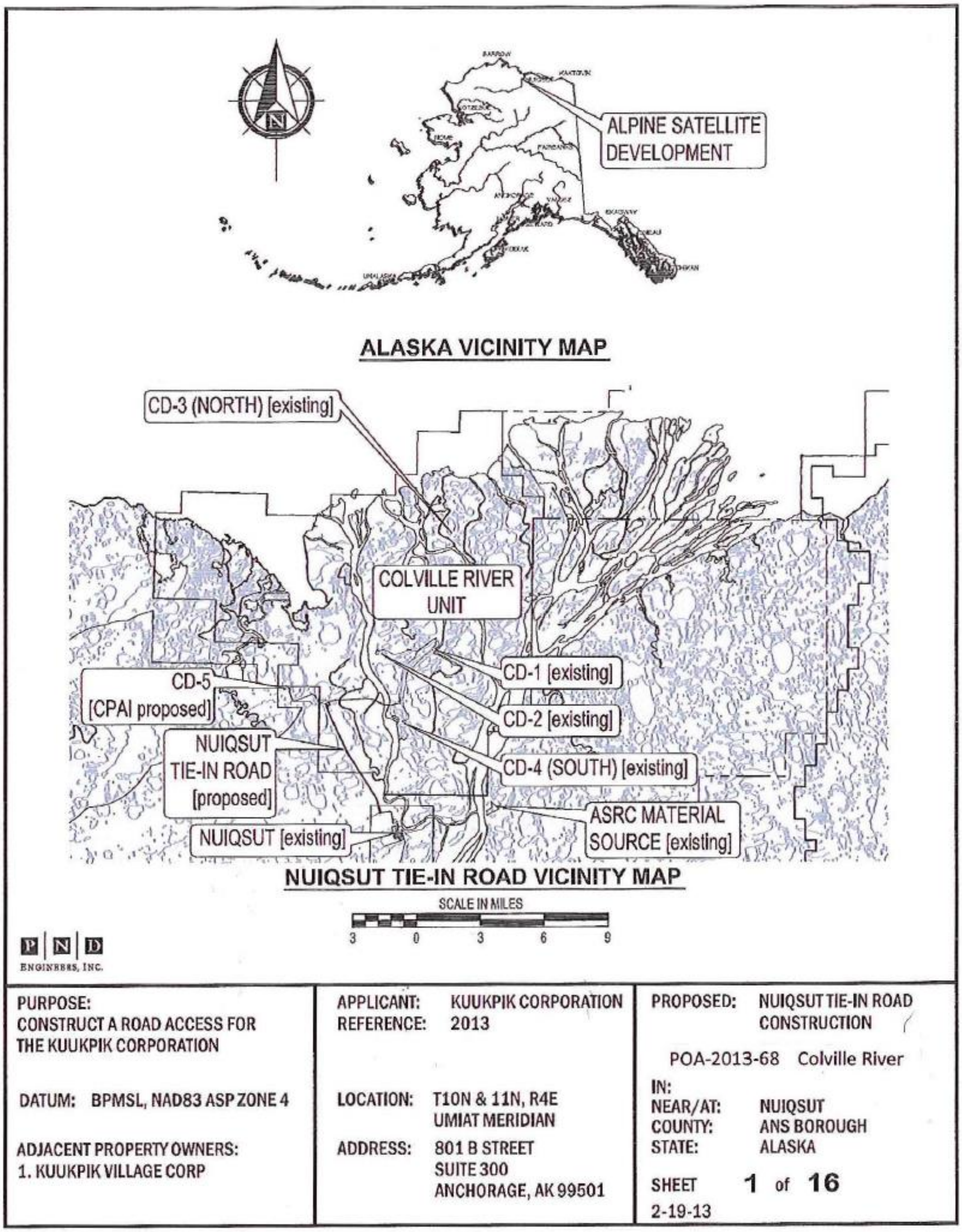

Figure 2.1. Location of the proposed Nuiqsut spur road north of Nuiqsut, Alaska.

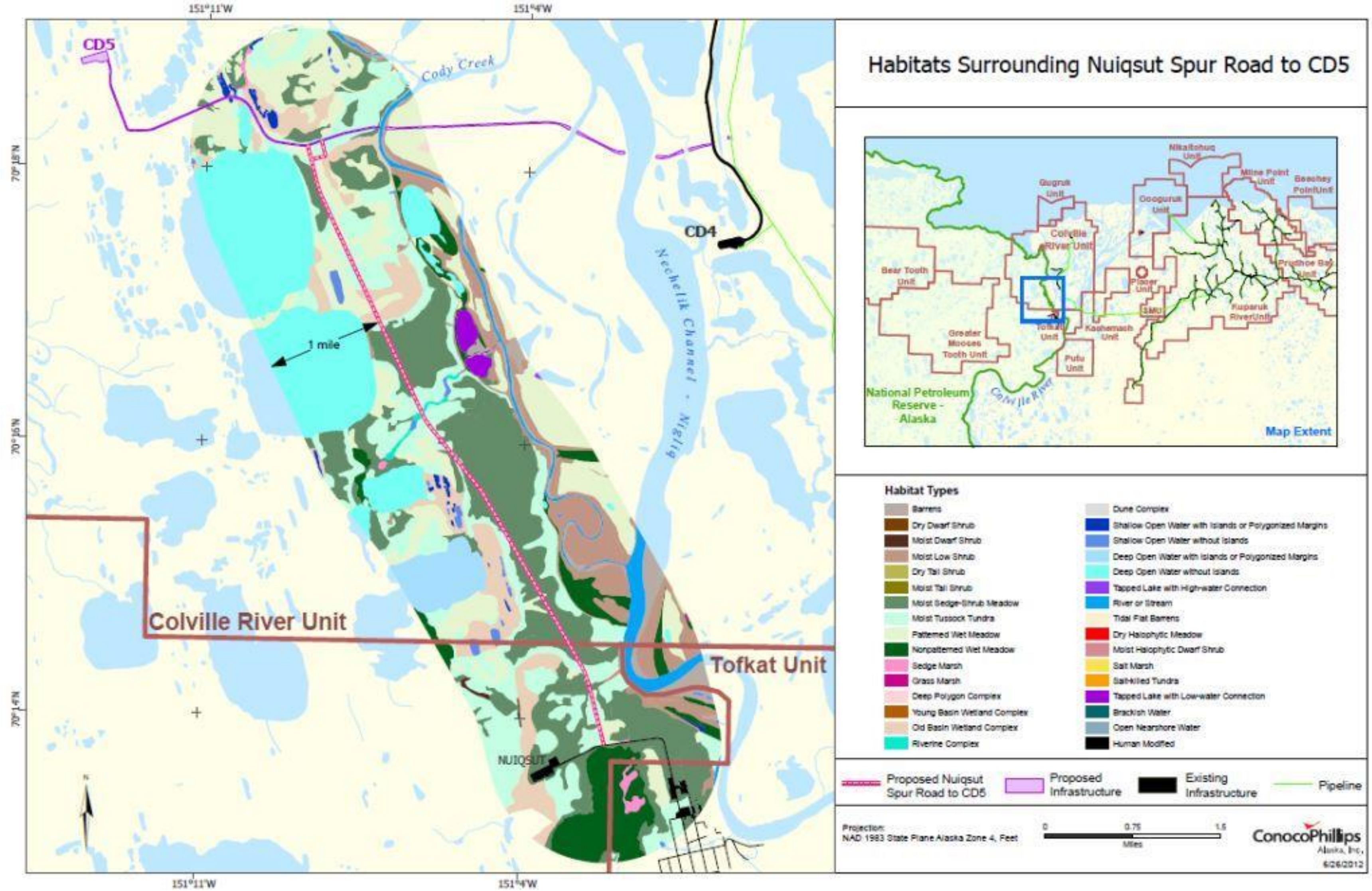

Figure 2.2. Detailed view of the project area including proposed Nuiqsut Spur road and CD-5 infrastructure, as well as habitat categories in and near the proposed road corridor north of Nuiqsut, Alaska.

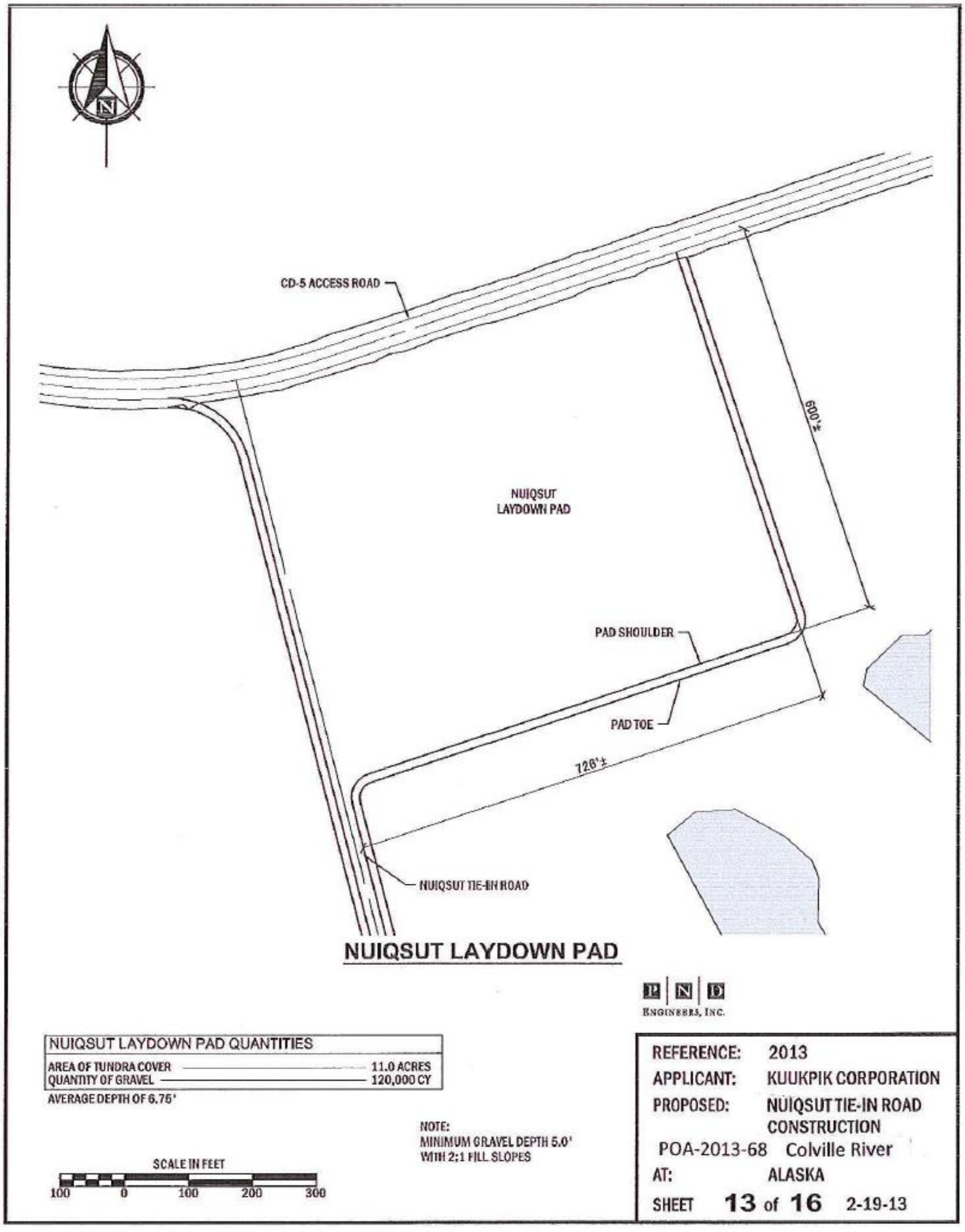

Figure 2.3. The proposed storage pad at the junction of the spur road and proposed CD-5 Road 5.8 mi (9.5 km) north of Nuiqsut, Alaska.

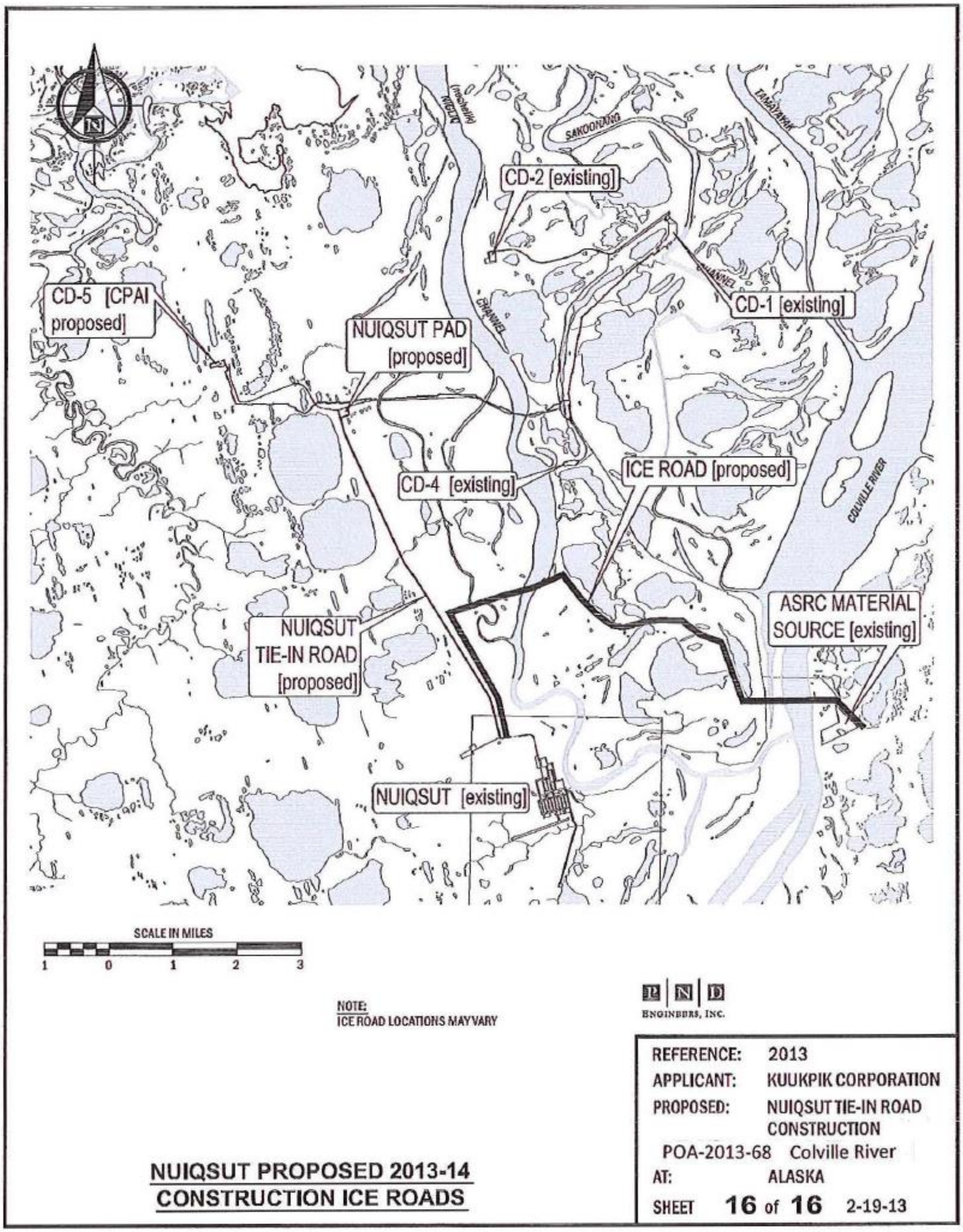

Figure 2.4. Approximate route of proposed ice road to access the ASRC gravel mine to source gravel for spur road construction during winter 2013/spring 2014.

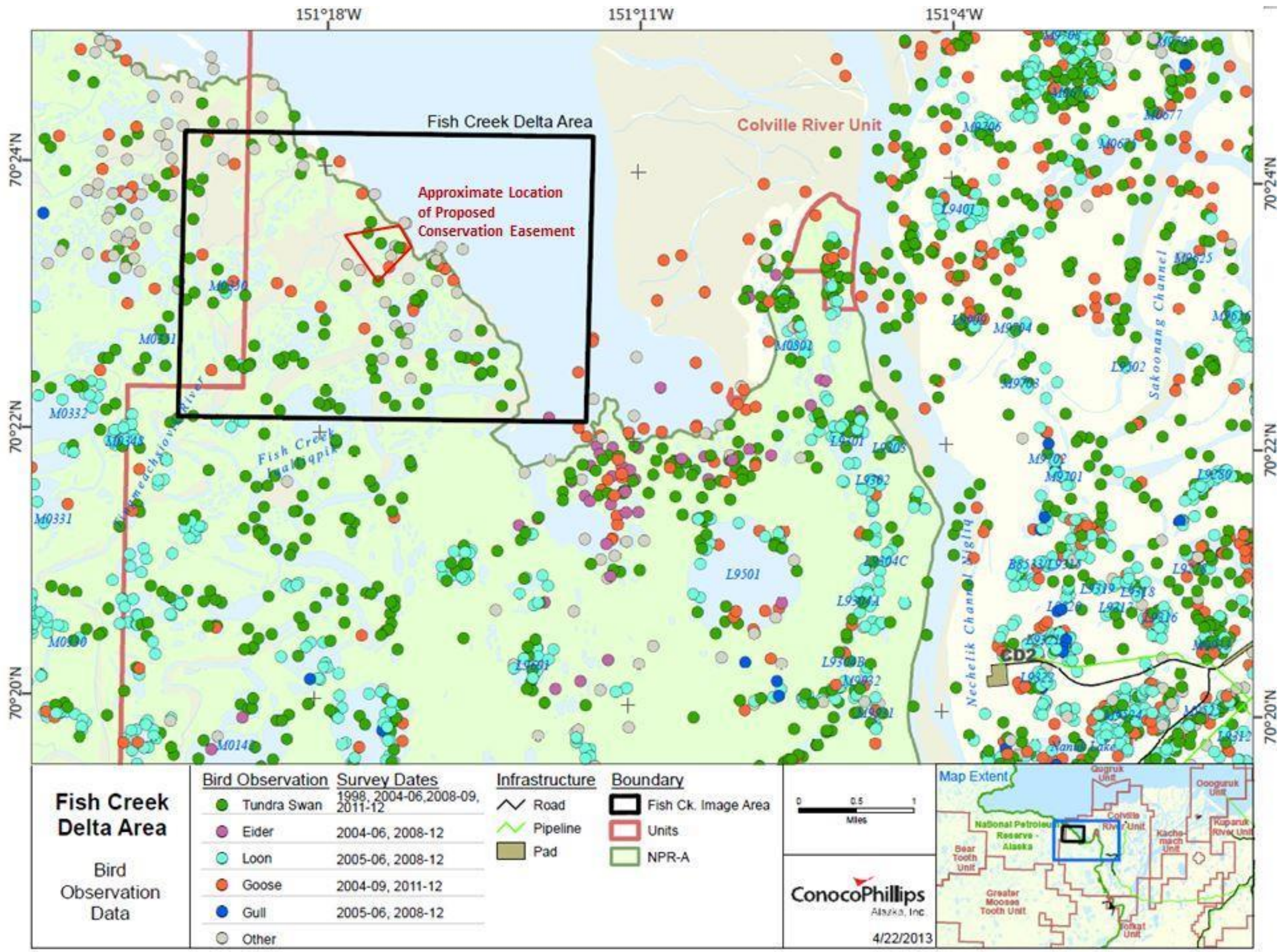

Figure 2.5. Approximate location of proposed conservation easement on the Fish Creek Delta northwest of Nuiqsut, Alaska on the Beaufort Sea coast.

3. EFFECT DETERMINATION FOR STELLER'S EIDER

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.

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 and Earnst 2005). 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 at 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 0.06–0.92 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.

(A)

(B)

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.

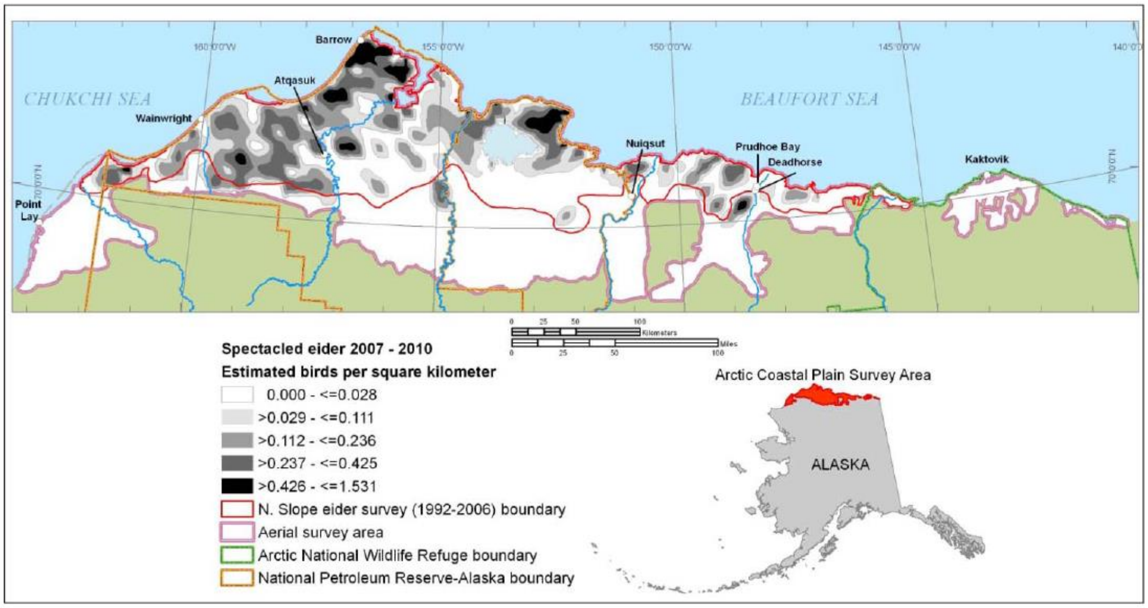

Figure 4.2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km^2 of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010 (Larned et al. 2011).

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.

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

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

(Korschgen 1977, Drent and Daan 1980, Parker and Holm 1990). 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 ± 35 g (n = 12), and slightly (but not significantly) more upon arrival at breeding sites (1,623 ± 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).

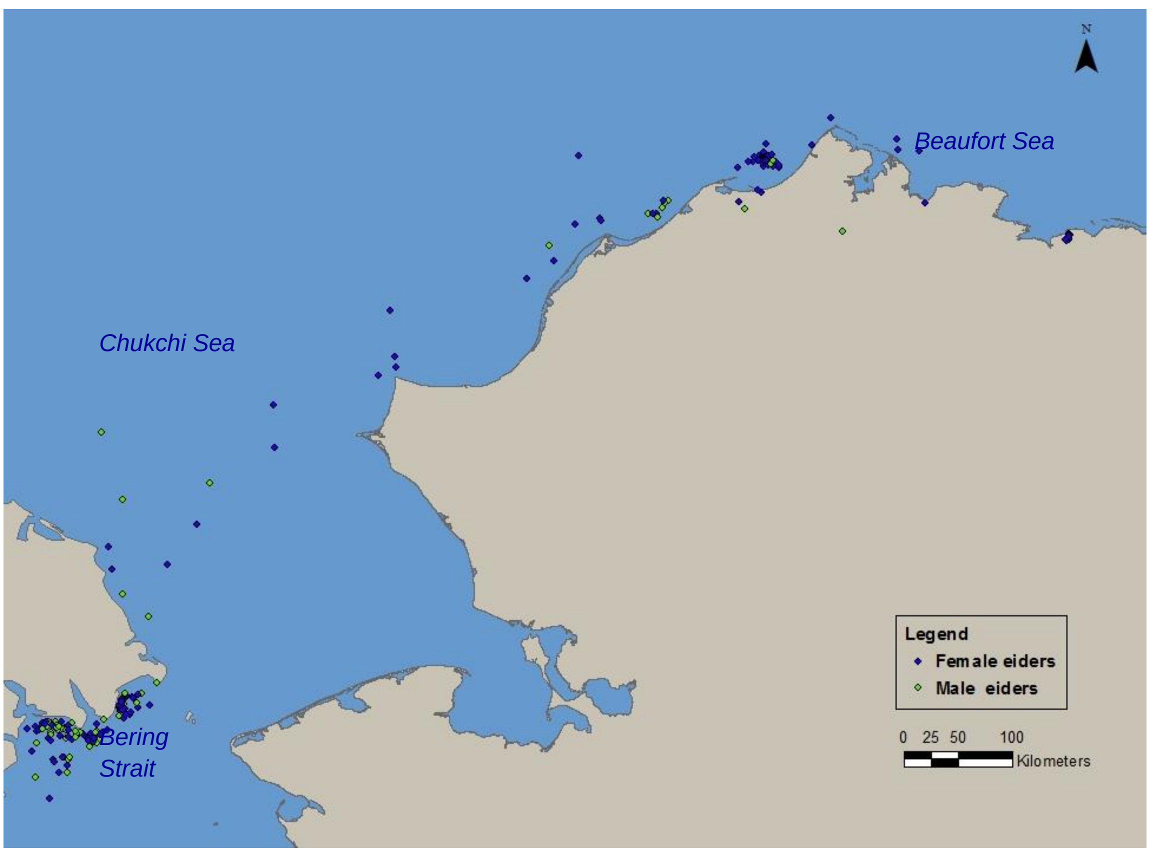

Figure 4.3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown.

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 nests in 2011 was estimated at 3,608 (SE 448) spectacled eiders nests on the YK-delta, 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.

Polar Bear

Status and Distribution

Due to threats to its sea ice habitat, on May 15, 2008 the Service listed the polar bear (*Ursus maritimus*) as threatened (73 FR 28212) throughout its range under the ESA. In the U.S., the polar bear is also protected under the MMPA and the Convention on International Trade in Endangered Species of Wildlife Fauna and Flora (CITES) of 1973.

Polar bears are widely distributed throughout the Arctic where the sea is ice-covered for large portions of the year (Figure 4.4). The number of polar bears is estimated to be 20,000-25,000 with 19 recognized management subpopulations or “stocks” (Obbard et al. 2010). The International Union for Conservation of Nature and Natural Resources, Species Survival Commission (IUCN/SSC) Polar Bear Specialist Group ranked 11, four, and three of these stocks as “data deficient,” “reduced,” and “not reduced,” respectively (Obbard et al. 2010). The status designation of “data deficient” for 11 stocks indicates that the estimate of the worldwide polar bear population was made with known uncertainty.

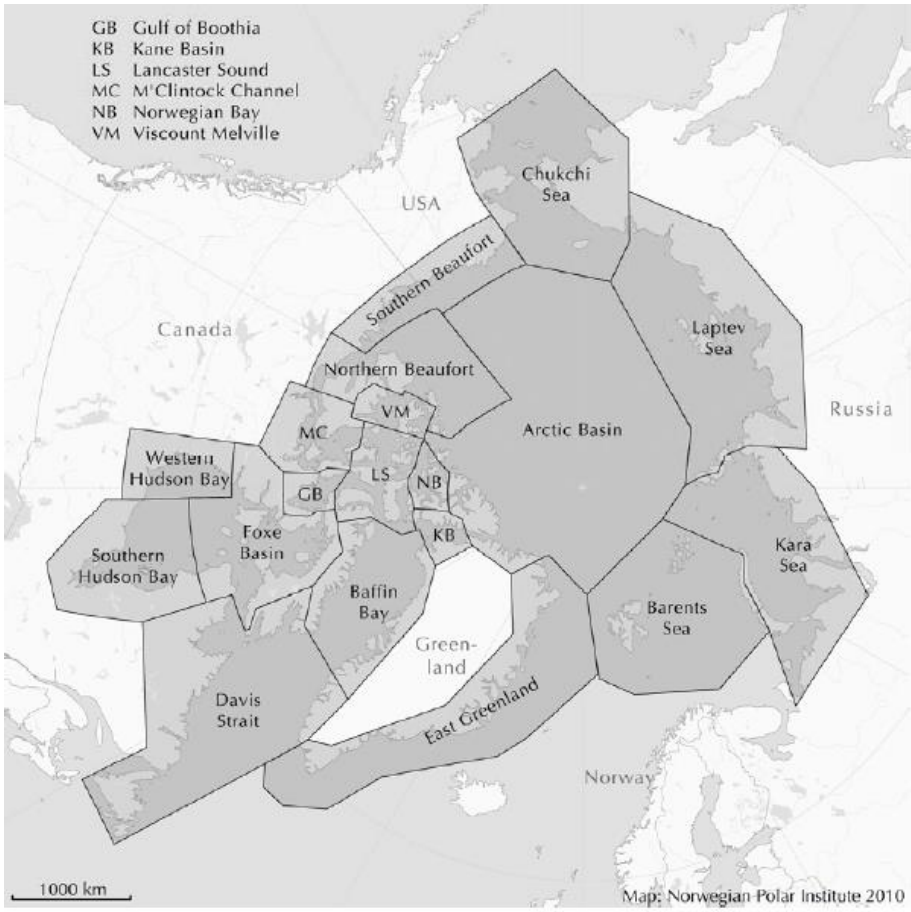

Figure 4.4. Distribution of polar bear stocks throughout the circumpolar basin (from Obbard et al. 2010).

Life History

For a complete life history of the polar bear, please see 73 FR 28212. We briefly describe the polar bear's food habits below.

Sea ice provides a platform for hunting and feeding, for seeking mates and breeding, for denning, for resting, and for long-distance movement. Ringed seals are the polar bear's primary food source, and areas near ice edges, leads, or polynyas where ocean depth is minimal are the most productive hunting grounds (Durner et al. 2004). While polar bears primarily hunt seals for food, they may occasionally consume other marine mammals (73 FR 28212). While the main food source of polar bears is ice seals, bowhead whale carcasses have been available to polar bears as a food source on the North Slope since the early 1970s (Koski et al. 2005) and therefore may affect their distribution locally. Barter Island (near Kaktovik) has had the highest recorded concentration of polar bears on shore (17.0 ± 6.0 polar bears/100 km) followed by Barrow (2.2 ± 1.8) and Cross Island (2.0 ± 1.8; Schliebe et al. 2008). Record numbers of polar bears were observed in 2012 in the vicinity of the bowhead whale carcass "bonepile" on Barter Island; the USFWS observed a minimum, maximum, and average of 24, 80, and 52 bears respectively (USFWS 2012). The high number of bears on/near Barter Island compared to other areas is thought to be due in part to the proximity to the ice edge and high ringed seal densities (Schliebe et al. 2008), as the whale harvest is at Kaktovik is lower than that at Barrow or Cross Island.

The use of whale carcasses as a food source likely varies among individuals and between years. Stable isotope analysis of polar bears in 2003 and 2004 suggested that bowhead whale carcasses comprised 11%-26% (95% CI) of the diets of sampled polar bears in 2003, and 0%-14% (95% CI) in 2004 (Bentzen et al. 2007). Polar bears depend on sea ice to hunt seals, and temporal and spatial availability of sea ice will likely decline. Thus, polar bear use of whale carcasses may increase in the future.

Threats to the Polar Bear

The arctic is losing sea ice, which will likely negatively affect polar bear populations. The loss rate of ice thickness is increasing (Haas et al. 2010), and trends in arctic sea ice extent and area (see http://nsidc.org/arcticseaicenews/faq/#area_extent for explanation of these terms) are negative (-12.2% and -13.5 %/decade, respectively; Comiso 2012). Declines in sea ice are more pronounced in summer than winter (NSIDC, 2011a, b). Positive feedback systems (i.e., sea-ice albedo) and naturally occurring events, such as warm water intrusion into the Arctic and changing atmospheric wind patterns, can cause fragmentation of sea ice, reduction in the extent and area of sea ice in all seasons, retraction of sea ice away from productive continental shelf areas throughout the polar basin, reduction of the amount of heavier and more stable multi-year ice, and declining thickness and quality of shore-fast ice (Parkinson et al. 1999, Rothrock et al. 1999, Comiso 2003, Fowler et al. 2004, Lindsay and Zhang 2005, Holland et al. 2006, Comiso 2006, Serreze et al. 2007, Stroeve et al. 2008). These climatic phenomena may also affect seal abundances, the polar bear's main food source (Kingsley 1979, DeMaster et al. 1980, Amstrup et al. 1986, Stirling 2002).

Warming-induced habitat degradation and loss are negatively affecting some polar bear stocks, and unabated global warming could reduce the worldwide polar bear population (Obbard et al. 2010). Loss of sea ice habitat due to climate change is identified as the primary threat to polar bears (Schliebe et al. 2006, 73 FR 28212, Obbard et al. 2010). Patterns of increased temperatures, earlier spring thaw, later fall freeze-up, increased rain-on-snow events (which can cause dens to collapse), and potential reductions in snowfall are also occurring. However, threats to polar bears will likely occur at different rates and times across their range, and uncertainty regarding their prediction makes management difficult (Obbard et al. 2010).

Because the polar bear depends on sea ice for its survival, loss of sea ice due to climate change is its largest threat worldwide, although polar bear subpopulations face different combinations of human-induced threats (Obbard et al. 2010). Arctic summer sea ice reached its lowest average extent in 2012 and has declined 13% since 1979 (NSIDC). The largest human-caused loss of polar bears is from subsistence hunting of the species, but for most subpopulations where subsistence hunting of polar bears occurs, it is a regulated and/or monitored activity (Obbard et al. 2010). Other threats include accumulation of persistent organic pollutants in polar bear tissue, tourism, human-bear conflict, and increased development in the Arctic (Obbard et al. 2010). Because uncertainty exists regarding the numbers of bears in some stocks and how human activities interact to ultimately affect the worldwide polar bear population, conservation and management of polar bears at the worldwide population level is challenging.

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, in the Kuparuk oilfield, 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 environmental contaminants, increased predator populations, incidental harvest, collisions with structures, long-term habitat loss through development and disturbance, and climate change. These impacts are occurring throughout much of the species' range, including within the action area.

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 all birds on the North Slope. Although the Service reports 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 (*Vulpes 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.

Harvest

Although local knowledge suggests spectacled eiders were not specifically targeted for subsistence, an unknown level of harvest occurred across the North Slope prior to listing spectacled eiders under the ESA (Braund et al. 1993). All harvest of spectacled eiders was closed in 1991 by Alaska State regulations and Service policy, and outreach efforts have been conducted by the Service, BLM, and North Slope Borough to encourage compliance. However, annual harvest data indicate that at least some listed eiders continue to be inadvertently or deliberately taken during subsistence activities on the North Slope. Ongoing efforts to help subsistence users avoid harvest of listed eiders are being implemented in North Slope villages and annual intra-service consultations are conducted for the Migratory Bird Subsistence Hunting Regulations. Although estimates are imprecise, harvest of all migratory bird species, including listed eiders, are reported annually.

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, increased development and disturbance in recent decades has impacted listed eiders through loss of nesting habitat.

For example, existing oil and gas industry developments in the KRU 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 towards the National Petroleum Reserve – Alaska (NPR-A) which lies just west of Nuiqsut. Given industry interest in NPR-A, expressed in lease sales, seismic surveys, and exploratory wells, westward 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.

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), on-tundra activities and 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.

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 eastern 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.

Project Name	**Impact Type**	**Estimated Incidental Take**
Intra-Service, Issuance of Section 10 permits for spectacled eider (2000)	Disturbance Collection	10 spectacled eiders 10 spectacled eider eggs 25 spectacled eiders
Alpine Development Project (2004)	Habitat loss Collisions	4 spectacled eider eggs/ducklings 3 adult spectacled eiders
ABR Avian Research/USFWS Intra-Service Consultation (2005)	Disturbance	5 spectacled eider eggs/ducklings
Pioneer's Oooguruk Project (2006)	Habitat loss Collisions	3 spectacled eider eggs/ducklings 3 adult spectacled eiders
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2006)	Disturbance	7 spectacled eider eggs/ducklings
KMG Nikaitchuq Project (2006)	Habitat loss Collisions	2 spectacled eiders/year 7 adult spectacled eiders
BP 69kV powerline between Z-Pad and GC 2 (2006)	Collisions	10 adult spectacled eiders
BP Liberty Project (2007)	Habitat loss Collisions	2 spectacled eider eggs/ducklings 1 adult spectacled eider
Intra-service on Subsistence Hunting Regulations (2007)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2007)	Disturbance	21 spectacled eider eggs/ducklings
Intra-Service Consultation on MBM Avian Influenza Sampling in NPR-A (2007)	Disturbance	6 spectacled eider eggs/ducklings
Intra-service on Subsistence Hunting Regulations (2008)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2008)	Disturbance	56 spectacled eider eggs/ducklings
BLM Northern Planning Areas of NPR-A (2008)	Disturbance Collision	87 spectacled eider eggs/ducklings/year 12 Steller's eider eggs/ducklings/year < 7 adult spectacled eiders < 1 adult Steller's eider
MBM/USFWS Intra-Service, Shorebird studies and white-fronted goose banding in NPR-A (2008)	Disturbance	21 spectacled eider eggs/ducklings
BP Alaska's Northstar Project (2009)	Collisions	≤ 2 adult spectacled eiders/year ≤ 1 adult Steller's eider/year

Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2009; North Slope field sites)	Loss of Production Capture/surgery	130 spectacled eider eggs/ducklings 4 adult spectacled eiders
Intra-service on Subsistence Hunting Regulations (2009)	No estimate of incidental take provided	
BLM Programmatic on Summer Activities in NPR-A (2009)	Disturbance	49 spectacled eider eggs/ducklings
Minerals Management Service Beaufort and Chukchi Sea Program Area Lease Sales (2009)	Collision	12 adult spectacled eiders <1 adult Steller's eider
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2010)	No estimate of incidental take provided	
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2010; North Slope field sites)	Loss of Production Capture/handling/ surgery	130 spectacled eider eggs/ducklings 7 adult/juvenile spectacled eiders (lethal take) 108 adult/juvenile spectacled eiders (non-lethal take)
BLM Programmatic on Summer Activities in NPR-A (2010)	Disturbance	32 Spectacled eider eggs
Intra-Service, USFWS Migratory Bird Management goose banding on the North Slope of Alaska (2010)	Disturbance	4 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2010)	Disturbance	35 spectacled eider eggs/ducklings
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2011)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)
Intra-Service, Section 10 permit for ABR Inc.'s eider survey work on the North Slope and at Cook Inlet (2011)	Disturbance	20 spectacled eider eggs/ducklings
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2011; Colville River Delta field site)	Capture/handling/ surgery	65 juvenile + 13 adult spectacled eiders (non-lethal take) 7 adult/juvenile spectacled eiders (lethal take)
ConocoPhillips Alaska, Inc's CD-5 Project (Alpine reinitiation; 2011)	Habitat loss	59 spectacled eider eggs/ducklings
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2012)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)

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 between 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.

Polar bear

Status of polar bears in the action area

Polar bears are generally sparsely distributed across the Beaufort Sea (Regehr et al. 2006, Regehr et al. 2010, Rode et al. 2010), and bears of the SBS are distributed across the northern coasts of Alaska, and the Yukon and Northwest territories of Canada. Declining survival, recruitment, and body size (Regehr et al. 2006, Regehr et al. 2010, Rode et al. 2010), and low population growth rates during years of reduced sea ice (2004 and 2005), and an overall declining population growth rate of 3% per year from 2001 to 2005 (Hunter et al. 2007) suggest that the SBS is now declining. The status of this stock is listed as reduced by the IUCN (Obbard et al. 2010) and depleted under the MMPA.

Previously, Alaskan stocks did not generally spend extended periods of time on land (Garner et al. 1990), with the exception of land-denning females. However, receding sea ice due to climate change is modifying polar bear behavior such that during the open-water months of August to October, bears can be found along the coast awaiting ice formation. Only land-denning females of the SBS are likely to spend extended time on land (Garner et al. 1990) in the action area, and non-denning bears in the action area are likely transients of the SBS stock (males, solitary females, and females with older cubs). Maternal dens have been observed near the action area, although because limited denning habitat exists within the action area, few dens are likely to occur there. We also expect non-denning bears to occasionally travel through the action area.

Oil and gas development, hunting, environmental contaminants, and climate change are the primary factors that have contributed to the environmental baseline for polar bears in the action area. These factors are discussed further below.

Oil and gas development

Extensive oil and gas development on Alaska's North Slope over the past several decades has likely altered polar bear use of these areas, including existing developments within the KRU and related infrastructure which occur in the action area. Assessing the magnitude of these effects is difficult. It is reasonable to assume that some bears have been excluded from habitat that they may have otherwise used for denning. However, documented impacts on polar bears by the oil and gas industry in Alaska during the past 30 years have been minimal. Polar bears have been encountered at or near most coastal production facilities, or along roads and causeways that link these facilities to land. Interactions have been minimized by implementation of Incidental Take Regulations (ITRs) for the Beaufort (USFWS 2006, 2011b) and Chukchi seas (USFWS 2008b) and associated Letters of Authorization (LOAs) issued under the MMPA. The ITRs only authorize non-lethal incidental take. As part of the LOAs issued pursuant to these regulations, the oil and gas industry is required to report the number of polar bears observed, their response to industry, infrastructure, or activities, and if deterrence activities were required (see below). Reports indicate an average of 306 polar bears are observed annually by the oil and gas industry in the Beaufort Sea region (range 170–420; 2006–2009). About 81% of these bears showed no change in behavior, 4% altered their behavior by moving away from (or towards) the industrial activity, and the remaining 15% were intentionally harassed (hazed) to deter the bears.

Lethal take associated with the oil and gas industry has occurred on only one occasion during the periods covered by the Chukchi Sea (1991–1996 and 2008–present) and Beaufort Sea (1993–present) ITRs, when a polar bear was accidentally killed in August 2011 due to the misuse of a firecracker round. Prior to issuance of these regulations, lethal take of adult polar bears by industry in Alaska was also rare with only a few occurrences since 1968.

Formal Section 7 consultations have been conducted on promulgation of the Chukchi and Beaufort sea ITRs, which authorize the incidental, unintentional taking of a small number of polar bears in these seas and the adjacent western and northern coasts of Alaska during oil and gas activities in arctic Alaska. These consultations and their conclusions were considered in the jeopardy analysis of this BO.

Hunting

Prior to the 1950s, most hunting was by indigenous people for subsistence purposes. Increased sport hunting in the 1950s and 1960s resulted in population declines (Prestrud and Stirling 1994). International concern about the status of polar bears resulted in biologists from the five polar bear range nations forming the Polar Bear Specialist Group (PBSG) within the IUCN SSC

(Servheen et al. 1999). The PBSG was largely responsible for the development and ratification of the 1973 International Agreement on the Conservation of Polar Bears (1973 Polar Bear Agreement), which called for international management of polar bear populations based on sound conservation practices. It prohibits polar bear hunting except by local people using traditional methods, calls for protection of females and denning bears, and bans use of aircraft and large motorized vessels to hunt polar bears. The PBSG meets every 3-5 years to review all aspects of polar bear science and management, including harvest management.

Additionally, since passage of the MMPA in 1972 (MMPA), the sport hunting of polar bears in the United States has ceased. However, the MMPA provides a special exemption to Coastal dwelling Alaska Natives who may continue to harvest polar bears for subsistence or handicraft purposes. Currently, under the MMPA, there are no restrictions on the number, season, or age of polar bears that can be harvested by Alaska Natives. However, there is a more restrictive Native-to-Native agreement between Inupiat from Alaska and Inuvialuit in Canada that was developed in 1988. Regulation of this harvest, which is considered sustainable, is based upon a voluntary harvest agreement between the Inuvialuit of Canada and the Inupiat of Alaska, who share subsistence hunting traditions within the range of the SBS stock. The Inuvialuit-Inupiat Polar Bear Management Agreement established quotas and recommendations concerning protection of denning females, family groups, and methods of take. Commissioners for the Inuvialuit-Inupiat Agreement set the original quota at 76 bears in 1988, and it was later increased to 80. At the Inuvialuit-Inupiat Polar Bear Management Meeting in July 2010, the quota was again reduced from 80 to 70 bears per year. The Native subsistence harvest from the SBS stock has averaged 36 bears removed per year (USFWS 2011a).

Environmental contaminants

Three main types of contaminants in the Arctic are thought to present the greatest potential threat to polar bears and other marine mammals: petroleum hydrocarbons, persistent organic pollutants (POPs), and heavy metals.

Potential exposure of polar bears to petroleum hydrocarbons comes from direct contact and ingestion of crude oil and refined products from acute and chronic oil spills. Polar bear range overlaps with many active and planned oil and gas operations within 25 mi (40 km) of the coast or offshore (Schliebe et al. 2006). Polar bears occurring in the action area may have been exposed to petroleum hydrocarbons associated with existing oil and gas industry operations on the North Slope.

Contamination of the Arctic and sub-Arctic regions through long-range transport of pollutants has been recognized for over 30 years (Bowes and Jonkel 1975, Proshutinsky and Johnson 2001, Lie et al. 2003). The Arctic ecosystem is particularly sensitive to environmental contamination due to the slower rate of breakdown of POPs, including organochlorine compounds (OCs), relatively simple food chains, and the presence of long-lived organisms with low rates of reproduction and high lipid levels. The persistence and lipophilic nature of organochlorines increase the potential for bioaccumulation and biomagnification at higher trophic levels (Fisk et al. 2001). The highest concentrations of OCs have been found in species at the top of the marine food chains such as glaucous gulls, which scavenge on marine mammals, and polar bears, which feed primarily on seals (Braune et al. 2005). Consistent patterns between OC and mercury contamination and trophic status have been documented in Arctic marine food webs (Braune et al. 2005), however contaminant concentrations in the action area are not likely to pose a population-level threat to polar bears.

Climate change

Warming-induced habitat degradation and loss are negatively affecting some polar bear stocks, and unabated global warming will ultimately reduce the worldwide polar bear population (Obbard et al. 2010). Loss of sea ice habitat due to climate change is identified as the primary threat to polar bears (Schliebe et al. 2006, USFWS 2008a, Obbard et al. 2010). Patterns of increased temperatures, earlier spring thaw, later fall freeze-up, increased rain-on-snow events (which can cause dens to collapse), and potential reductions in snowfall are also occurring.

While climate change will have the largest impact on polar bears in the marine environment, it may also lead to changes in use and vulnerability of polar bears in the terrestrial environment. It is estimated that > 60% of females from the SBS stock den on land, with the remaining bears denning on drifting pack ice (Fischbach et al. 2007). Durner et al. (2006) noted that ice must be stable for ice-denning females to be successful. As climate change continues, the quality of sea ice may decrease, forcing more females to den on land (Durner et al. 2006), including within the action area. However, if large areas of open water persist until late winter due to a decrease in the extent of the pack ice, females may be unable to access land to den (Stirling and Andriashek 1992).

Climate change may also affect the availability and quality of denning habitat on land. Durner et al. (2006) reported that 65% of terrestrial dens found in Alaska between 1981 and 2005 were on coastal or island bluffs. These areas are suffering rapid erosion and slope failure as permafrost melts and wave action increases in duration and magnitude. In all areas, dens are constructed in autumn snowdrifts (Durner et al. 2003). Changes in autumn and winter precipitation or wind patterns (Hinzman et al. 2005) could significantly alter the availability and quality of denning habitat.

Polar bears' use of coastal habitats in the fall during open-water and freeze-up conditions has increased since 1992 (USFWS 2006). This may increase the number of human – polar bear interactions if bears occur close to human settlements or development. Amstrup (2000) observed that direct interactions between people and polar bears in Alaska have increased markedly in recent years. The number of bears deterred for safety reasons, based on three-year running averages, increased steadily from about 3 per year in 1993 to 12 in 1998, averaging about 10 in recent years. There are several plausible explanations for this increase. It could be an artifact of increased reporting, or of increased polar bear abundance and corresponding probability of interactions with humans. Alternatively, or in combination, polar bears from the SBS population typically move from the pack ice to the near-shore environment in the fall to take advantage of the higher productivity of ice seals over the continental shelf. In the 1980s and early 1990s, the near shore environment would have been frozen by early or mid-October, allowing polar bears to effectively access seals in the area. Since the late 1990s, the timing of ice formation in fall has occurred later in November or early December, resulting in an increased amount of time that the area was not accessible to polar bears. Consequently, bears spent a greater amount of time on land unable to forage. The later formation of near-shore ice increases the probability of bear-human interactions occurring in coastal villages (Schliebe et al. 2006). Some experts predict the number of polar bear–human interactions will increase as climate change continues (Derocher et al. 2004).

Summary
Primary threats to polar bears in the action area relate to increased use of coastal habitats by non-denning bears and increased use of terrestrial denning habitat resulting from climate change, which exposes polar bears to the effects of human activities in these areas with greater frequency. While other stressors exist and are managed, they are not currently thought to be significant threats to polar bear populations; however, each of these factors could become more significant in combination with future effects of climate change and the resultant loss of sea ice.

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 are 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 potential increased harvest, increased environmental contaminants, long-term habitat loss, and loss of production; each of these factors is evaluated below.

Potential increased harvest
Because the proposed road is meant to improve subsistence access to the surrounding area, spectacled eiders would be at risk of potential increased harvest during subsistence activities. Furthermore, spectacled eiders often fly in mixed flocks with king and common eiders, and due to similarities in size and female/juvenile plumage, they may be subject to misidentification and

inadvertent harvest. There may also be a lack of knowledge regarding the threatened status and harvest closure for spectacled eiders.

The potential for spectacled eiders to be taken during subsistence activities along the proposed road may be increased if characteristics of the new roadway serve to draw waterfowl early in spring. Accumulations of fugitive dust from the completed road would likely result in earlier snowmelt as darker dust-covered snow absorbs more solar radiation (NRC 2003). This phenomenon is expected to occur on the west (leeward) side of the proposed road as prevailing winds in the action area are generally northeastern (Walker et al. 1987). The leeward side of the proposed road also has a higher proportion of wetland habitat compared to the east side (Figure 2.2). As accelerated snowmelt occurs within the roadside dust shadow, habitat may become available to wildlife up to 14 days earlier than adjacent snow-covered tundra (Troy 1988, Walker and Everett 1987, Walker et al. 1987). When migratory birds arrive in spring, these conditions could lead to localized concentrations of spectacled eiders and other waterfowl near the proposed roadway where they would be more vulnerable to harvest.

Although spatial and temporal coverage of survey data vary, harvest of spectacled eiders is sometimes reported in subsistence surveys. Harvest of 995 spectacled eiders across five North Slope villages was reported in 1992, including 31 in Nuiqsut (Huntington 2009), although species misidentification may have biased this estimate (Fuller and George 1997). Alaska Migratory Bird Co-management Council reports estimate that up to 392 (31–984, 95% CI) spectacled eiders are harvested on the North Slope annually (Naves 2011). Variation in harvest survey timing, coverage, and methodology coupled with misidentification, inconsistent reporting, and other unquantifiable biases, confound our ability to estimate harvest with precision. However, available harvest reports, combined with density and distribution data, suggest roughly tens to low hundreds of spectacled eiders are harvested each year in Alaska.

Overall, we anticipate risk of increased spectacled eider harvest as a result of enhanced subsistence access from the proposed spur road would be low. Given (1) the low density of spectacled eiders in the action area (Larned 2011); (2) interannual variation in timing of spring arrival and snowmelt; and (3) lack of empirical harvest data, we speculate, based on extremely subjective impressions of risk, that between 0 and 4 spectacled eiders could be harvested during subsistence activities each year. Given that the North Slope-breeding population of spectacled eiders is estimated to be 11,254 (8,338–14,167, 95% CI), population-level effects from this level of increased harvest of spectacled eiders are not anticipated.

Environmental contaminants

Lead shot for waterfowl hunting in Alaska has been illegal since 1991 and use of lead shot appears to be declining in some areas. However, compliance varies regionally (G. Peltola, Refuge Manager, pers. comm.) and lead shot is still occasionally available in some North Slope communities. For example, shelves at the Alaska Commercial Company in Barrow were stocked with lead shot as recently as 2013 (USFWS, unpublished observations).

Given that the proposed road would enhance subsistence access within the area, and an unknown proportion of North Slope residents may continue to use lead shot, construction of the spur road could conceivably increase lead shot deposition in wetland habitat. Although potential lead shot deposition in spectacled eider breeding and foraging habitat is difficult to quantify, ingestion of spent lead has reduced annual survival of spectacled eiders on the Y-K Delta (Franson et al. 1995, Flint et al. 1997, Flint and Grand 1997, Grand et al. 1998, Flint and Herzog 1999). Furthermore, due to underlying permafrost, lead pellets may persist in arctic environments, thereby affecting survival and reproduction of spectacled eiders many years after deposition (Flint and Schamber 2010).

Long-term habitat loss

Permanent habitat loss will result from placement of gravel to construct the Nuiqsut Spur Road (38.7 acres), improve the Dump Road (1.3 acres), and construct the laydown pad (11.0 acres). We do not anticipate significant long-term habitat loss from ice road construction or operations. Research indicates that damage 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 microsites 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 construction, maintenance, and on-pad 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 or predators.

Loss of production

In the discussion below, we provide an assessment of potential loss of spectacled eider production resulting from the proposed action. 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. Direct loss of habitat would occur by placement of gravel onto approximately 51 acres (0.21 km^2) of tundra wetlands during construction of the pads and access road. Indirect habitat loss may occur through displacement of eiders within a 200-m zone of influence surrounding the gravel pad, gravel roads, and pipelines. The area encompassed by the zone of influence, or the area of total habitat loss, is estimated to be 1,006 acres (4.1 km^2).

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 in the action area ranged from 0 to 0.236 birds/km^2 (Larned et al. 2011). To estimate the potential number of spectacled eider pairs displaced by the proposed action per year, we multiplied the median estimated density in the action area (0.118 birds/km^2) by the estimated affected footprint (4.07 km^2). 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 preclude initiation or success of 12 nests over an estimated 50-year project life:

$$0.118 \text{ birds/km}^2 \times 0.5 \text{ nests/pair} \times 4.07 \text{ km}^2 = 0.24 \text{ nests annually}$$

$$0.24 \text{ nests annually} \times 50 \text{ years} = 12.01 \text{ spectacled eider nests}$$

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 only 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 achieve reproductive potential.

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 47 eggs could be lost due to nest abandonment.

$$12.01 \text{ nests} \times 3.9 \text{ eggs per nest} = 46.85 \text{ eggs lost}$$

Because the most recent population estimate for North Slope-breeding spectacled eiders is 11,254 (8,338–14,167, 95% CI), we would not anticipate population level effects from the loss of 47 eggs from 12 nests as a result of disturbance associated with the proposed road and pad.

Effects to polar bears

Adverse effects to polar bears could result from the proposed action primarily through disturbance, increased polar bear–human interactions, increased hunting, and habitat loss.

Denning polar bears

Denning polar bears are more sensitive than other cohorts to disturbance from noise (USFWS 2011a). If disturbed, females appear more likely to abandon their dens and relocate in fall before cubs are born (Lentfer and Hensel 1980, Amstrup 1993), than in spring when cubs may not survive if they leave the maternal den early (Amstrup and Gardner 1994). Construction noise and activities that commence after denning is initiated may cause females to abandon dens prematurely, before cubs have developed enough to survive outside the den. In addition, females and cubs continue to rely on the den site after cubs first emerge and they have been observed to spend an average of 8 days in the area before a den site is abandoned (USGS data cited by USFWS 2006). Therefore, denning polar bears and females with young cubs may be particularly susceptible to disturbance.

Behavioral response of individual denning females and family groups to disturbance is variable. While observations of den abandonment associated with industry activities have been reported from northern Alaska (see review in USFWS 2011a), available data indicates such events have been infrequent and isolated (USFWS 2011a) and some studies have reported individual denning polar bears to be tolerant of human disturbance (Amstrup 1993, Smith et al. 2007). Additionally, USFWS (2011a) reported three examples (2006, 2009, and 2010) of pregnant female bears establishing dens prior to the onset of industry activity within 400 m (1,312 ft) of the den site and remaining in the den through the normal denning cycle.

Data indicate polar bears den at low densities in the action area. However, use of terrestrial denning habitat by the SBS stock may increase in response to changes in sea ice habitat (Durner et al. 2006). Den abandonment would be most likely to occur during construction activities because once complete, ongoing routine use of the spur road would allow more sensitive bears to avoid denning near the road. However, in compliance with Nanuq Inc.'s *Polar Bear and Wildlife Interaction Plan*, if dens are detected within 1 mi (1.6 km) of the proposed road construction, ice road, or gravel mine, work in the immediate area would cease, a 1 mile no-disturbance buffer would be established around the densite, and MMM would be contacted for guidance.

Disturbance to non-denning bears

Operations along the construction route and ice road may disturb and displace transient bears from the immediate area. 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. Additionally, polar bears exposed to routine disturbance may acclimate and show less vigilance than bears not exposed to such stimuli (Smith et al. 2007). Furthermore, the Service expects that potential adverse effects to transient polar bears will be reduced by following Nanuq Inc.'s *Polar Bear and Wildlife Interaction Plan* and the applicant's compliance with existing and future authorizations.

Increased polar bear–human interactions

Polar bears may need to be hazed if they approach work areas. Many acoustic and vehicular deterrence methods (starting a vehicle or revving an engine) are not likely to adversely affect polar bears (75 FR 61631). However, as described in Letters of Authorization (LOAs), trained individuals may use mechanisms (e.g., chemical repellants, electric fences, and firearm projectiles) to harass or deter polar bears away from personnel and equipment. Polar bears could experience temporary disturbance and stress from some deterrence activities and may depart the area. Bears that are deterred using more aggressive methods (e.g., direct contact projectiles from firearms), would likely experience stress, short-term pain, and could be bruised. In extremely rare circumstances, if performed incorrectly, a polar bear may be severely injured or die.

Although Kuukpik personnel may obtain authorization to use projectiles to deter bears away from personnel, we expect the majority of deterrence events would not involve contact with the bear (Level B Harassment under the MMPA[1]), and most would cause only minor, temporary, behavioral changes (e.g., the bear departs the area). Very few deterrence events would entail techniques that would physically contact a bear, such as projectiles. For example, from 2006 through 2010, the entire North Slope oil and gas industry reported sightings of 1,414 polar bears, of which 209 (15%) were intentionally deterred (USFWS 2011a). During those previous events, between 0-5 polar bears were deterred using bean bags and between 0-1 with rubber bullets annually. Given (1) that approximately 15% of bears encountered by industry have been subject to deterrence (USFWS 2011a); (2) the low density of bears in the action area; and (3) the inland location of the proposed development; (4) the unlikely event that deterrence would result in injury; and (5) the extremely unlikely event that deterrence would result in lethal take, we expect the proposed action would have a minimal impact on polar bears.

Increased hunting

Because the proposed road is meant to improve subsistence access to the surrounding area, polar bears would be subject to potential increased subsistence harvest. However, given conservation practices afforded through the 1973 Polar Bear Agreement and Inuvialuit-Inupiat Polar Bear Management Agreement, which established sustainable quotas and restrictions regarding denning females, family groups, and methods of take, we anticipate increased polar bear harvest due to enhanced subsistence access from the proposed spur road would be low. Furthermore, reporting requirements under the MMPA's marking and tagging program require all harvested polar bears be tagged by a representative of the Service to monitor subsistence harvest and control illegal take, trade, and transport of marine mammal parts.

Subsistence harvest from the SBS stock has averaged 36 bears per year and six polar bears were harvested by residents of Nuiqsut from 2005–2009 (USFWS 2011a). Therefore, while subsistence use of polar bears occurs near the action area, annual harvest is likely low. Given (1) the low density of polar bears in the action area; (2) provisions included in the 1973 Polar Bear and Inuvialuit-Inupiat Polar Bear Management Agreements; and (3) MMPA reporting requirements, we expect increased subsistence harvest of polar bears in the action area would be low, and population-level effects from increased harvest as a result of the proposed spur road are not anticipated.

Habitat loss

Habitat loss would occur through the construction of the gravel road and storage pad, impacting approximately 0.21 km^2 (51 acres) of tundra within the action area. It is possible a small amount of potential denning habitat may be destroyed or altered by project activities; however, denning habitat does not limit population size (C. Perham, pers. comm. in USFWS 2008c). Furthermore,

[1] Level B Harassment - has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild.

the action area is approximately 4 mi (6.4 km) from the coast and the majority of denning bears occur closer to the coast, therefore, the small amount of habitat lost in the action area would likely have a minimal impact on denning bears.

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 lands surrounding 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 adverse effects due to increased harvest, as well as direct and indirect habitat loss. Using methods explained in the *Effects of the Action* section, the Service estimates loss of ≤ 4 spectacled eiders (including adults and/or fledged juveniles) annually as well as potential loss of production of up to 47 eggs from 12 nests over the life of the spur road. Given that this roughly estimated impact is a small proportion of the estimated North Slope-breeding population of spectacled eiders (10,942–14,890, 95% CI; Stehn et al. 2006), we believe spectacled eider loss that may result from the proposed Nuiqsut Spur Road 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 the likelihood of its survival and recovery in the wild by reducing reproduction, numbers, or distribution of the species.

Polar bear
We have assessed potential impacts to polar bears to ensure activities that may result from the action do not jeopardize the continued existence of the species as required under section 7(a)(2) of the ESA. As described in the *Effects of the Action*, activities that may result from the action could adversely affect polar bears through disturbance, increased polar bear-human interactions, and habitat loss. A very small number of polar bears may also be adversely affected through polar bear-human interactions which may include intentional take and subsistence hunting. These adverse effects are expected to impact only the SBS polar bear stock, and lethal take or population level impacts to the species are not anticipated. Given that (1) habitat loss would be minor; and (2) disturbance and polar bear-human interactions would be unlikely to result in injury or death of a bear, we do not expect population-level impact to occur as a result of the proposed action. Therefore, we conclude that the proposed action is *not likely to jeopardize the continued existence* of the polar bear or prevent 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 the Nuiqsut Spur Road that are not evaluated in this document.

In addition to listed eiders and polar bears, the area affected by the Nuiqsut Spur Road 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 developments 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

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, 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, carrying out 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 (i.e., construction of the Nuiqsut Spur Road), is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement (ITS).

Spectacled eider
As described in *Effects of the Action*, the activities described and assessed in this BO may adversely affect spectacled eiders through increased harvest, and direct and indirect long-term habitat loss.

Increased harvest
Incidental to the proposed road construction, the Service anticipates take of between *0 and 4 spectacled eiders (adults and/or fledged juveniles) annually* may be shot in subsistence hunting along the proposed road.

Section 9 of the ESA and Federal regulations pursuant to Section 4(d) of the ESA prohibit take of endangered and threatened species. However, under Section 10(e), provisions of the ESA shall not apply with respect to the taking of any such species, or the importation of such species taken pursuant to this section, by any Indian, Aleut, or Eskimo who is an Alaska Native who resides in Alaska, or any non-Native permanent resident of an Alaska Native village if such taking is primarily for subsistence purposes, unless the Secretary determines that the taking of an endangered or threatened species materially and negatively affects the species. Because the proposed road is intended to increase subsistence access for the community of Nuiqsut, anticipated increased take of listed eiders through shooting as a result of road construction would qualify under section 10(e), and therefore would not be prohibited by the ESA.

Although take of spectacled eiders for subsistence purposes would be lawful under the ESA, harvest of listed eiders remains prohibited under the Migratory Bird Treaty Act (MBTA) of 1918 as amended (16 U.S.C. §§ 703-702), as regulated under annual subsistence and fall hunting regulations published by the Alaska Migratory Bird Co-Management Council and Alaska Department of Fish and Game. Therefore, while this ITS authorizes incidental take under the ESA for the action agency and applicant (USACE and Kuukpik, respectively), it does not constitute an exemption from take prohibitions for listed migratory birds under the MBTA and associated Federal and State hunting regulations. Consequently, depending on circumstances, the Service may refer take of any listed eider, due to injury or death through shooting, for prosecution under these regulations.

Habitat loss
Long-term habitat loss would occur directly from placement of gravel fill and indirectly through disturbance associated with construction, routine maintenance, and vehicle traffic on the proposed road. Based on estimates described in the *Effects of the Action* section, the Service anticipates *loss of production from 12 potential nests with eggs over the life of the project*. This ITS satisfies requirements of the ESA for the action agency and applicant, and authorizes the aforementioned level of incidental take from long-term direct and indirect habitat loss.

USACE has a continuing duty to regulate the activity covered by this ITS. If USACE (1) fails to assume and implement any terms and conditions set forth herein, or (2) fails to require the applicant to adhere to any terms and conditions of the ITS through enforceable terms that are added to the permit or grant document, the protective coverage of ESA Section 7(o)(2) may lapse.

Polar bear

The Service is not authorizing take of marine mammals under the ESA at this time because such take has not yet been authorized under the Marine Mammal Protection Act and/or its 2007 Amendments. After take has been authorized under the MMPA, take under the ESA that results from actions conducted in compliance with all requirements and stipulations set forth in the MMPA authorization will be considered by the Service to also be authorized under the ESA.

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. Although construction activities are not expected beyond spring 2014, if activities persist into summer 2014, the Service recommends the applicant avoids placing gravel or otherwise physically disrupting undisturbed tundra from June 1 through July 31 to avoid direct impacts to nesting spectacled eiders.

2. In order to inform subsistence users of spectacled eider status, enhance stewardship of listed species, and promote mutual conservation goals, the Service accepts responsibility to work with appropriate community representatives to develop and conduct relevant outreach in Nuiqsut.

13. REINITIATION NOTICE

This concludes formal consultation for the Nuiqsut Spur Road Project (POA-2013-68). 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 4 spectacled eiders (adults and/or fledged juveniles) taken annually during the course of subsistence activities; and
    b. More than 47 spectacled eider eggs taken over the life of the project;
2. New information reveals effects of the action agency that may affect listed species in a manner or to an extent not considered in this opinion;
    a. If observations collected in the Nuiqsut Spur Road area indicate that levels of interaction with polar bears, especially the need for hazing, are appreciably

increasing over time, or are resulting in chronic or repeated interference with normal behavior of polar bears in the action area;

3. 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
4. A new species is listed or critical habitat is designated that may be affected by the action.

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