

**SUMMARY OF SPECTACLED EIDER OBSERVATIONS  
ALONG THE ALPINE PIPELINES, 1993–2014**

Prepared for

**ConocoPhillips Alaska, Inc.**

P.O. Box 100360  
Anchorage, AK 99510

Prepared by

Charles B. Johnson  
and  
Dorte Dissing

**ABR, Inc.—Environmental Research & Services**

P.O. Box 80410  
Fairbanks, AK 99708

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## INTRODUCTION

Since 2004, ABR, Inc., has conducted surveys for Spectacled Eiders under contract to ConocoPhillips Alaska, Inc., (CPAI) along the Alpine Pipelines between the Kuparuk and Alpine oilfields. Four (4) CPAI pipelines are regulated by the U.S. Department of Transportation (USDOT) under the Pipeline Safety Act (49 CFR 195.6): the Oliktok Pipeline, Kuparuk Pipeline, Alpine Oil Pipeline, and Alpine Arctic Heating Fuel Pipeline. CPAI instituted surveys in 2004 for threatened eiders within a corridor along the USDOT Alpine Oil and the Arctic Heating Fuel pipelines (hereafter, the Alpine Pipelines) between the CD-1 processing facility at Alpine on the Colville River delta and Central Processing Facility 2 (CPF-2) in the Kuparuk oilfield (Figure 1). The other USDOT regulated pipelines in the Greater Kuparuk Area (GKA, which encompasses the Kuparuk oilfield) have been included in annual aerial surveys for pre-nesting eiders since 1993 (Stickney et al. 2014), but only to the eastern boundary of the GKA unit.

Under 49 CFR 195.6, the Pipeline and Hazardous Materials Safety Administration of USDOT is required to identify and protect Unusually Sensitive Areas (USAs) where “drinking water or ecological resources are especially sensitive to environmental damage from a hazardous liquid pipeline release”. Ecological resources for which USAs can be delineated include areas containing threatened or endangered species with a limited range, as well as other important ecological communities such as waterbird aggregation areas. Oil and gas pipelines within USAs are required to have Pipeline Integrity Management Plans that are intended to protect the resources of USAs from spills of hazardous liquids. The northern portion of the Arctic Coastal Plain of Alaska was identified as an USA because it is within the breeding range of the Spectacled Eider (*Somateria fischeri*), a primarily arctic breeding sea duck, which was listed as threatened in 1993 (58 FR 27474) under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Another sea duck, the Steller's Eider (*Polysticta stelleri*), was listed as threatened in 1997 (62 FR 31748–31757), but it breeds mainly in western and northwestern Alaska and is uncommon east of Point Barrow (Johnson and Herter 1989, Quakenbush et al. 2002). Less than 10 observations of Steller's Eiders have accumulated over the last 20 years in areas surveyed for pre-nesting eiders in the GKA and Colville River delta, and no evidence of breeding has been documented in this region. No areas of critical habitat have been designated

on the Arctic Coastal Plain for either of these threatened eiders. Critical habitat for the Spectacled Eider comprises 4 areas: coastal terrestrial zones of the Yukon-Kuskokwim Delta, a portion of Norton Sound, Ledyard Bay in the Chukchi Sea, and the wintering area on the south side of Saint Lawrence Island in the Bering Sea (66 FR 9146–9185). Critical habitat for the Steller’s Eider also includes a coastal area of the Yukon-Kuskokwim Delta and marine zone of Kuskokwim Bay, as well as coastal waters of the Seal Islands and Nelson and Izembek lagoons along the Alaska Peninsula (66 FR 8850–8884).

The purpose of this report is to summarize what is known about Spectacled and Steller’s eider occurrence and distribution in the area of the Alpine Pipelines between CPF-2 in the GKA and CD-1 in Alpine. We summarize data collected on the Colville Delta and Alpine Transportation Corridor study areas (Smith et al. 1994; Johnson 1995; Johnson et al. 1996, 1997, 1998, 1999, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015; Burgess et al. 2000, 2002, 2003) , the GKA (Anderson and Cooper 1994; Anderson et al. 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005a, 2005b, 2007, 2008, 2009; Stickney et al. 2010, 2011, 2012, 2013, 2014, in prep.), and the Alpine Pipelines surveys (Anderson and Shook 2004; Anderson 2005, 2006, 2007, 2008, 2009; Stickney 2010, 2011, 2011, 2012, 2014a, 2014b).

## **STUDY AREA**

The Alpine Pipelines traverse an east–west corridor between the CPF-2 in the GKA on the east to the horizontal directional drilling pipeline crossing (HDD) on the Colville River in the west (Figure 1). From HDD, the Alpine Pipelines turn northwesterly to the processing facility on CD-1 in the Alpine oilfield. The Alpine Pipelines are located on the Arctic Coastal Plain of Alaska in an area dominated by habitats created by the thaw-lake cycle, fluvial processes from the Kuparuk and Colville rivers, and coastal processes of flooding, erosion, and sediment deposition. The representative vegetation and landforms are discussed in Roth et al. (2007) and Roth and Loomis (2008) for most of the GKA and in Jorgenson et al. (1997) for the Colville River delta and the Alpine Transportation Corridor study area (which encompasses most of the route of the Alpine Pipelines).

## METHODS

One aerial survey was conducted each year from 2004 to 2014 during 12–18 June for breeding pairs of eiders along the Alpine Pipelines between CPF-2 in the GKA and CD-1 at Alpine on the Colville River delta (Figure 1). Surveys were flown during the pre-nesting period, when male eiders (the more conspicuous of the sexes when in breeding plumage) are still on the breeding grounds. The survey area was a strip 400 m (~0.25 miles) wide on each side of the pipelines for 100% coverage of a 800 m (~0.5 miles) strip. The other USDOT pipelines in the GKA were surveyed for Spectacled Eiders 8–18 June during the regional aerial survey of the GKA by flying east–west transects spaced 800 m apart, providing 50% coverage of the Greater Kuparuk study area (Table 1). The Colville Delta study area also was surveyed for eiders over the same dates as the Greater Kuparuk study area but at 100% coverage (transects spaced at 400 m intervals, except in 1993, when transects were spaced at 800 m intervals achieving 50% coverage). Partial coverage of the pipeline route was achieved by various eider surveys in years before 2004. Beginning in 1993, pre-nesting aerial surveys were flown 8–19 June in east–west transects over the Greater Kuparuk and Colville Delta study areas (Table 1), thereby covering other USDOT regulated CPAI pipelines. In 1993 and 1995–1997, the Alpine Transportation Corridor, which included multiple potential routes of the Alpine Pipelines, was surveyed in support of construction permit applications. In 1994, a survey was flown only in the Colville Delta study area, and in 1999, a survey was flown only in the Greater Kuparuk study area. In 1998, and 2000–2003, surveys were flown in both the Colville Delta and Greater Kuparuk study areas, but the area between these 2 study areas was not surveyed.

The procedures for the aerial survey of the Alpine Pipelines were similar to those used since 1993 (Anderson and Cooper 1994, Smith et al. 1994) and employed 2 observers (in addition to the pilot) in a fixed-wing aircraft (Cessna 185 or 206). During the survey, the pilot navigated the airplane following the pipelines on transects 400 m apart, using a global positioning system (GPS) receiver and photomosaic maps of the area, as well as visual reference to the pipelines. Flight altitude was 30–50 m (98–164 feet) above ground level and flight speed was approximately 145 km/h (90 mph). Using a tape or digital recorder, each observer noted the species of eider, the number of each sex, the number of identifiable pairs, the side (north or south) of the pipelines, and whether the birds were flying or on the ground. Each observer also

marked all eider locations on photomosaic maps of the survey area scaled to 1:63,360. All observations were added to a GIS database. Only locations of eiders seen on the ground are reported here, as the flying birds could not be assigned to a specific location.

When Spectacled Eiders were recorded on the Alpine Pipelines survey, the study protocol required a nest search be conducted in the location of the observations. Three or more people would start at the coordinate of the pre-nesting location searching at least a 400 m radius around the location including the shorelines and islands of all nearby waterbodies and all wet meadow habitats, which are preferred nesting areas for Spectacled Eiders. In addition to nest searches prompted by observation of pre-nesting Spectacled Eiders within 400 m of the Alpine Pipelines, nest searches were conducted during 3 years in the CD-4 area prior to construction of the CD-4 drill site (Burgess et al. 2000, 2002, 2003) and during approximately 20 years in the CPF-2 area as part of the GKA avian studies (Stickney et al., in prep.).

## RESULTS

Four species of eiders occur on the Arctic Coastal Plain. No observation of Steller's Eiders or Common Eiders (*Somateria mollissima*) have been recorded in the Alpine Pipelines vicinity; Spectacled Eiders are observed sporadically, whereas King Eiders (*Somateria spectabilis*), which are neither threatened nor endangered, are common and frequently observed (ABR, unpubl. data).

Spectacled Eiders have been recorded in 5 of the 21 years (24%) during which surveys have covered portions of the Alpine Pipelines survey area (the Alpine Pipelines survey area is the area within 400 m of the current Alpine Pipelines location; Figure 1, Table 1). Spectacled Eiders were observed in the Alpine Pipelines survey area prior to construction of the pipelines in 1993, 1997, and 1998 (Figure 2, Table 2). After surveys specifically for the Alpine Pipelines commenced in 2004, Spectacled Eiders were recorded in only 2 years (18% of the 11 years surveys were conducted; Figure 3, Table 2).

Six groups of Spectacled Eiders were observed within 400 m of the Alpine Pipelines in 21 years of surveys (Table 2). Sixteen indicated total birds were recorded, with 14 birds actually observed during surveys. Indicated birds is a standardized method of counting ducks, which doubles the number of males (with exceptions for mixed sex groups) to account for the number

of females, which are frequently undercounted on aerial surveys because of their drab plumage (USFWS 1987). Less than 1 Spectacled Eider was observed on average each year (mean = 0.64 observed or 0.73 indicated total,  $n = 21$  years). Most records are from the CPF-2 area between approximately DS-2M to CPF-2 (Figures 2 and 3). Only 2 records of pre-nesting Spectacled Eiders have occurred during the Alpine Pipelines surveys, 1 pair near DS-2H in 2006 and 1 group of 3 males and 1 female mid-way between DS-2M and HDD in 2007 (Figure 3).

Three Spectacled Eider nests have been found within 400 m of the Alpine Pipelines, but only 1 nest occurred during years in which the Alpine Pipelines surveys were conducted (Figure 4). In 1998, a Spectacled Eider nest was found 355 m from the future pipelines location near CPF-2 in the GKA (Anderson et al. 1999). One nest was found in 2000 in the Colville Delta study area 182 m from the pipelines during nest searches prior to construction of CD-4 (Burgess et al. 2000). The most recent nest was found in 2013 at 235 m from the pipelines near CPF-2 in the GKA (Stickney et al. 2014). A nest search was conducted in 2007, where 3 male and 1 female Spectacled Eiders were detected on the pre-nesting aerial survey mid-way along the Alpine Pipelines (Figures 3 and 4), but no nests were found. Several depredated eider eggs belonging either to King or Spectacled eiders (eggs of the 2 species are visually indistinguishable) were found near that location and both King and Spectacled eiders were observed in the area; however, no nests were discovered.

## DISCUSSION

The Alpine Pipelines traverse an area supporting low densities of Spectacled Eiders (mean annual density = 0.02 indicated birds/km<sup>2</sup>, SE = 0.01,  $n = 21$  years). Records of pre-nesting Spectacled Eiders within the 400 m Alpine Pipelines survey area have been sporadic; Spectacled Eiders were recorded in only 5 of 21 years. We caution that the Alpine Pipelines were surveyed in their entirety only for the last 11 of those years, so it is possible there were Spectacled Eiders in the unsurveyed portions of the Alpine Pipelines prior to 2004. We also caution that lack of observations on a single survey does not prove absence in any year, because pre-nesting eiders are mobile and often not yet settled into final nesting locations. Nonetheless, Spectacled Eiders were observed in only 18% of the years the pipelines were completely surveyed and averaged <1 bird/year in the pipeline survey area.

Another data source illustrates the distribution of Spectacled Eiders in the Alpine Pipelines area, and confirms the low numbers observed during pre-nesting surveys. U.S. Fish and Wildlife Service (USFWS) flies annual surveys, at low coverage (2–8%), across the entire Arctic Coastal Plain in mid-June each year and alternates transects annually that are repeated in 4-year cycles (Stehn et al. 2013). The last complete cycle was flown in 2009–2012 and was portrayed in the form of density polygons of pre-nesting Spectacled Eiders (Figure 5). Density polygons provide a way to visualize a smoothed relative density distribution. The majority (72% of survey area) of the Alpine Pipelines route is in the lowest density category (0–0.028 indicated birds/km<sup>2</sup>). Higher density polygons are crossed by the Alpine Pipelines near CPF-2 in the GKA (>0.028–0.111 indicated birds/km<sup>2</sup>) and on the Colville River delta (>0.028–0.425 indicated birds/km<sup>2</sup>), where some of the highest densities occur. Twenty-eight percent of the survey area is in the 4 highest density polygons. The distribution of pre-nesting locations from ABR aerial surveys (Figures 2 and 3) generally agrees with the density distribution estimated from USFWS surveys (Figure 5): the highest densities along the Alpine Pipelines occur at the eastern and western extents of the pipelines survey area, in the CPF-2 area and the Colville River delta, respectively.

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Table 1. Area that was surveyed each year for pre-nesting Spectacled Eiders in the Alpine Pipelines survey area, 1993–2014. Values for 1993–2003 represent the portion of the Alpine Pipelines survey area that was covered by pre-nesting eider surveys in 3 separate study areas in those years.

Study Area	Year	Coverage (%)	Surveyed Area (km <sup>2</sup> )
Alpine Pipelines Survey Area <sup>a</sup>	2004–2011	100	44.28
	2012	100	88.98 <sup>b</sup>
	2013–2014	100	44.28
Pre-2004 Colville Delta study area	1993	50	6.54
	1994	100	13.08
	1995–1997	100	13.08
	1999	—	—
	1998, 2000–2003	100	13.08
Pre-2004 Greater Kuparuk study area	1993	50	8.52
	1994	—	—
	1995–1997	50	14.0
	1999	50	8.52
	1998, 2000–2003	50	8.52
Pre-2004 Transportation Corridor study area	1993	50	7.08
	1995–1997	100	14.16

<sup>a</sup> Total area surveyed at 100% coverage. See Figure 1 for map of study areas

<sup>b</sup> Survey area doubled in 2012 to 800 m on each side of the pipelines



Table 2. Spectacled Eider numbers and densities, and area surveyed on pre-nesting aerial surveys within 400 m of the Alpine Pipelines, Alaska, 1993–2014. See Table 1 and Figures 2 and 3 for areas surveyed.

Year	Number of Eiders	Indicated Total <sup>a</sup>	Number of Groups	Indicated Total Density <sup>a</sup>	Area Surveyed (km <sup>2</sup> ) <sup>b</sup>
1993	2	2	1	0.09	22.14
1994	0	0	0	0	13.08
1995	0	0	0	0	41.23
1996	0	0	0	0	41.23
1997	4	4	2	0.10	41.23
1998	2	2	1	0.09	21.6
1999	0	0	0	0	8.52
2000	0	0	0	0	21.6
2001	0	0	0	0	21.6
2002	0	0	0	0	21.6
2003	0	0	0	0	21.6
2004	0	0	0	0	44.28
2005	0	0	0	0	44.28
2006	2	2	1	0.05	44.28
2007	4	6	1	0.14	44.28
2008	0	0	0	0	44.28
2009	0	0	0	0	44.28
2010	0	0	0	0	44.28
2011	0	0	0	0	44.28
2012 <sup>c</sup>	0	0	0	0	88.98
2013	0	0	0	0	44.28
2014	0	0	0	0	44.28
Total	14	16	6		
Mean	0.64	0.73	0.27	0.02	34.20
SE	0.28	0.34	0.12	0.01	2.76
<i>n</i>	21	21	21	21	21

<sup>a</sup> Indicated total = (no. of males) × 2, except when flocks of mixed sex occurred (more than 5 birds that cannot be separated into breeding pairs), and counted as the number of birds in the flock (USFWS 1987a)

<sup>b</sup> Area surveyed within Alpine Pipelines survey area varied from 44.28 km<sup>2</sup> (400 m each side of pipelines) due to the following survey changes: 50% coverage in 1993, no survey in the Greater Kuparuk study area in 1994, no survey in the Colville Delta study area in 1999, 50% coverage in the Greater Kuparuk study area in 1995–2003, and no surveys between Greater Kuparuk and the Colville Delta study areas in 1998–2003

<sup>c</sup> Survey area included 800 m on each side of pipeline, 1,600 m total width; 1 pair of Spectacled Eiders was recorded 497 m from pipelines

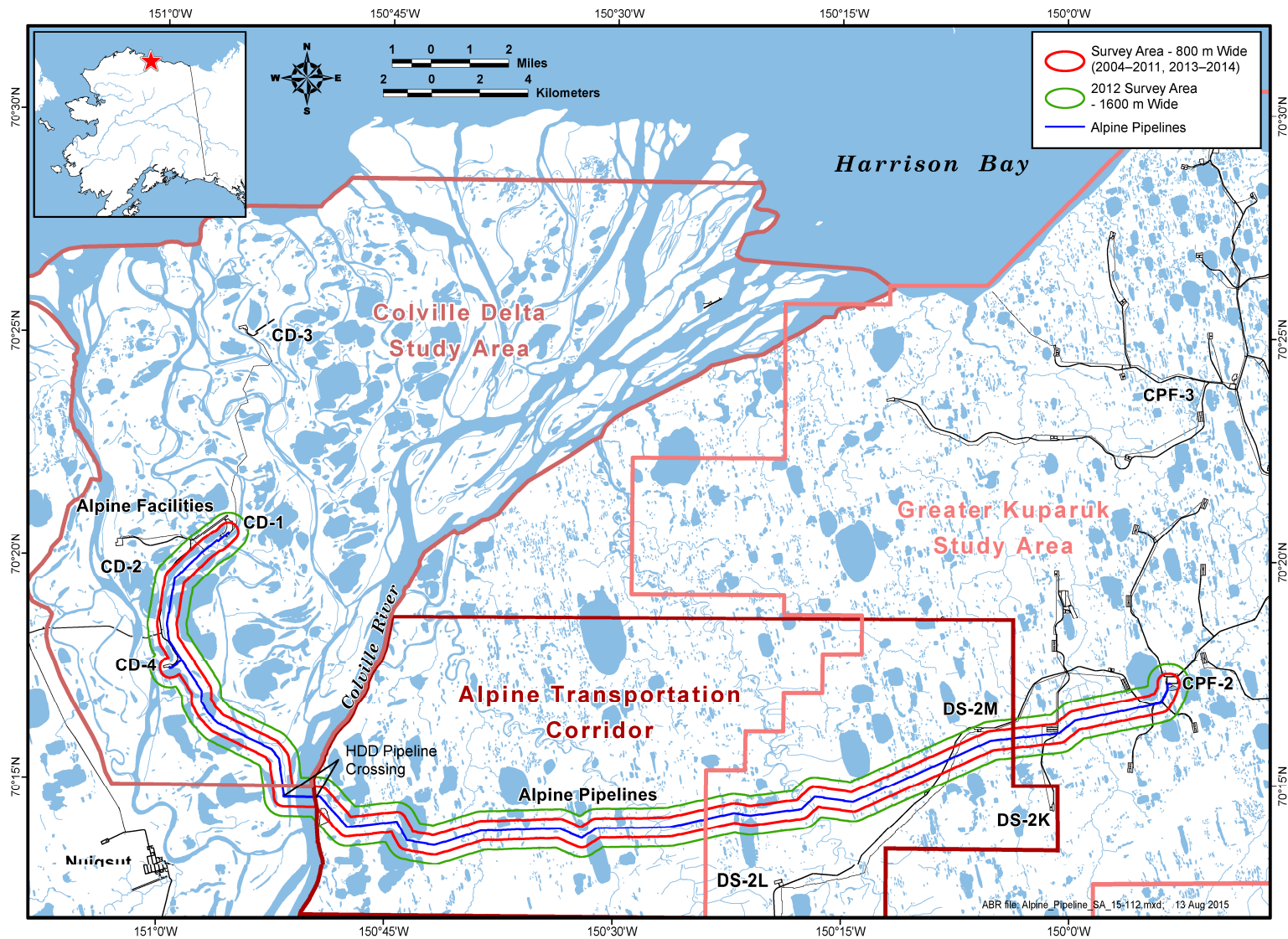


Figure 1. Location of the Alpine Pipelines survey area between the Kuparuk and Alpine oilfields, Alaska, 2004–2014. The survey area was 800 m wide (400 m on each side of the pipelines) except in 2012 when it was 1,600 m wide (800 m on each side of the pipelines). Boundaries of the Colville Delta, Greater Kuparuk, and Alpine Transportation Corridor study areas varied among years.

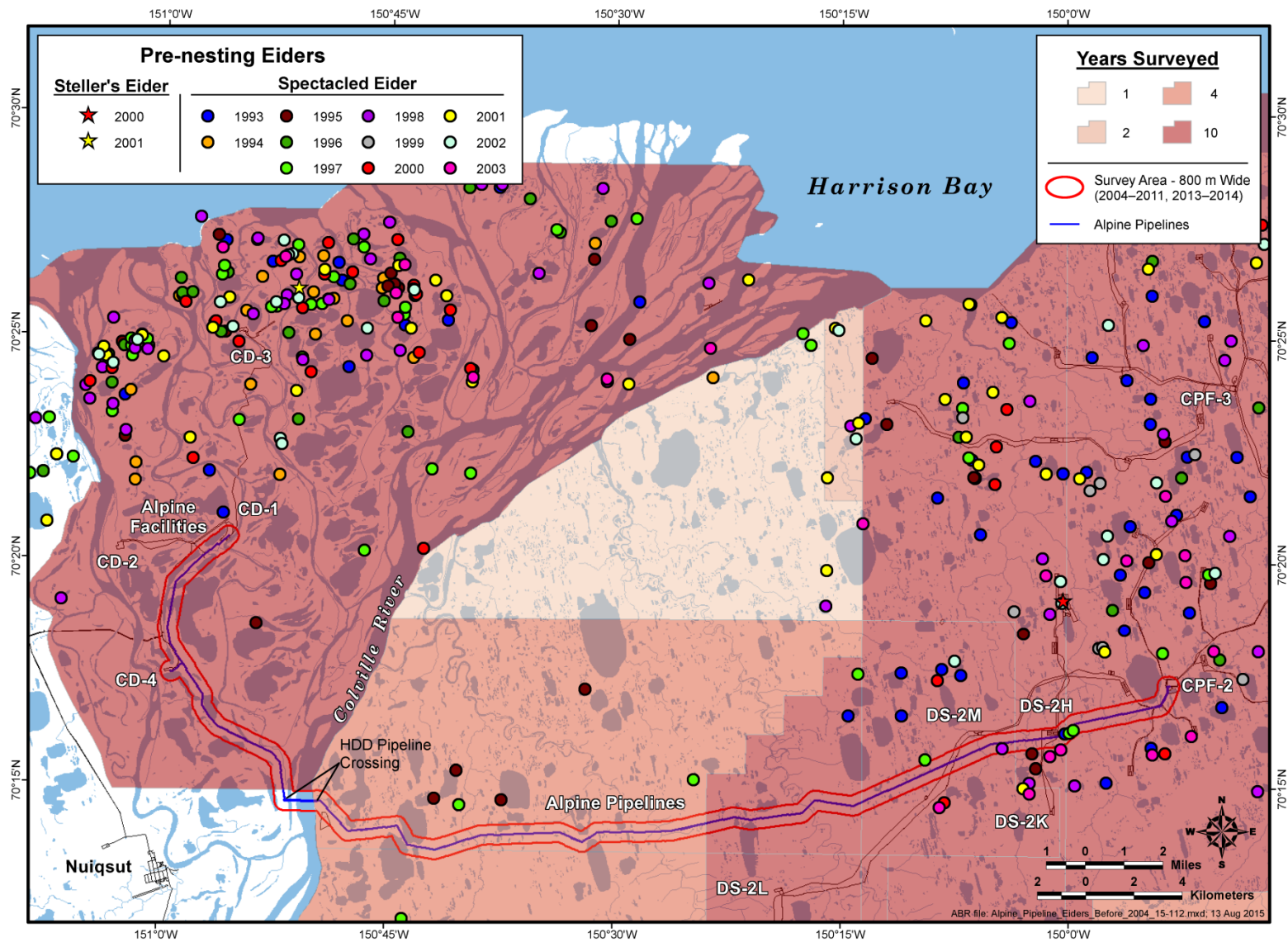


Figure 2. Pre-nesting locations of Spectacled and Steller's eiders in the Alpine Pipelines region from studies prior to the Alpine Pipeline surveys, Alaska, 1993–2003. The Colville Delta study area was surveyed in 1993–1998 and 2000–2003; the Greater Kuparuk study area was surveyed in 1993 and 1995–2003; and the Alpine Transportation Corridor study area was surveyed in 1993 and 1995–1997. Survey coverage was 100% in the Colville Delta and Alpine Transportation Corridor study areas (except 1993 was 50%) and survey coverage was 50% in the Greater Kuparuk study area. See Table 1.

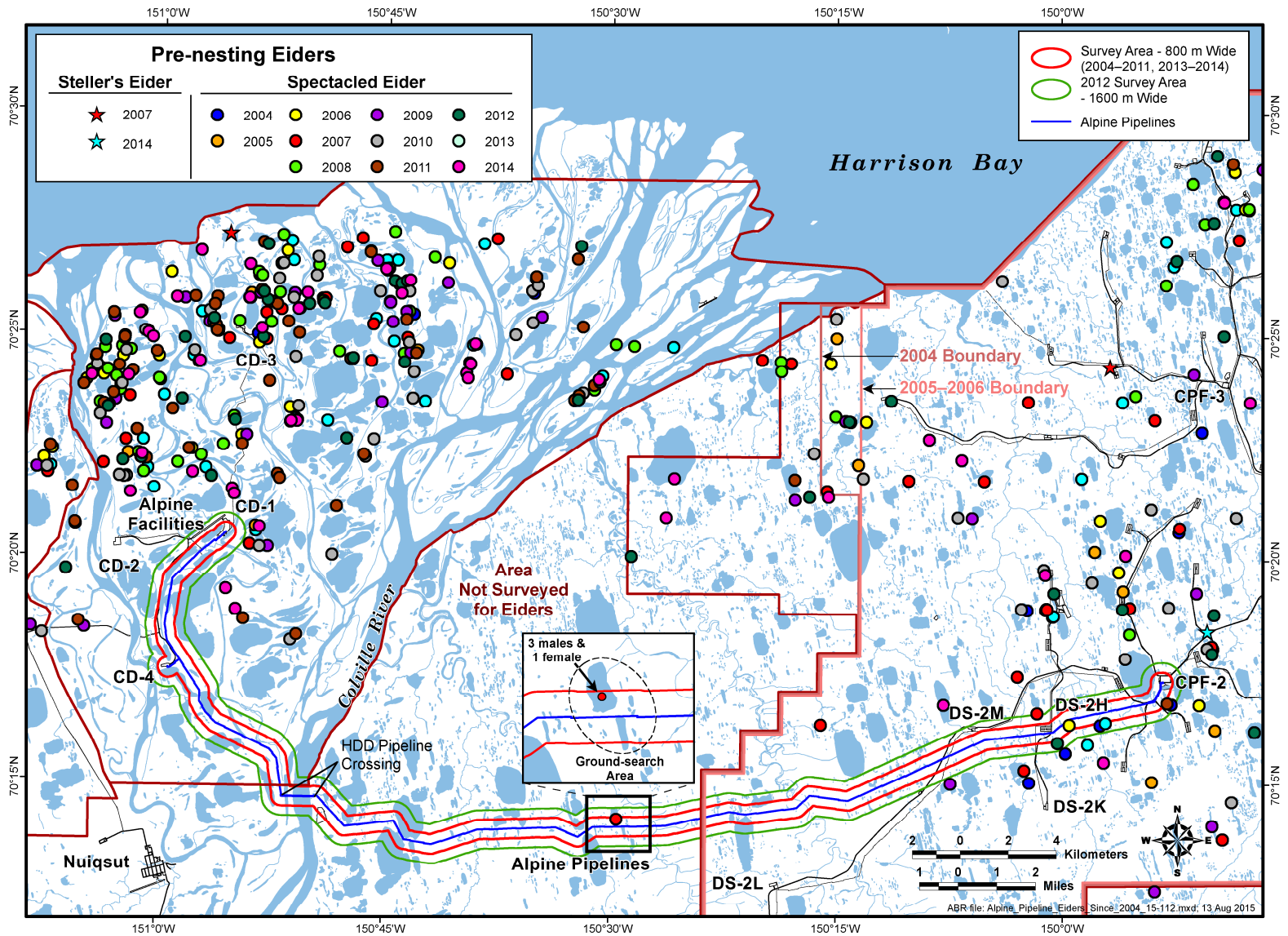


Figure 3. Pre-nesting locations of Spectacled and Steller's eiders during Alpine Pipelines surveys, Alaska, 2004–2014. Survey coverage was 100% in the Alpine Pipelines survey area and in the Colville Delta study area; survey coverage was 50% in the portion of Greater Kuparuk study area outside the Alpine Pipelines survey area. The 1,600 m wide corridor was surveyed in 2012 only. See Table 1.

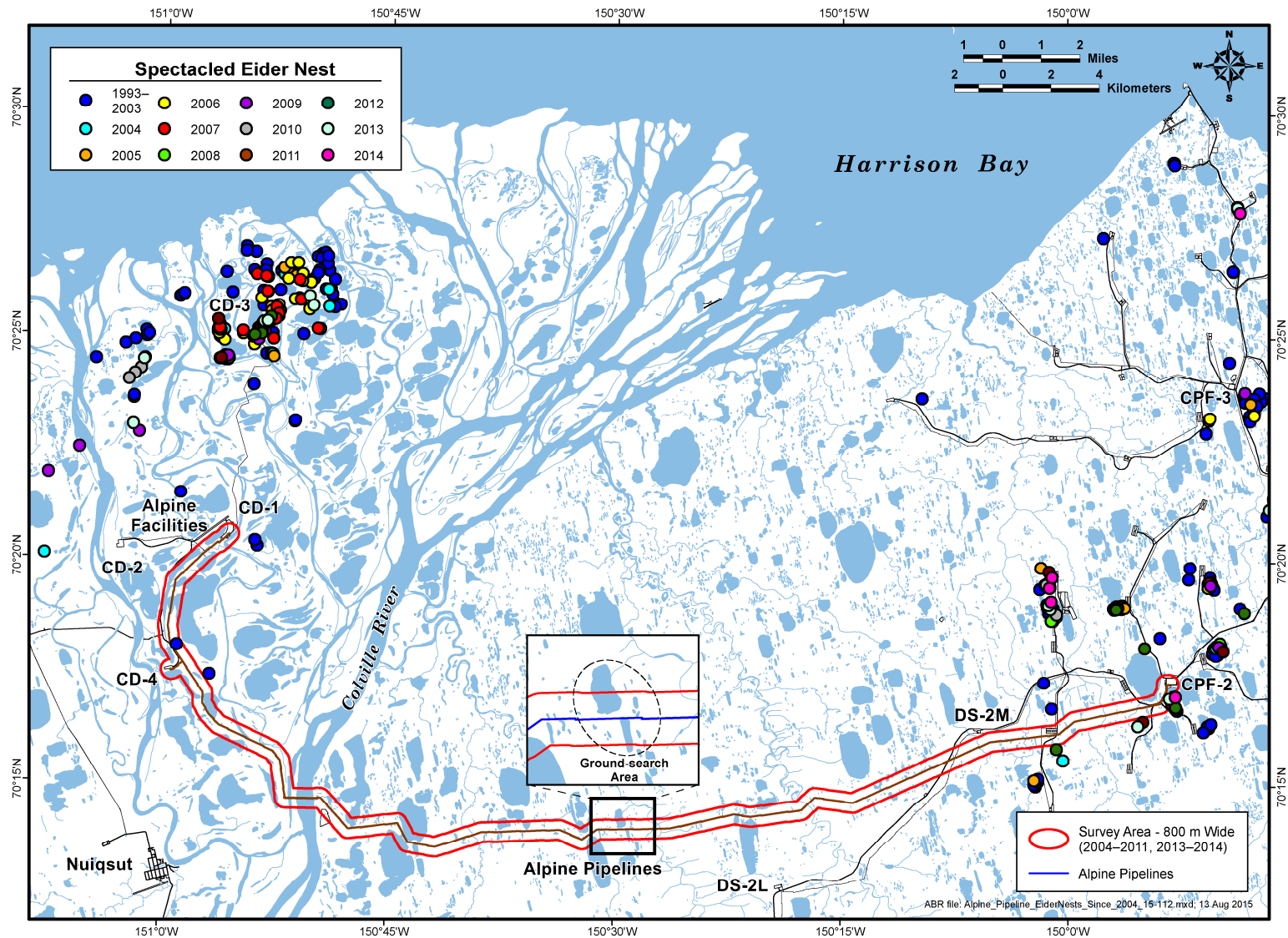


Figure 4. Nesting locations of Spectacled Eiders in the Alpine Pipelines survey area, and in the Colville Delta and Greater Kuparuk study areas, Alaska, 1993–2014. Nest searches were concentrated at CD-3, along ice roads from CD-3 to CD-2, and at various locations along the road system in the Greater Kuparuk study area where pre-nesting Spectacled Eiders were observed or where nests from previous years had been recorded. The ground search area along the pipelines is where 3 males and 1 female Spectacled Eider were seen on the pre-nesting survey in 2007, but no nests were found.

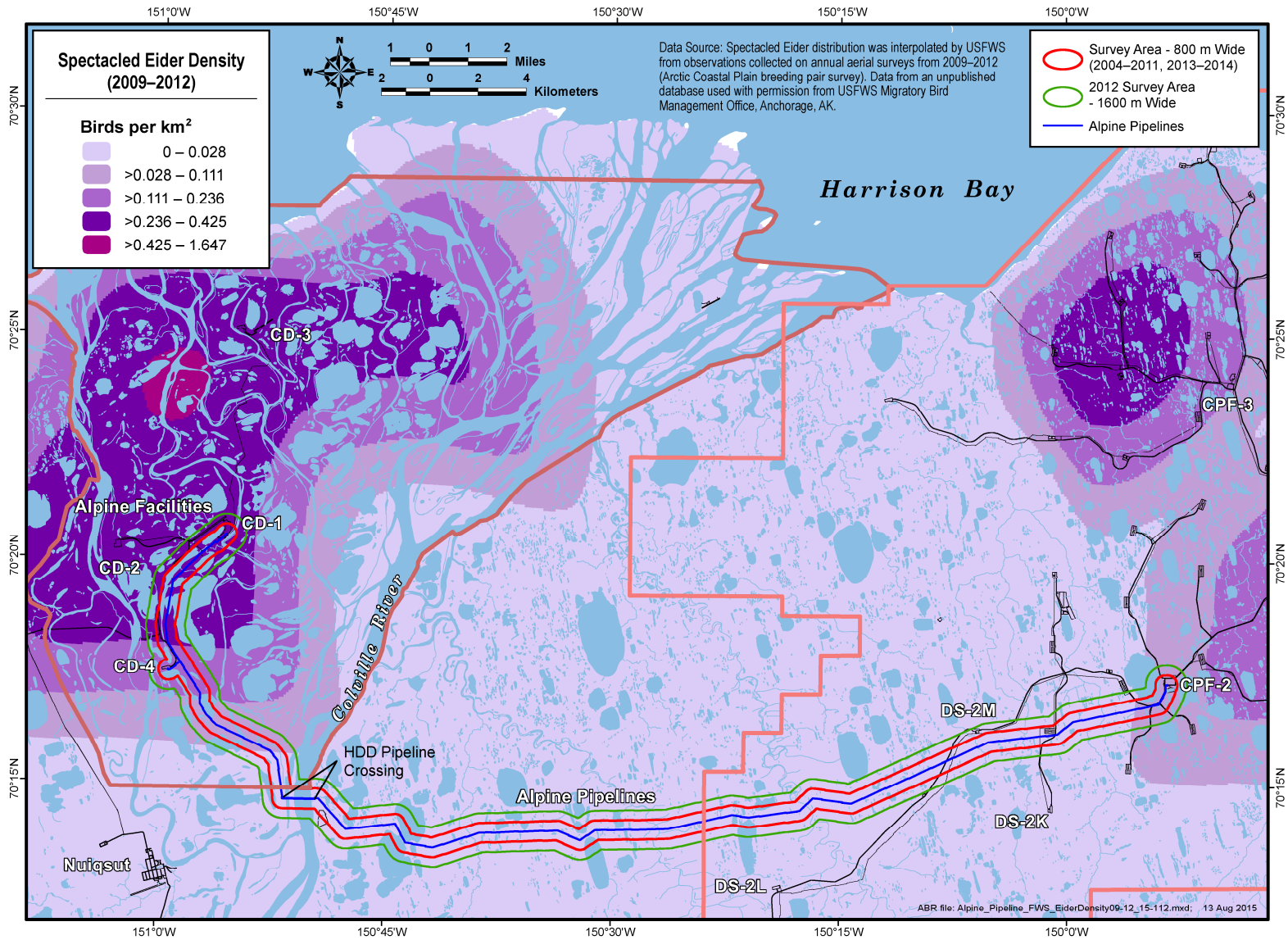


Figure 5. Density distribution of pre-nesting Spectacled Eiders from U.S. Fish and Wildlife Service aerial surveys, Alpine Pipelines area, Alaska, 2009–2012.