INTRA-SERVICE BIOLOGICAL OPINION

for

U.S. Fish & Wildlife Service's Issuance of a Section 10 Permit to ABR, Inc.

for

Studies on the North Slope and Cook Inlet Involving Spectacled and Steller's eiders

May 2012

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1. INTRODUCTION

This document is the U.S. Fish and Wildlife Service's (Service) Biological Opinion (BO) on the issuance of a Section 10 permit under the Endangered Species Act for ABR, Inc.'s on-going survey work across the North Slope and Cook Inlet for spectacled and Steller's eiders. The purpose of the permitted studies is to increase our understanding of the range and distribution of these species. Little is known about nesting behavior in relation to disturbance from construction and oil field activities. As oil field development expands into new areas within the range of these listed species it is important to have data that will assist in setting appropriate limits, and developing work practices in the future. Data from the Cook Inlet study will provide important baseline data on wintering populations of Steller's eiders that will be key in minimizing effects from a proposed development project.

This BO describes the effects of these actions on threatened spectacled (*Somateria fischeri*) and Steller's (*Polysticta stelleri)* eiders, and polar bears (*Ursus maritimus*) and polar bear critical habitat pursuant to section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). Project details were received on 13 April 2012. Formal consultation began on 22 May 2012.

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 polar bears and Steller's eiders and is likely to affect spectacled eiders. After reviewing the status and environmental baseline of spectacled eiders and analysis of the potential effects of the Proposed Action to them, the Service concludes the Proposed Action is not likely to jeopardize the continued existence of spectacled eiders.

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

2. DESCRIPTION OF THE PROPOSED ACTION

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

For the actions described in this document, the action agency is the Region 7 Fisheries and Ecological Services Office (Endangered Species Program) of the U.S. Fish and Wildlife Service. This office is issuing a section 10 permit to ABR Inc. for survey work across the North Slope and at Cook Inlet. The permit issuance is the federal nexus for consultation. This consultation is being conducted as an intra-service consultation with the Endangered Species Branch of the Fairbanks Fish and Wildlife Field Office.

Action Area

The action area is that area in which the direct and indirect effects of the proposed action may occur. The proposed studies will take place in a number of discrete geographic areas on the North Slope and in Cook Inlet:

1. Kuparuk Oilfields
2. Colville River Delta - ground-based survey work will concentrate around the CD-3 development.
3. National Petroleum Reserve – Alaska - study areas are west of Alpine and Nuiqsut and north to the Beaufort Sea coast in the Fish Creek delta area.
4. Barrow - Aerial surveys in USGS Quads Barrow and Meade River from Ikpikpuk River to Peard Bay, south to Meade River.
5. Lower Cook Inlet

Project Action

This BO describes and evaluates three groups of actions that will occur as a result of the proposed project:

- Ground-based surveys for spectacled and Steller's eiders;
- Aerial surveys (fixed-wing) for spectacled eiders and Steller's eiders; and
- Aerial surveys (helicopter-based) for Steller's eiders.

Ground-based Surveys

Kuparuk Oilfield

Road surveys will be conducted from approximately June 3 – 19 to locate pre-nesting males and pairs. Ground-based searches for spectacled eider nests will be conducted at locations based on observations of pre-nesting pairs, and at previous years nest sites. As in past years, ABR, Inc. will place up to 3 digital video cameras to monitor spectacled eider nests and insert up to 10 thermistored eggs in spectacled eider nests to monitor incubation constancy. Improved cameras with larger memory cards will be used that will not need to be collected until the nest-fate checks in early July, which eliminates disturbance of nesting eiders after the initial installation. Thermistors do not need to be checked until after nest hatch.

Nuna Project

Ground-based searches for spectacled eider nests will be conducted in an approximately 13 km² area west of DS3S in the Kuparuk Oilfield on the eastern bank of the Colville River. Active Spectacled Eider nests (up to 5 nests) will be instrumented with timelapse cameras to monitor incubation activity and predators. Any additional Spectacled Eider nests will be instrumented with temperature-sensing eggs to monitor incubation. Cameras

and data loggers will be retrieved in mid-July after nesting is complete (no other visits will be necessary).

Colville River Delta

Ground-based searches for spectacled eider nests will be conducted within 200 m of the CD-3 footprint, at Alaska Clean Seas equipment deployment sites, and along the ice-road from Alpine to CD-3. Nest searches will occur between the last week of June and first week of July to find all active and inactive eider nests prior to activities by clean-up and deployment crews at these sites. CPAI environmental staff will be informed of any spectacled eider nest locations so that active nest sites can be avoided by oilfield workers. Up to10 active nests will receive thermistored eggs to monitor incubation, and thermistors will be retrieved in mid-July after nesting is complete.

Additionally, a new nest search will be conducted around the road and bridge sites for the proposed CD-5 project on the Colville River Delta. Approximately 91 breeding bird plots (2.5 each) will be nest searched at least once per week from 4 June to 15 July, primarily for shorebird and passerine nests, but waterfowl nests will also be encountered. Based on aerial survey data, the study area is not used frequently by pre-nesting spectacled eiders. Nonetheless, it is possible spectacled eider nests may be encountered. If spectacled eiders nest on the plots, they would likely be flushed during the rope dragging and intensive nest searching techniques. Once nests are found, eggs would be floated to age the nest, data would be recorded as for other nests, and the nest would be covered with down and vegetation to camouflage it from predators.

Aerial surveys (fixed-wing)

Fixed-wing aerial surveys will be conducted in mid June to locate possible breeding pairs of Spectacled and Steller's eiders in the Kuparuk Oilfield, on the Colville River Delta, in the NPRA, and in the Barrow area. Methods are generally similar among all the surveys. For most surveys, two observers in a Cessna 185 (or comparable aircraft) record all eiders seen from the aircraft along east–west oriented strip transects of fixed width (200 m on each side of the aircraft). Transects are spaced at various distances depending on coverage and all surveys are flown 30–50 m above ground level at a speed of approximately 145km/hr. Although birds sometimes flush during these surveys, they generally circle and land again (duration less than 1 minute). The survey plane moves quickly through the area and the disturbance is a single, transitory event.

Aerial surveys (Helicopter-based)

In lower Cook Inlet, aerial surveys for Steller's eiders (under this permit), northern sea otters (under USFWS Permit #MA187053-0), and other marine mammals (under NOAA permit #15750) will be flown in up to 19 survey periods (with up to 2 replicates per survey period) by helicopter, at an altitude of 500 feet above sea level and a speed of 80-130 km/h, once or twice per month during June–December 2011 and January–May 2012. When possible, an intial high-level (180-230 m) overflight will be conducted to detect Steller's eider flocks in commonly-used areas. Subsequently, to reduce disturbance, ABR, Inc. will try to maintain the greatest possible distance from Steller's eiders and traverse the area without circling or hovering. However, some level of disturbance may

still occur. Judging from past surveys, up to 700 Steller's Eiders could occur in the study bays (Iniskin and Iliamna bays) during the winter months, so up to 700 birds conceivably could be disturbed during each replicate survey. Although Steller's Eiders have reacted to some past surveys, those reactions have been brief, consisting of flushing, circling, and landing again (duration about 1 minute or less). Results will provide baseline data in the area of potential port construction for the proposed Pebble Mine Project.

3. EFFECT DETERMINATIONS FOR POLAR BEARS AND THEIR CRITICAL HABITAT

Polar Bears

Polar bears are widely distributed throughout the Arctic where the sea is ice-covered for large portions of the year. Sea ice provides a platform for hunting, feeding, breeding, denning, resting, and long-distance movement. Polar bears primarily hunt ringed seals, which also depend on sea ice for their survival, but they also consume other marine mammals (USFWS 2008a). Female polar bears excavate maternal dens in snow drifts in areas with suitable topographic relief in terrestrial habitats as well as on pack ice. While dens do occur in the region, there are no historic observations within the Action Area and females will not be denning during the period in which field studies will occur. In Alaska, non-denning polar bears usually occur on sea ice, but may occupy onshore habitats during the open-water period in late summer and early fall (reviewed in Schliebe et al. 2008). Thus, non-denning bears may occasionally travel through the Action Area. We expect most transient bears would move quickly through the area to a less disturbed location with minimal disruption of their normal behavior patterns; however, potential encounters with polar bears in the project area could result in harassment, injury, or killing of bears and pose a risk to human safety. Field crews will follow the Polar Bear Interaction Guidelines (Appendix A) to reduce potential adverse effects to polar bears associated with negative polar bear–human interactions by managing food and other wastes that may attract bears to the project site and supporting early detection and appropriate responses by field personnel if polar bears do enter the area. The Service has determined effects to denning polar bears would not occur based on project timing and effects to non-denning bears would be insignificant because transient polar bears are likely to experience only minor and short-lived effects associated with disturbance from field crews and minimization measures are in place to reduce further potential adverse effects should a polar bear enter the oilfields. Accordingly, we conclude the Proposed Action is not likely to adversely affect polar bears.

Polar Bear Critical Habitat

Proposed activities will occur within designated terrestrial denning habitat for polar bear (USFWS 2010), which extends 8 km (5 mi) inland from the coast in the Prudhoe Bay area. Proposed activities will not affect the physical integrity of terrestrial denning habitat and would not produce a persistent disturbance that could diminish the conservation role of surrounding critical habitat. Therefore, we conclude effects to polar bear critical habitat would be discountable and the proposed action is not likely to adversely affect polar bear critical habitat.

4. EFFECT DETERMINATION FOR 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, AK and Steller's eiders occur at very low densities elsewhere on the ACP (Larned et al. 2010). USFWS aerial surveys for breeding eiders conducted on the ACP from 1992–2010 detected only 5 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 Action Area, we conclude that adverse effects to the species will be discountable and that the Proposed Action is not likely to adversely affect Steller's eiders.

5. STATUS OF THE SPECTACLED EIDER

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

Spectacled eiders (Figure 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, based on breeding distribution; these are the North Slope, Yukon–Kuskokwim Delta (YKD), and northern Russia populations. The YKD 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, AK (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 1b) during late summer and fall, with birds from the 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 and southwest of St. Lawrence Island (Petersen et al. 1999; Figure 1b), 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 YKD. 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 miles) inland from its mouth. Breeding density varies across the ACP (Figure 2). Although spectacled eiders historically occurred throughout the coastal zone of the YKD, they currently breed primarily in the central coast zone within about 15 km (~9 miles) of the coast from Kigigak Island north to Kokechik Bay (USFWS 1996). However, a number of sightings on the YKD 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). Mean spectacled eider clutch size near Barrow was 4.1 ± 0.3 SE in 2009–2010 and 4.7 ± 0.3 in 2011 (Safine 2011, Safine *in prep*). Hatching occurs in mid-July (Bart and Earnst 2005, Safine 2011, Safine *in prep*).

(A)

(B)

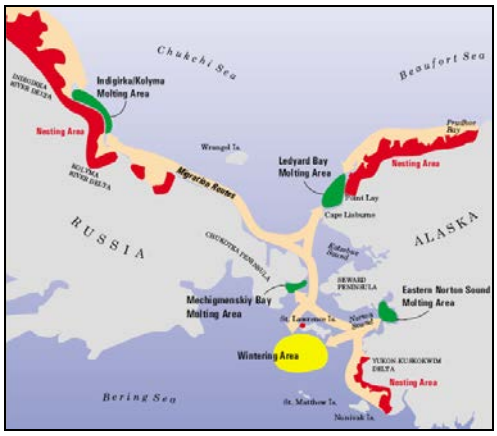

Figure 1. (A) Male and female spectacled eiders in breeding plumage. (B) Distribution of spectacled eiders. Molting areas (green) are used July –October. Wintering areas (yellow) are used October –April. The full extent of molting and wintering areas is not yet known and may extend beyond the boundaries shown.

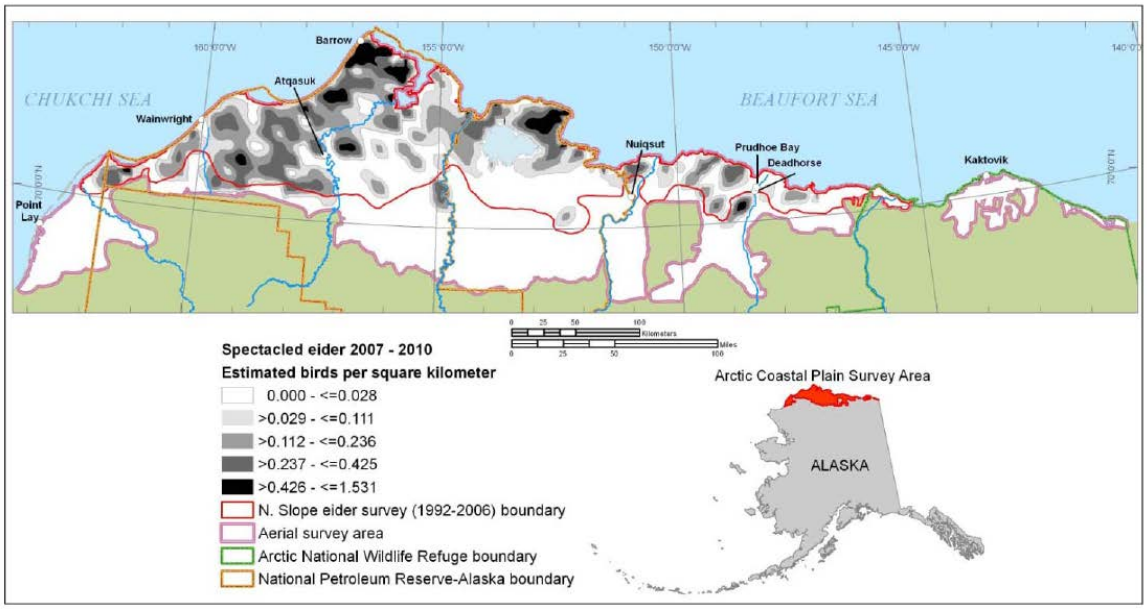

Figure 2. Density distribution of spectacled eiders observed on aerial transects sampling 57,336 km^2 of wetland tundra on the North Slope of Alaska during early to mid-June, 2007–2010 (Larned et al. 2011).

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, and then females with broods move directly from freshwater to marine habitat to stage prior to fall migration.

Nest success is highly variable and thought to be influenced by predators, including gulls (*Larus* spp.), jaegers (*Stercorarius* spp.), and red (*Vulpes vulpes*) and arctic (*Alopex lagopus*) foxes. In arctic Russia, apparent nest success was calculated as <2% in 1994 and 27% in 1995; low nest success was attributed to predation (Pearce et al. 1998). On the ACP, apparent nest success was 40% for 15 spectacled eiders nests monitored in the Prudhoe Bay oil fields from 1981 to 1991 (Warnock and Troy 1992) and 35% (range 27–42%) for nests in the Kuparuk oilfields in 1993–1998 (Anderson et al. 1998). On Kigigak Island in the YKD, 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. Estimates of spectacled eider nest success within the YKD coastal zone in 1985–2011 varied from 45% to 93% (Fischer at al. 2011).

Abundance and trends

The most recent rangewide estimate of spectacled eider population size was 369,122 ± 4,932 90% CI, obtained by aerial surveys of the known wintering area in the northern Bering Sea south of St. Lawrence Island, Alaska in late winter 2010 (Larned et al. 2012). Fewer birds were documented in the wintering area in 2009 (305,261 ± 2,977 90% CI); however, satellite telemetry and other survey data indicated the survey may have been

timed late relative to the beginning of spring migration (Larned et al. 2012). Comparison of the appropriately timed 2010 estimate (369,122) to the results of similar aerial surveys in 1997 (363,030 eiders) and 1998 (374,792 eiders) suggests a stable global wintering population (Larned et al. 2012).

Population indices for North Slope-breeding spectacled eiders are unavailable prior to 1992. 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 YKD. If the same methods are applied to the 2007–2010 ACP aerial index reported in Larned et al. (2011), the resulting North Slope-breeding population estimate is 11,254 (8,338–14,167, 95% CI).

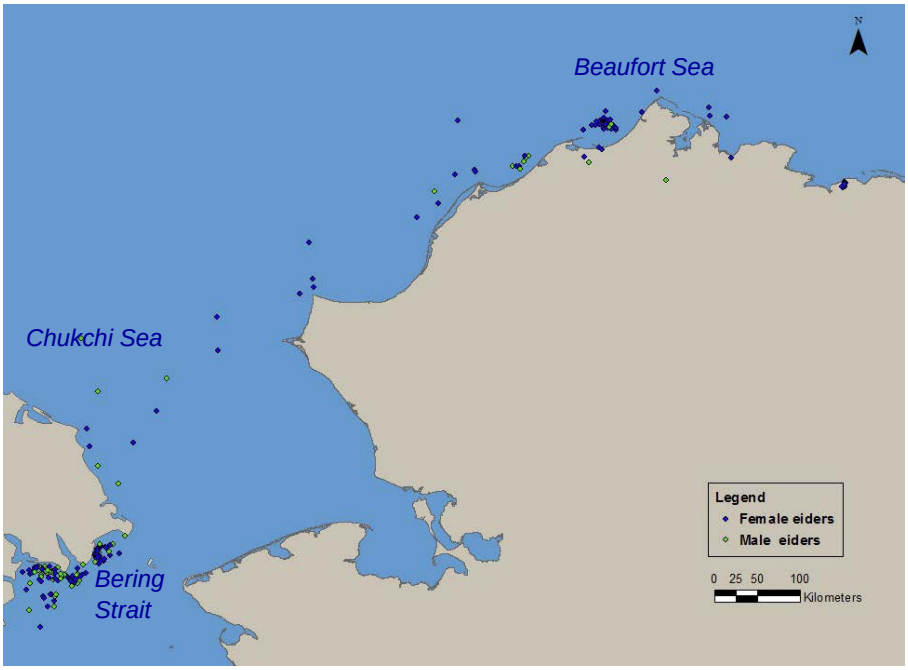

Figure 3. Spectacled eider satellite telemetry locations for 12 female and 7 male spectacled eiders in the eastern Chukchi Sea from 1 April – 15 June 2010 and 1 April – 15 June 2011. Additional locations from the northern coast of Russia are not shown. Eiders were tagged on the North Slope during the 2009 and 2010 breeding seasons. Data provided by Matt Sexson, USGS Alaska Science Center (USGS, unpublished).

The YKD spectacled eider population was thought to be about 4% of historical levels in 1992 (Stehn et al. 1993). Evidence of the dramatic decline in spectacled eider nesting on the YKD was corroborated by Ely et al. (1994). They documented a 79% decline in eider nesting between 1969 and 1992 for areas near the Kashunuk River. Aerial and ground survey data indicated that spectacled eiders were undergoing a decline of 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 YKD 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 YKD 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 YKD in 2011 and evaluate long-term trends in the YKD breeding population from 1985 to 2011. The estimated total number of nests reflects the minimum number of breeding pairs in the population in a given year and does not include potential breeders that did not establish nests that year or nests that were destroyed or abandoned at an early stage (Fischer et al. 2011). The total number of nests in 2011 was estimated at 3,608 (SE 448) spectacled eiders nests on the YKD, 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 YKD 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). The 2010 population index based on these aerial surveys was 5362 birds (SE 527). Platte and Stehn (2011) estimated the YKD spectacled eider breeding population to be 12,601 (95% CI[1] = 10,173–15,028) in 2010.

4. ENVIRONMENTAL BASELINE

The environmental baseline is the current status of listed species and their habitats, and critical habitat, as a result of past and ongoing human and natural factors in the area of the proposed action. Also included in the environmental baseline are the anticipated impacts of other proposed Federal projects in the action area that have already undergone formal section 7 consultation.

Spectacled and Steller's Eiders

Spectacled and Steller's eiders are present on the North Slope in the project action areas from late May through September. The Lower Cook Inlet project is not within the known range of spectacled eiders and is on the edge of the wintering/molting range of Steller's eiders. Both species have undergone significant, unexplained declines in their Alaska-breeding populations. Factors that may have contributed to the current status of spectacled and Steller's eiders are discussed below and include, but are not limited to, toxic contamination of habitat, increase in predation, over harvest, and habitat loss

[1] Confidence intervals calculated based on information provided in Platte and Stehn (2011).

through development and disturbance. Recovery efforts for both species are underway in portions of the action area.

Toxic Contamination of Habitat
The deposition/ of lead shot in tundra or nearshore habitats used for foraging is a threat for spectacled and Steller's eiders. Lead poisoning of spectacled eiders has been documented on the YKD (Franson et al. 1995, Grand et al. 1998) and Steller's eiders on the ACP (Trust et al. 1997; Service unpublished data). Female Steller's eiders nesting at Barrow in 1999 had blood lead concentrations that reflected exposure to lead (>0.2 ppm lead), and six of the seven tested had blood lead concentrations that indicated poisoning (>0.6 ppm lead) (Pattee and Pain 2003). Additional lead isotope tests confirmed the lead in the Steller's eider blood was of lead shot origin, rather than natural sources such as sediments (Matz, USFWS, unpublished data). A juvenile Steller's eider, found shot dead at Barrow in 2008, also had a single ingested lead pellet in its gizzard, indicating spent lead shot is still available to migratory birds that feed in that environment (Matz, USFWS, pers. comm.). However, the Service is encouraged by much recent progress in the decreasing use of lead shot, especially on the North Slope (use of lead shot for hunting waterfowl is prohibited statewide, and for hunting all birds on the North Slope). Hunter outreach programs are ongoing to reduce any continuing use of lead shot in waterfowl nesting areas, and the Service reports good compliance in most areas with the lead shot prohibitions.

Water birds in arctic regions are also exposed to global contamination, including radiation, industrial, and agricultural chemicals that can be transported by atmospheric and marine transport. Twenty male spectacled eiders wintering near St. Lawrence Island examined for the presence and effects of contaminants apparently were in good condition, but had high concentrations of metals and subtle biochemical changes that may have long term effects (Trust et al. 2000).

Increase in Predator Populations
It has been speculated that anthropogenic influences on predator populations or predation rates may have affected eider populations, but this has not been substantiated. Steller's eider studies at Barrow suggest that high predation rates explain poor breeding success (Quakenbush et al. 1995, Obritschkewitsch et al. 2001). Researchers have proposed that reduced fox trapping, anthropogenic food sources in villages and oil fields, and nesting sites on human-built structures have increased fox, gull, and raven numbers (R. Suydam and D. Troy pers. comm., Day 1998), but the connection between these factors and increased predation rates has not been proven.

Over Harvest
Hunting for spectacled and Steller's eiders was closed in 1991 by Alaska State regulations and Service policy. Outreach efforts have been conducted by the North Slope Borough, BLM, and Service to encourage compliance. However, harvest data collected from the spring/summer subsistence hunts suggests that both Steller's and spectacled eiders are being taken during this hunt on the North Slope (Service data). Measures are

being implemented to avoid and minimize the lethal take of listed eiders on the North Slope during the 2011 and subsequent spring/summer subsistence hunts.

Habitat Loss through Development and Disturbance
With the exception of contamination by lead shot, destruction or modification of North Slope nesting habitat of listed eiders has been limited to date, and is not thought to have played a major role in population declines of spectacled or Steller's eiders. Until recently eider breeding habitat on the ACP was largely unaltered by humans, but limited portions of each species' breeding habitat have been impacted by fill of wetlands, the presence of infrastructure that presents collision risk, and other types of human activity that may disturb birds or increase populations of nest predators. These impacts have resulted from the gradual expansion of villages, coupled with cold war era military developments such as the Distant Early Warning (DEW) Line sites at Cape Lonely and Cape Simpson (*circa* 1957), and, more recently, the initiation and expansion of oil development since construction of the Prudhoe Bay field and Trans Alaska Pipeline System (TAPS) in the 1970s.

The population of communities such as Barrow has been increasing, and BLM (2007) expects growth to continue at approximately 2% per annum until at least the middle of this century. Assuming community infrastructure and footprint grow at roughly the same pace as population, BLM (2007) estimates that community footprint could cover 3,600 acres by the 2040s. Oil and gas development has steadily moved westward across the ACP towards NPR-A since the initial discovery and development of oil on the North Slope. Given industries interest in NPR-A, as expressed in lease sales, seismic surveys, and drilling of exploratory wells, the westward expansion of industrial development is likely to continue. Scientific, field-based research is also increasing on the ACP as interest in climate change and impacts to high latitude areas continues.

Scientific, field-based research is also increasing on the ACP as interest in climate change and its effects on high latitude areas continues. While many of these activities have no impacts on listed eiders as they occur in seasons when eiders are absent from the area, or use remote sensing tools, on-the-ground activities and tundra aircraft landings likely disturb a small number of listed eiders each year. Many of these activities are considered in intra-Service consultations, or under a programmatic consultation with BLM for summer activities in NPR-A.

Federal Actions
Recent activities across the North Slope that required formal section 7 consultation, and the estimated incidental take of listed eiders, is presented in Table 4.1. These actions were considered in the final jeopardy analysis of this biological opinion. It should be noted that incidental take is estimated prior to the implementation of reasonable and prudent measures and associated terms and conditions which serve to reduce the levels of incidental take. Further, in some cases included in this table, estimated take is likely to occur over the life of the project (often 30–50 years) rather than annually or during single years reducing the severity of the impact to the population. There are also important differences in the type of incidental take. The majority of the incidental take estimated is

a loss of eggs/ducklings, which is of much lower significance for survival and recovery of the species than the death of an adult bird. For example, spectacled eider nest success recorded on the Y-K Delta ranged from 18-73% (Grand and Flint 1997), and average clutch size was 5 eggs (Petersen et al. 1999). From the nests that survived to hatch, spectacled eider duckling survival to 30-days ranged from 25-47% on the Y-K Delta (Flint et al. 2000). Over-winter survival of one-year old spectacled eiders was estimated at 25% (P. Flint pers. comm.), with annual adult survival of 2-year old birds (that may enter the breeding population) of 80% (Grand et al. 1998). Using these data (in a very simplistic scenario) we estimate for every 100 spectacled eider nests on the Y-K Delta, less than 2 - 17 adult females would be expected to survive and enter (recruit) into the breeding population. Similarly, we expect that only a small proportion of spectacled and Steller's eider eggs or ducklings on the North Slope would eventually survive to recruit into the breeding population.

Table 1. - Activities in Alaska that required formal section 7 consultation and the amount of incidental take provided.

Project Name	Impact Type	Estimated Incidental Take
Fairweather Seismic (2003)	Disturbance	66 adult Steller's eiders
Intra-Service, Issuance of Section 10 permits for spectacled eider (2000)	Disturbance Collection	10 spectacled eiders 10 spectacled eider eggs 25 spectacled eiders
Intra-Service, Section 10 permit for USFWS Barrow Steller's eider project (2003)	Research activities; collection of eggs for artificial incubation	24 Steller's eiders or Steller's eider eggs
Alpine Development Project (2004)	Habitat loss Collisions	4 spectacled eider eggs/ducklings 3 adult spectacled eiders
Barrow Hospital (2004 & 2007)	Habitat loss	2 spectacled eider eggs/ducklings 17 Steller's eider eggs/ducklings
Barrow Landfill (2003)	Habitat loss	1 spectacled eider nest/ year 1 Steller's eider nest/year
Barrow Tundra Manipulation Experiment (2005)	Habitat loss Collisions	2 spectacled eider eggs/ducklings 1 Steller's eider eggs/ducklings 2 adult spectacled eiders 2 adult Steller's eiders
Barrow Global Climate Change Research Facility, Phase I & II (2005 & 2007)	Habitat loss Collisions	6 spectacled eider eggs/ducklings 25 Steller's eider eggs/ducklings 1 adult spectacled eider 1 adult Steller's eider
Barrow Wastewater Treatment Facility (2005)	Habitat loss	3 Steller's eider eggs/ducklings 3 spectacled eider eggs/ducklings
Savoonga Wind Turbine (2005)	Collisions	1 adult spectacled eider
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

Barrow Artificial Egg Incubation (2006)	Removal of eggs for captive breeding program	Maximum of 24 Steller's eider eggs
Barrow Airport Expansion (2006)	Habitat loss	14 spectacled eider eggs/ducklings 29 Steller's eider eggs/ducklings
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
Intra-Service, Section 10 permit for USGS telemetry research on spectacled eider use of the Bering, Chukchi, and Beaufort Seas (2008; Yukon-Kuskokwim Delta field site)	Loss of Production Capture/handling/ surgery	156 spectacled eider eggs/ducklings 4 adults
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
NOAA National Weather Service Office in Barrow (2008)	Habitat loss Disturbance Collision	< 4 spectacled eider eggs/ducklings < 10 Steller's eider eggs/ducklings 1 adult Steller's eider
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
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 USFWS eider survey work at Barrow (2009)	Disturbance Capture/handling	3 Steller's eider or spectacled eider clutches 90 Steller's and 60 spectacled eider pairs (nonlethal take; pre-nesting) 60 Steller's and 60 spectacled eider hens (nonlethal take; nesting) 1 Steller's eider or spectacled eider adult (lethal take) 7 ducklings Steller's eider or spectacled eider (lethal take) 30 Steller's eider or spectacled eider hens (nonlethal take) 40 Steller's eider or spectacled eider ducklings (nonlethal take)
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)
Olgoonik gravel pad and access road, Wainwright, Alaska (2011)	Loss of production	23 spectacled eider eggs/ducklings
Barrow Gas Fields Well Drilling Program, (2011)	Loss of production	20 spectacled eider eggs/ducklings 22 Steller's eider eggs/ducklings
Intra-Service, Migratory Bird Management Greater White-fronted Goose Banding, North Slope of Alaska (2011)	Disturbance	8 spectacled eider eggs/ducklings
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 USFWS eider survey work at Barrow (2011)	Disturbance Capture/handling	4 Steller's and 4 spectacled eider clutches 20 additional Steller's or spectacled eider eggs 90 Steller's and 60 spectacled eider pairs (nonlethal take; pre-nesting) 60 Steller's and 60 spectacled eider hens (nonlethal take; nesting) 20 Steller's and 20 spectacled eider hens (nonlethal take) 40 Steller's or spectacled eider ducklings (nonlethal take) 1 Steller's eider or spectacled eider adult (lethal take) 7 ducklings Steller's eider or spectacled eider (lethal take)

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
Revised Biological Opinion and Conference Opinion for Oil and Gas Activities in the Beaufort and Chukchi Sea Planning Areas (BOEM and BSEE: 2012)	Collision	13 adult spectacled eiders 1 adult Steller's eiders
Intra-Service, Migratory Bird Subsistence Hunting Regulations (2012)	Shooting	400 adult spectacled eiders (lethal take) 4 adult Steller's eiders (lethal take)
Pioneer Natural Resources, Inc.'s Nuna Project (2012)	Habitat loss	114 spectacled eider eggs/ducklings
Barrow gravel pad and 60-man camp (2012)	Loss of production	20 spectacled eider eggs/ducklings 22 Steller's eider eggs/ducklings
The Wildlife Conservation Society's 2012 and 2013 avian field studies near Prudhoe Bay, Alaska (2012)	Disturbance	8 spectacled eider eggs/ducklings

Climate Change

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

There are a wide variety of changes occurring in the arctic worldwide, including Alaska's North Slope. Arctic landscapes are dominated by lakes and ponds (Quinlan et al. 2005), such as those used by listed eiders for feeding and brood rearing. In many areas these water bodies are drying out during the summer as a result of thawing permafrost (Smith et al. 2005 and Oechel et al. 1995), and increased evaporation and evapotranspiration as they are ice-free for longer periods (Schindler and Smol 2006, and Smol and Douglas 2007). Productivity of lakes and ponds appears to be increasing as a result of nutrient inputs from thawing soil and an increase in degree days (Quinlan et al. 2005, Smol et al. 2005, Hinzman et al. 2005, and Chapin et al. 1995). Changes in water chemistry and temperature are resulting in changes in the algal and invertebrate communities, which form the basis of the food web in these areas (Smol et al. 2005, Quinlan et al. 2005).

With the reduction in summer sea ice, the frequency and magnitude of coastal storm surges has increased. These often result in breaching of lakes and low lying coastal wetland areas killing salt intolerant plants and altering soil and water chemistry, and hence, the fauna and flora of the area (USGS 2006a). Historically sea ice has served to protect shorelines from erosion; however, this protection has decreased as sea ice has declined. Coupled with softer, partially thawed permafrost, the lack of sea ice has

significantly increased coastal erosion rates (USGS 2006a), potentially reducing available coastal tundra habitat.

Changes in precipitation patterns, air and soil temperature, and water chemistry are also affecting tundra vegetation communities (Hinzman et al. 2005, Prowse et al. 2006, Chapin et al. 1995), and boreal species are expanding their range into tundra areas (Callaghan et al. 2004). Changes in the distribution of predators, parasites, and disease causing agents resulting from climate change may have significant effects on listed species and other arctic fauna and flora. Climate change may also result in mismatched timing of migration and the development of food in Arctic ponds (Callaghan et al. 2004), and changes in the population cycles of small mammals such as lemmings to which many other species, including nesting Steller's eiders (Quakenbush and Suydam 1999), are linked (Callaghan et al. 2004).

While the impacts of climate change on listed species in both the action area and marine environment that comprises the rest of their range are unclear, species with small populations are vulnerable to environmental change (Crick 2004). Some species will increase in abundance and range with climate change, while others will suffer from reduced population size and range. The ultimate effects of climate change on listed eiders are undetermined at present.

5. EFFECTS OF THE ACTION ON LISTED SPECIES

This section of the biological opinion provides an analysis of the effects of the Action on listed species, and on critical habitat. Both direct effects (those immediately attributable to the Action), and indirect effects (those caused by the Action, but which will occur later in time, and are reasonably certain to occur) are considered. Finally, the effects from interrelated and interdependent activities are also considered. These effects will then be added to the environmental baseline in determining the proposed Action's effects to the species or its critical habitat (50 CFR Part 402.02).

Beneficial effects
Beneficial effects are those effects of an action that are wholly positive, without any adverse effects, on a listed species or designated critical habitat. This project will have beneficial effects for the species, in that it will provide the Service and Eider Recovery Team with information that will better enable us to develop management actions to aid recovery.

Direct Effects
Issuance of the section 10 permit would allow activities that may affect both listed eider species through disturbance. The proposed field activities will not occur within critical habitat; thus we conclude that the proposed activity will not adversely modify or destroy critical habitat.

<u>Ground-based Surveys</u>

Ground-based surveys for spectacled eiders will occur at the Kuparuk Oilfield, and the Colville River Delta. It is generally recognized among researchers that investigator disturbance can have a negative impact on waterfowl breeding success. During the pre-nesting period, courting activities and foraging efficiency and feeding times could be impacted. During the nesting period, females may be flushed from nests, resulting in exposure of eggs or young ducklings to inclement weather and predators. Hens may damage eggs as they are flushed from a nest (Major 1989); and may abandon nests entirely, particularly if disturbance occurs early in the incubation period (Livezy 1980, Götmark and Ählund 1984).

While both avian and mammalian predators have been documented depredating nests after a hen has been flushed by humans, Götmark (1992) concluded that avian predators were more likely to depredate nests following disturbance. Grand and Flint (1997) suggested avian predators, particularly gulls, were more prevalent than mammalian predators on the Y-K Delta. Similar results were reported from studies in the area by Mickelson (1975) who attributed 85.9% of nest predation to avian predators, while Vacca and Handel (1988) attributed 78% of predation to avian predators. Given the similar fauna, vegetation, and terrain it is likely that avian predators would also be more significant than mammalian predators if nests are disturbed on the North Slope.

The effects of human disturbance may be reduced if predators are also disturbed and move away from the area. While some predators, such as corvids, appeared to negatively respond to humans and move away when disturbed, Götmark and Ählund (1984) noted a weak attraction to humans by gulls. In contrast Strang (1980), observed an attraction to humans from parasitic jaegers but not by gulls. It remains unclear how human presence will affect predator behavior in the action area.

In his review paper, Götmark (1992) concluded 76% of papers that showed decreased nest success as a result of disturbance attributed the reduction to predation and 34% to nest desertion. Mickleson (1975) suggested very low rates of desertion, 0.8% naturally with an additional 0.7% as a result of human disturbance, in his studies of cackling geese and spectacled eiders on the Y-K Delta. Data from the Y-K Delta indicates reductions in the daily spectacled eider nest survival rate of 4% (Bowman and Stehn 2003), and 14% (Grand and Flint 1997) due to disturbance.

In conclusion, the action could adversely affect individual Steller's and spectacled eiders through disturbance. For spectacled eiders, estimated disturbance at Kuparuk Oilfield, including the Nuna project is 20 nests during nest searches, and 17 nests for placement and service of time-lapse digital cameras and thermistored eggs. Up to 13 nests may be disturbed at the Colville River Delta site during nest searches and implantation of thermistored eggs. Thus, a total of 50 nests may be disturbed by nest searching and implantation of thermistored eggs.

While the potential for eider egg loss or nest abandonment is low from nest searching and monitoring, it is not negligible. For the purposes of this BO, we are considering nest searches and placement of thermistored eggs to create the same probability of nest failure. However, not all flushes will result in a nest being abandoned or depredated. Data from the Y-K Delta indicates reductions in the daily spectacled eider nest survival

rate of 4% (Bowman and Stehn 2003), and 14% (Grand and Flint 1997) due to disturbance. For the purposes of estimating incidental take in this BO, we use the midpoint in this range and estimate that 9% of all flushes will result in nest loss. Hence, the predicted 50 single spectacled eider flush events will result in the loss of up to 5 nests. Average clutch size for spectacled eiders in northern Alaska is 3.9 (Petersen et. al. 2000, Bart and Earnst 2005, Johnson et al. 2008). Using this figure, incidental take resulting from ground-based nest searches may be up to 3.9 eggs x 5 nests = 20 eggs.

Aerial Surveys

Fixed-wing aerial surveys will be conducted to locate possible breeding pairs of spectacled and Steller's eiders in the Kuparuk Oilfield, on the Colville River Delta, in the NPRA, and in the Barrow area. Surveys are flown in a Cessna 185, 30-50 m above ground level at a speed of approximately 145km/hr. Although birds sometimes flush during these surveys, they generally circle and land again (duration less than 1 minute). The survey plane moves quickly through the area and the disturbance is a single, transitory event. Additionally, although difficult to quantify, it is reasonable to assume that birds in the direct flight path are more likely to flush than those farther away from the aircraft. Given that observers are recording observations at 200m on each side of the aircraft and that the majority of surveys are flown with transects spaced 800m apart (50% coverage) or 1600m apart (25% coverage), we presume that only a proportion of the total listed eiders in the survey area may be disturbed. Disturbance of non-nesting birds is unlikely to result in harassment or harm as defined by the ESA, whereas disturbance to incubating females may increase risk of nest abandonment or depredation. However, surveys are timed to occur at the pre-nesting stage, when only a small number of females will be incubating. In the unlikely event that an incubating female is flushed, the transitory nature of the disturbance presumably would not preclude the female's timely return to the nest. Therefore, given that: 1) surveys are transitory and will likely disturb listed eiders for a short period of time, after which they will resume normal behavior; 2) surveys are not expected to disturb all listed eiders in survey area; and 3) few if any incubating females will be disturbed, it is unlikely that disturbance from fixed wing aerial surveys will adversely affect listed eiders.

Helicopter surveys for Steller's eiders, northern sea otters, and other marine mammals will be flown in lower Cook Inlet. Aerial surveys will be flown in up to 19 survey periods (with up to 2 replicates per survey period) at an altitude of ~ 160 m above sea level and a speed of 80-130 km/h, once or twice per month during June–December 2011 and January–May 2012. When possible, an initial high-level (180-230 m) overflight will be conducted to detect Steller's eider flocks in commonly-used areas. Subsequently, to reduce disturbance, ABR, Inc. will try to maintain the greatest possible distance from Steller's eiders and traverse the area without circling or hovering. However, some level of disturbance may still occur. Judging from past surveys, up to 700 non-breeding Steller's eiders could occur in the study bays (Iniskin and Iliamna bays) during the winter months, so up to 700 non-breeding or 7 listed eiders (~ 1% are Alaska-breeding) conceivably could be disturbed during each replicate survey in the winter.

Because of concerns about the effects of helicopter-caused disturbance to these birds, ABR, Inc. kept detailed notes about responses of Steller's eiders to the disturbance in all

years of this study. In some cases, researchers successfully avoided flushing Steller's eiders during the survey by conducting an initial high-level (180–230 m) overflight of the study area to detect flocks in commonly-used areas; they subsequently maintained higher altitudes (>180 m) in areas with flocks, maintained the greatest distance possible from Steller's eiders that still allowed estimation of flock size, and traversed the area without circling or hovering. However, Steller's eiders sometimes flushed before they were detected, from distances as great as 1.5 km and with helicopter altitudes as high as 230 m asl. Birds that flushed generally were arranged in loose flocks that were strung out over a substantial area, and flushing brought them together into a tight single-species flock. The common response of birds that were farther away from the main group was to fly toward birds that were more closely compacted. Once the flock aggregated, the birds were less prone to flush again, even when the helicopter passed within 0.25–0.5 km. In every case in which they were able to observe the entire flushing event, the duration of flight after flushing was < 60 seconds and usually lasted < 30 seconds.

In summary, helicopter-based surveys are unlikely to constitute a significant physiological impact to the individuals affected. The following information led us to this conclusion:

1.) During helicopter surveys, ABR, Inc. will conduct overflights when possible, reducing the likelihood of a flushing response.

2.) In the event that Steller's eiders are flushed, the response will be short term, and not likely to significantly disrupt normal behavior patterns (feeding and resting) such that it would affect their energy budget.

3.) Birds that are close together tend to not flush and swim towards each other, whereas birds farther from the core of the flock may fly back toward the core, thus reducing displacement from their resting and feeding grounds.

4.) Once the flock is reunited in a tight group, they are less likely to flush a second time.

5.) The total duration of the flushing flight response is usually < 30 seconds.

6.) Only ~1% of Steller's eiders in Cook Inlet are considered listed eiders.

Therefore, the Service believes helicopter surveys in lower Cook Inlet will have negligible effects on listed Steller's eiders.

Indirect Effects

Indirect effects of the action are defined as "those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur" (50 CFR §402.02). While the activities that may be authorized could lead to additional research in the future, they cannot be said to be reasonably expected to occur. Therefore, no indirect effects to listed eiders are anticipated to result from the proposed activities.

Interrelated and Interdependent Actions
Interdependent actions are defined as “actions having no independent utility apart for the proposed action,” while interrelated actions are defined as “actions that are part of a larger action and depend upon the larger action for their justification” (50 CFR §402.02). The Service has not identified any interdependent or interrelated actions that may result from the issuance of the proposed permit or activities authorized by it that could result in impacts to listed eiders.

8. CUMULATIVE EFFECTS

Under the Act, cumulative effects are 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 because they require separate consultation under the Act.

9. CONCLUSION

After reviewing the current status of spectacled and Steller’s eiders and polar bears, the environmental baseline, effects of the proposed activities, and cumulative effects, it is the Service’s biological opinion that the issuance of a section 10 permit to authorize the proposed activities is not likely to jeopardize the continued existence of spectacled and Steller’s eiders, and polar bears and is not likely to result in destruction or adverse modification of designated critical habitat.

The regulations (51 FR 19958) that implement section 7(a)(2) of the Act 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." We have concluded that the proposed action is not likely to jeopardize the continued existence of spectacled and Steller’s eiders, and polar bears or adversely modify or destroy its critical habitat.

The following information led us to the conclusion that this action, as proposed, is not likely to jeopardize the continued existence of these species:

1) Disturbance to breeding and nesting birds will occur, however, it will affect comparatively few individuals, and be minor in nature, and should be offset by the net benefit of the research to recovery of the species.

2) Disturbance to the listed population of Steller’s and spectacled eiders from aerial surveys is anticipated to be transitory and will likely disturb listed eiders for a short period of time, after which they will resume normal behavior.

3) Disturbance to over wintering populations in Lower Cook Inlet from permitted helicopter surveys is temporary, and should not have significant energetic costs such that over winter survival is affected.

4) The project participants will abide by Polar Bear Interaction Guidelines (Appendix A) developed to ensure the permitted activities are conducted in a manner that avoids conflict between polar bears and humans. As a result of agreement to follow the guidelines, no adverse impacts to this species are anticipated.

5) Effects to critical habitat will not persist, will have at most an insignificant effect on the function of PCEs, and are unlikely to affect the intended conservation role for polar bears.

Using methods and logic explained in the *Effects of the Action* section, we estimate up to 20 spectacled eider eggs may be incidentally taken as a result of ground-based survey work.

Only a small proportion of eider eggs or ducklings would eventually survive to recruit into the breeding populations. For example, spectacled eider nest success recorded on the YKD ranged from 18-73% (Grand and Flint 1997). From the nests that survived to hatch, spectacled eider duckling survival to 30-days ranged from 25–47% on the YKD (Flint et al. 2000). Over-winter survival of one-year old spectacled eiders was estimated at 25% (P. Flint pers. comm.), with annual adult survival of 2-year old birds (that may enter the breeding population) of 80% (Grand et al. 1998). Using these data (in a very simplistic scenario) we estimate that 0.9–6.6% of eggs/ducklings would be expected to survive and recruit into the breeding population. Thus, the loss of eggs or ducklings is of lower significance for survival and recovery of listed eiders than the death of an adult bird.

Because the potential loss of eider recruitment is very small relative to the size of the North Slope breeding population[2], we believe the Proposed Action will not have significant population–level effects and will not affect the likelihood of survival and recovery of spectacled eiders. Accordingly, it is the Services' biological opinion that the Proposed Action is not likely to jeopardize the continued existence of spectacled eiders.

This BO's determination of non-jeopardy is based on the assumption that ABR, Inc. will consult with the USFWS Endangered Species Program on any future activities related to the Proposed Action that are not evaluated in this document.

In addition to listed eiders and polar bears, the area affected by the Proposed Action may now or hereafter contain plants, animals, or their habitats determined to be threatened or endangered. The Service, through future consultation may recommend alternatives to future 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

[2] Applying the methods of Stehn et al. (2006) to more recent aerial survey data from the North Slope results in an estimate of 11,254 (8,338–14,167, 95% CI) for the period of 2007–2010.

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.

10. INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. "Harm" is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement. In addition, because the proposed action is the issuance of permits per section 10(a)1(A) of the Act, direct take is permitted per the statute and implementing regulations.

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

As described in the *Effects of the Action* section, the activities described and assessed in this BO may adversely affect spectacled and Steller's eiders through investigator disturbance during ground-based surveys and nest searches. The researchers may disturb up to 5 spectacled eider nests in association with nest searches and implantation of thermistor eggs, which could result in egg loss. Estimating take of spectacled eiders from the proposed project activities is difficult, but information does exist from similar studies of spectacled eiders and other waterfowl, using similar techniques. Methods used to estimate incidental take for each of these are described in the *Effects of the Action on* section. The Service estimates 20 spectacled eider eggs may be incidentally taken as a result of ground-based survey work.

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

11. REASONABLE AND PRUDENT MEASURES

Of the activities covered under the permit TE012155-0, only those associated with the ground-based surveys may result in incidental take. The Service believes that the following reasonable and prudent measure (RPM) is necessary and appropriate to minimize this incidental take of spectacled eiders:

1. To minimize the likelihood that nest investigation work will increase predation rates and reduce nesting and fledgling success of spectacled eiders, work shall be organized so that the minimum number of visits to a nest are performed.

12. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measure described above applies. These terms and conditions are non-discretionary:

(a) Prior to approaching nests, the surrounding area shall be visually checked for predators. If a predator is spotted in proximity (i.e., would be able to locate the nest through flushing of the hen), the nest shall not be approached. Predators, for the purposes of this term and condition, shall include fox, ravens, gulls, and jaegers.

(b) Equipment (thermistored eggs) will be retrieved, and nest fate will be checked, only after hatch.

(c) Eggs shall be immediately covered with down or like insulating material following completion of nest/egg examination and thermistored egg addition.

(d) A report for all activities conducted under authority of this permit must be submitted annually to the Endangered Species Coordinator, Regional Office, by December 31. The report shall include the following sections: introduction, objectives, methods, results, conclusions, and recommendation for species recovery.

The Service believes that no more than 20 spectacled eider eggs will be incidentally taken during activities permitted by TE012155. The RPM, with its implementing terms and conditions, is designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of

incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measure provided. The permittee (ABR, Inc.) must immediately provide an explanation of the causes of the take and review with the Service the need for possible modification of the reasonable and prudent measure. If Steller's or spectacled eiders are encountered injured or killed as a result of permitted activities, please contact either the Fairbanks Fish and Wildlife Field Office, Endangered Species Branch, at (907) 456-0441, or the Anchorage Fish and Wildlife Field Office, Endangered Species Branch, at (907) 271-2778, for instruction on the handling and disposal of the injured or dead bird.

13. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. No conservation recommendations have been developed for this project.

14. REINITIATION NOTICE

This concludes formal consultation on the renewal of Recovery Permit # TE012155. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the action agency that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the action is subsequently modified in a manner that causes an effect to listed or critical habitat not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

15. LITERATURE CITED

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Appendix A.

POLAR BEAR INTERACTION GUIDELINES

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

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

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

When operating aircraft:

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

When traveling on land or water:

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

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

- Avoid carrying bear attractants (such as strongly scented snacks, fish, meat, or dog food) while away from camp; if you must carry attractants away from camp,

store foods in air-tight containers or bags to minimize odor transmission until you return them to "bear-resistant" containers.*

- If a polar bear(s) is encountered, remain calm and avoid making sudden movements. Stay downwind if possible to avoid allowing the bear to smell you. Do not approach polar bears. Allow bears to continue what they were doing before you encountered them. Slowly leave the vicinity if you see signs that you've been detected. Be aware that safe viewing distances will vary with each bear and individual situation. Remember that the closer you are to the animal, the more likely you are to disturb it.

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

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

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

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

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

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

When camping:

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

- Store food and other attractants in “bear-resistant” containers*. Consider the use of an electric fence as additional protection. Do not allow the bear to receive food as a reward in your camp. A food-rewarded bear is likely to become a problem bear for you or someone else in the future.

- Maintain a clean camp. Plan carefully to: minimize excess food; fly unnecessary attractants out on a regular basis (i.e. garbage, animal carcasses, excess anti-freeze or petroleum products); locate latrines at least ¼ mile from camp; and wash kitchen equipment after every use.

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

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

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

FOR DEPARTMENT OF INTERIOR EMPLOYEES ONLY

Use of Deterrents

In addition to following the Guidelines above, all U.S. Fish and Wildlife Service (Service) employees must have completed the Department of the Interior’s (DOI) Bear and Firearm Safety Training course and be current in certification before engaging in field activities. Service staff must practice with and know how to use deterrents prior to conducting field work. If working in bear habitat, Service staff must anticipate and plan for possible scenarios of encountering polar bears, and identify appropriate responses, prior to initiating field work. Use of non-lethal polar bear deterrents by Service staff is only permissible if it is done in a humane manner and is for the purposes of protection or

welfare of the bear or the public. Service staff has the right to use lethal methods to protect the public from polar bears in defense of life situations, and may do so when all reasonable steps to avoid killing the bear(s) have been taken.

Notification of Use of Deterrents

The Department of the Interior Bear Incident Report Form will be used to record and report polar bear-human interactions *that require use of deterrents*. These incidents will be reported to the MMM Office. This information will be used to track interactions over time and improve polar bear conservation and management.