



**EIDER NEST SEARCHES AT THE CD-3 PAD,  
ICE ROAD, AND SPILL-RESPONSE SITES ON THE  
COLVILLE RIVER DELTA, 2012**

**PAM E. SEISER AND  
CHARLES B. JOHNSON**

PREPARED FOR

**CONOCOPHILLIPS ALASKA, INC.  
ANCHORAGE, ALASKA**

PREPARED BY

**ABR, INC.—ENVIRONMENTAL RESEARCH & SERVICES  
FAIRBANKS, ALASKA**



**EIDER NEST SEARCHES AT THE CD-3 PAD, ICE ROAD,  
AND SPILL-RESPONSE SITES ON THE COLVILLE RIVER DELTA, 2012**

FINAL REPORT

Prepared for

**ConocoPhillips Alaska, Inc.**

P.O. Box 100360

Anchorage, Alaska 99510-0360

Prepared by

Pam E. Seiser and Charles B. Johnson

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

P.O. Box 80410

Fairbanks, Alaska 99708

September 2012



*Printed on recycled paper.*



## EXECUTIVE SUMMARY

Spectacled Eiders (*Somateria fischeri*) and Steller's Eiders (*Polysticta stelleri*) occur on the Colville River Delta and are listed as threatened species under the Endangered Species Act (ESA). ConocoPhillips Alaska, Inc., (CPAI) operates the Alpine Satellite Development Project (Alpine Oilfield), an oil and gas development on the Colville River Delta, in areas of potential breeding habitat for these 2 species of eiders. The Spectacled Eider is the focus of this report because they commonly nest in the northern parts of the Colville River Delta, while the Steller's Eider is rarely sighted on the delta and no nests or broods have been recorded there. The nesting range of Steller's Eiders once included the Colville River Delta, but over the last 3–4 decades that range has retracted westward to the Barrow area. To comply with the ESA and to avoid disturbance of Spectacled Eiders during the nesting season, CPAI documented the location of Spectacled Eider nests in areas slated for off-pad activities (e.g., tundra clean-up, surveying, spill prevention). When active nests were identified, CPAI delayed scheduled work activities near the nest locations until after the nesting season.

This is the fourth year CPAI has contracted ABR, Inc., to conduct nest searches for eiders in areas where off-pad work was scheduled during the eider nesting season. In 2012, these areas included the CD-3 pad and airstrip, the ice road from CD-2 to CD-3, and 4 Alaska Clean Seas (ACS) spill-response equipment sites. Other ACS sites were evaluated for suitable eider nesting habitat during the 2009–2011 nesting seasons, but were excluded from the 2012 nest search either because no activities were scheduled at these sites during the eider nesting season or because eider nesting habitat was lacking at a specific site. Search areas were delineated as 200-m buffers around identified work sites. The search area for the ice road was a 200-m buffer on each side of the ice-road centerline.

In 2012, a total of 4 Spectacled Eider and 2 unidentified eider nests were discovered during nest searches. Four Spectacled Eider nests (2 active and 2 inactive) were found in the CD-3 pad and airstrip buffers. Two unidentified eider nests (inactive) were found within 200 m of the ice road.

No eider nests were found in the 4 ACS sites searched in 2012 (Site 3, Site 4, SK-15, and SK-13). We found no Steller's Eiders or their nests in any of the areas searched in 2012.

ABR provided CPAI field environmental compliance staff with the coordinates of 2 active eider nest locations. CPAI staff then instructed the helicopter pilots and off-pad workers of the areas to avoid. At the end of the nesting season, we found evidence that the 2 active Spectacled Eider nests near the CD3 airstrip failed before hatch.

In previous years, we reviewed nesting records and made assessments of nesting habitat available at 19 spill-response equipment sites and 3 pipeline bridge sites. Based on this review and assessment, we recommend continuing nest searches around the CD-3 pad and airstrip, the ice road, 9 spill-response sites, and 3 pipeline-bridge sites, if off-pad activities are planned for these locations during the 2013 breeding season.



## TABLE OF CONTENTS

Executive Summary .....	iii
List of Figures .....	v
List of Tables .....	v
Acknowledgments .....	v
Introduction.....	1
Objectives .....	3
Methods .....	3
Results.....	5
CD-3 Pad.....	5
Ice Road .....	5
Spill-response Sites .....	5
Summary.....	7
Literature Cited.....	13

## LIST OF FIGURES

Figure 1. Study area map of areas searched for Spectacled Eider nests at CD-3, the ice-road route, spill-response equipment sites, and pipeline-bridge sites on the Colville River Delta, Alaska, 2009–2012 .....	2
Figure 2. Eider nest locations at CD-3, the ice-road route, and spill-response equipment sites on the Colville River Delta, Alaska, June 2012.....	4

## LIST OF TABLES

Table 1. Numbers of nests of Spectacled Eiders and other large waterbirds found in search areas at CD-3, the ice road between CD-2 and CD-3, and 4 spill-response equipment sites, Colville River Delta, Alaska, 21–27 June 2012 .....	6
Table 2. Site descriptions and eider habitat assessments for 19 spill-response equipment sites and 3 pipeline bridge sites on the Colville River Delta, Alaska, 2009–2012.....	8

## ACKNOWLEDGMENTS

Our team of biologists and support staff that contributed to this project included Kristen Bartecchi-Rozell, Mike Davis, Davya Flaharty, Nathan Jones, Matt Macander, Liz Miner, Jon Plissner, John Price, Nate Schwab, and Mark Winterstein. Helicopter coordinators Erik Burney and Ray Rush and pilots Rory Kirkendall and Don Herbert got us safely in and out of the field. In our Fairbanks office, Will Lentz, Dorte Dissing, and Pam Odom provided assistance with data analysis, figure production, and report preparation. Tony LaCortiglia and Davya Flaharty prepared and shipped field gear. This project was funded by ConocoPhillips Alaska, Inc., and was administered by Caryn Rea, Senior Staff Biologist and Environmental Studies Lead for ConocoPhillips Alaska. We appreciate the review and comments on this report made by Caryn Rea and ABR’s Bob Burgess. Lastly we thank all the other ConocoPhillips Alaska staff and contractors at the Alpine Oilfield for creating a safe and positive work environment.





## INTRODUCTION

The Colville River Delta is within the current or historic ranges of 2 species of eider ducks that are listed as threatened under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.): the Spectacled Eider (*Somateria fischeri*) and Steller's Eider (*Polysticta stelleri*). Spectacled Eiders are common breeders on the Colville River Delta and occur at relatively high densities on the outer portions of the delta. In contrast, Steller's Eiders in Alaska breed primarily near Barrow, and although their historic range included all of the Arctic Coastal Plain of Alaska, they are extremely rare on the Colville River Delta (Quakenbush et al. 2002).

Evidence of nesting by Steller's Eiders east of Barrow has been reported only 3 times in the last 25 years: single broods were seen inland along the Colville River in 1987 (T. Swem, USFWS, unpubl. data), near Prudhoe Bay in 1993 (M. M. Johnson, pers. comm.), and near the upper Chipp River, approximately 80 km inland from the Dease Inlet/Admiralty Bay area in 1997 (King and Dau 1997). In the last 18 years, Steller's Eiders have been sighted only 3 times on the Colville River Delta (1995, 2001, and 2007) (J. Bart, Boise State University, pers. comm.; Johnson et al. 2002, 2008a), and there is no record of a Steller's nest or brood from the delta.

Spectacled Eiders nest on the outer Colville River Delta where ConocoPhillips Alaska, Inc. (CPAI), operates the CD-3 drill site as part of the Alpine Oilfield (Figure 1). Section 9 of the ESA prohibits harming, harassing, and disrupting normal activities of threatened and endangered species, without special exemption. However, under section 7(b)(4) and 7(o)(2) of the ESA, Incidental Take Statements can be issued to allow actions that are prohibited under Section 9 if they comply with specific terms and conditions. In the Biological Opinion issued prior to construction of CD-3 (part of the Alpine Satellites Development Project [ASDP]), the U.S. Fish and Wildlife Service (USFWS) stipulated terms and conditions in the Incidental Take Statement for the project that restrict human activity to existing gravel fill within 200 m of occupied Spectacled Eider nests during 1 June–1 August (USFWS 2004). Where minimal

summer support or construction activities must occur off existing gravel fill during the restricted period, USFWS-approved nest surveys for Spectacled Eiders must be conducted each year during the nesting period prior to those activities so that active nests can be avoided. CPAI conducts off-pad activities annually (e.g., tundra clean-up after the ice-road season, pipeline inspections, and civil surveys) on the tundra in portions of the nesting habitat of the Spectacled Eider during the breeding season (June and July). These off-pad activities have the potential to disturb nesting Spectacled Eiders, as the cryptic female eiders are difficult to detect and avoid from a distance and difficult to identify. Without prior knowledge of nest locations, workers could unintentionally flush birds from their nests, leaving the nest exposed to predators. In particular, helicopter landings and clean-up crews picking up debris from the tundra near gravel pads and along ice-road routes could inadvertently disturb nesting Spectacled Eiders. Similarly, seasonal mobilization at spill-response sites and pipeline-bridge inspections may affect eiders nesting near work sites.

To comply with the Incidental Take Statement issued in the Biological Opinion for ASDP (USFWS 2004) and to reduce inadvertent disturbance to breeding Spectacled Eiders, CPAI Operations requires documentation of the presence or absence of Spectacled Eider nests prior to initiating off-pad activities and then modifies those activities to avoid disturbance if nests are found. Consequently, CPAI contracted ABR, Inc., to conduct nest searches for eiders in areas of the Colville River Delta where off-pad activities were scheduled during the 2012 breeding season. In this report, we document eider nest locations within search areas around the CD-3 pad and airstrip, the ice road from CD-2 to CD-3, and 4 Alaska Clean Seas (ACS) spill-response equipment sites on the Colville River Delta. This is the fourth year that eider nest searches have been conducted in advance of the off-pad work, and included in this report is a summary of nesting habitat and prior nest searches for all 19 spill-response equipment sites and 3 pipeline-bridge sites visited during 2009–2012 (Seiser and Johnson 2010, 2011a, 2011b).

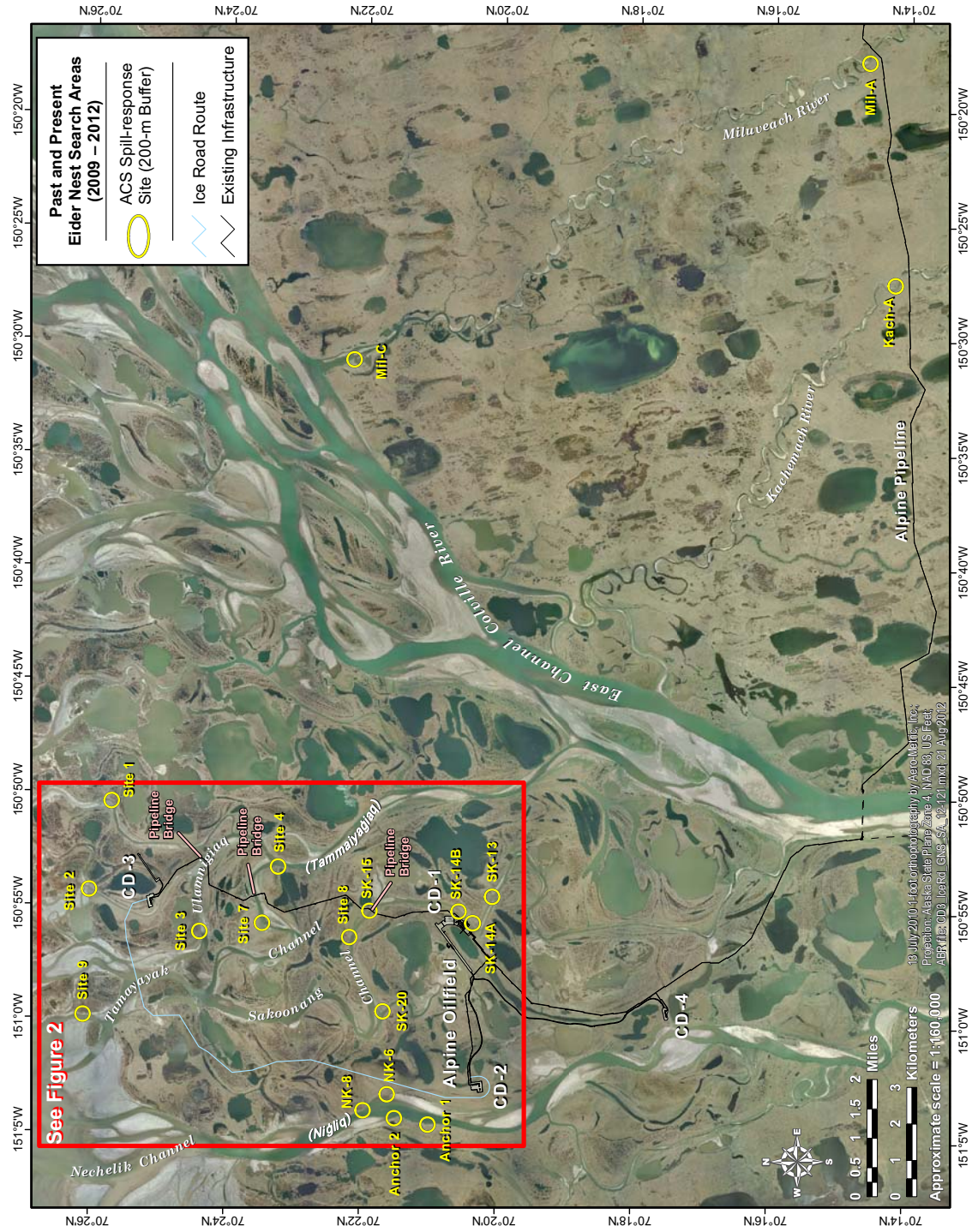


Figure 1. Study area map of areas searched for Spectacled Eider nests at CD-3, the ice-road route, spill-response equipment sites, and pipeline-bridge sites on the Colville River Delta, Alaska, 2009–2012.

## OBJECTIVES

The primary objective of nest searching in 2012 was to identify the locations of nesting Spectacled and Steller's eiders prior to off-pad activities in eider nesting habitat. Documentation of nest locations allowed CPAI to modify planned activities occurring near nests, either by delaying activities until after the nesting season or by maintaining a 200-m zone of no activity around nests. On the completion of nest searches, ABR transmitted a list of active eider nest locations to CPAI field environmental compliance staff, who then informed helicopter pilots and off-pad workers of areas to avoid.

## METHODS

We conducted intensive ground-based nest searches for Spectacled Eiders in areas on the Colville River Delta and nearby areas where tundra cleanup, pipeline inspections, mobilization and maintenance of spill-response equipment, or other tundra-based activities were proposed to occur during the breeding season (Figure 1). We searched a 200-m buffer around the majority of work sites. The 200-m buffer around work sites is based on terms and conditions in the Incidental Take Statement contained within the USFWS' Biological Opinion for the Alpine Satellite Development Project (USFWS 2004). While regulatory guidelines have not been issued on the extent of area around human activity that should be monitored for nesting activity, or conversely, the area around nests in which human activity should be avoided, we have applied the 200-m buffer as a zone outside of which human activity is not likely to cause severe disturbance. Data on flushing distances for nesting Spectacled Eiders over the last 19 years of nest searching suggest that this species rarely flushes from a nest when people are greater than 25 m away (ABR, unpublished data).

Crews of 3–9 people searched for nests by walking a regular search pattern with 10–20 m between searchers, which provided total coverage of the tundra within search boundaries. Crews were transported by helicopter to search sites, except for a few sites near Alpine that were reached by vehicle or by walking. All eider nest locations were recorded with handheld GPS units and on aerial-photo maps. Each nest was recorded as

active if occupied, or inactive if empty. We tried to avoid disturbing incubating Spectacled Eiders, but when a female Spectacled Eider was flushed inadvertently, we floated the eggs to estimate hatch dates and installed in the nest an artificial temperature-sensing egg. Temperature data recorded by the artificial egg were used to determine nest fate (success or failure), the timing of hatch or nest failure, and incubation constancy. After hatch, we returned to retrieve the artificial eggs and record the fate of nests. Inactive nests were identified to species based on size and color pattern of contour feathers (Anderson and Cooper 1994). In this report the designation of unidentified eider species refers to the determination of nests belonging to either Spectacled Eiders or King Eiders (*Somateria spectabilis*). Both Steller's Eiders and Common Eiders (*Somateria mollissima*) are extremely rare in the study area and not documented to nest there (Johnson et al 2004b, 2008b).

The CD-3 pad, airstrip, and ice road areas are scheduled annually for summer tundra clean-up. At CD-3, we searched within a 200-m buffer around the drill pad, airstrip, and connecting road (Figure 2). For the ice road, we searched the entire length from CD-3 to CD-2, within a 200-m buffer on each side of the road centerline (Figure 2). In 2012, we searched 4 spill-response equipment sites (Figure 2), where maintenance and inspection activities were planned during the nesting season. At sites where spill-response storage containers were already in place, we searched within a 200-m radius of the container, otherwise we searched a 200-m radius around the coordinates provided by ACS.

During 2009–2011, we evaluated habitat quality for nesting Spectacled Eiders at 19 spill-response sites and 3 pipeline-bridge sites and found eider nesting habitat varied in quality and abundance among the sites (Seiser and Johnson 2010, 2011a, 2011b). We inventoried habitat within the 200 m buffer of each site by visual inspection and by overlapping wildlife habitat maps of the Colville River Delta and the Alpine Transportation Corridor (Johnson et al. 1997, Jorgenson et al. 1997) on each site. For sites outside the mapped areas, we visually assessed habitat quality during the nest search. We considered habitats that were preferred or frequently used by nesting and

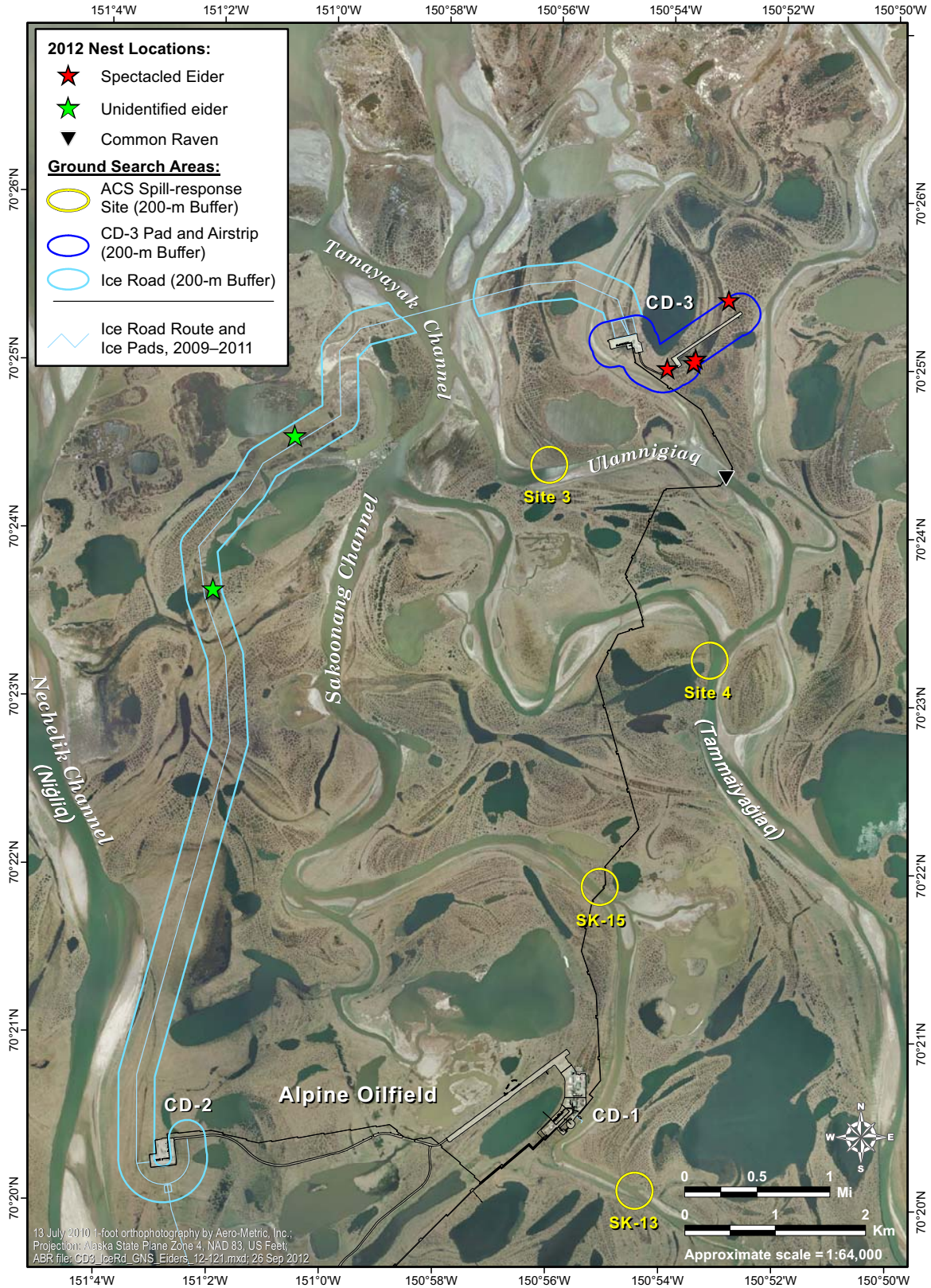


Figure 2. Eider nest locations at CD-3, the ice-road route, and spill-response equipment sites on the Colville River Delta, Alaska, June 2012.

pre-nesting Spectacled Eiders (Johnson et al. 2008b) to have the highest potential for nesting: Brackish Water, Salt-killed Tundra, Salt Marsh, Deep Water (both with and without islands), Shallow Water (both with and without islands), Deep Polygon Complex, Sedge Marsh, Grass Marsh, and Patterned Wet Meadow.

## RESULTS

### CD-3 PAD

On 26 and 27 June, we searched a 200-m-wide buffer encompassing 103.8 ha around the CD-3 pad, airstrip, and access road to the airstrip (Figure 2). We found 2 active and 2 failed Spectacled Eider nests. The identities of the failed nests were based on evaluation of the color pattern of contour feathers found in the nest (Anderson and Cooper 1994). We revisited the 2 active Spectacled Eider nests on 18 July and found no evidence of hatch at either nest site. No Steller's Eider adults or nests were sighted in the CD-3 search areas in 2012. In addition to the eider nests, we also found 44 nests of other large waterbirds in the CD-3 search area (Table 1).

### ICE ROAD

We searched a 200-m-wide buffer on each side of the centerline along the length (13.8 km) of the ice road between CD-2 to CD-3 on 22–25 June (Figure 2). We found 2 failed eider nests within the ice road's 546-ha search area (Figure 2, Table 1). The nests could not be identified by contour feathers. Two female Spectacled Eiders were sighted on the waterbody adjacent to one of the failed nests, suggesting the identity of that nest, but too few contour feathers were in the nest for us to confirm the species of the nesting eider. The contour feathers found in the other failed nest could not be definitively assigned to Spectacled Eider or King Eider (Anderson and Cooper 1994). While searching for eider nests, we recorded 157 nests of other large waterbirds within the ice-road search area (Table 1).

### SPILL-RESPONSE SITES

We found no Spectacled Eider nests within the 4 spill-response sites we searched on 21 June (Figure 2). Two Spectacled Eider females flew

across spill-response Site 3, an area with previous records of nesting Spectacled Eiders (Johnson et al. 2000, 2002, 2003a, 2004a, 2004b, 2005, 2006, 2007, 2008b; Seiser and Johnson 2010, 2011). We did find a combined total of 21 nests of other large waterbirds at the 4 spill-response sites (Table 1). Also noteworthy is a Common Raven (*Corvus corvus*) nest with 3 fledglings on the bridge spanning the Ulamnigaiq Channel (Figure 2), which we discovered while in transit to our nest searching sites. Ravens are predators of bird eggs and rely upon elevated structures when nesting in tundra areas.

Of 22 total sites, including 3 pipeline bridge crossings, 10 were considered to have insufficient nesting habitat to merit nest searching for eiders (Table 2). Spill-response sites south of Alpine on the Colville River Delta were deleted from the list of sites to search because previous studies had shown Spectacled Eiders rarely occurred there (Johnson et al. 2004b). In a meeting on 2 May 2011, USFWS, CPAI, and ABR agreed on completing nest searches at a reduced list of spill-response sites based on assessments of nesting habitat (letter from Caryn Rea to Sarah Conn, dated June 2011). As a result of this meeting, 4 sites were dropped from the list of sites requiring nest searches after nest searches were conducted in 2009 and 2010 because of insufficient nesting habitat or because their location was south of Alpine. At the same meeting, the USFWS also agreed that nest searches would be required prior to ground-based work conducted at sites between 9 June and 30 July; 9 June is the earliest known record of nest initiation for Spectacled Eiders on the Colville River Delta (ABR, unpubl. data). The date that nesting begins is of concern because CPAI has a regulatory obligation in its Oil Discharge Prevention and Contingency Plan for Alpine to deploy spill prevention equipment as soon as ice leaves the channels, which typically overlaps with the eider nesting season. After 9 June, activities at spill-response sites will require nest searches prior to work crew arrival. Another 6 sites (Anchor 1, Kach-A, Mil-A, Mil-C, NK-8, and Site 2) were dropped from the list of sites after the nest search in 2011, for the same reasons as before (letter from Caryn Rea to Sarah Conn, dated 14 March 2012). Thus, 9 ACS sites (searched annually) and 3 pipeline bridge crossings (searched

Table 1. Numbers of nests of Spectacled Eiders and other large waterbirds found in search areas at CD-3, the ice road between CD-2 and CD-3, and 4 spill-response equipment sites, Colville River Delta, Alaska, 21–27 June 2012.

Search Area	Eider Species		Other Waterbirds														Total			
	Spectacled Eider	Unidentified eider	Greater White-fronted Goose	Snow Goose	Brant	Cackling/Canada Goose <sup>a</sup>	Unidentified goose	Northern Pintail	Greater Scaup	Long-tailed Duck	Willow Ptarmigan	Red-throated Loon	Pacific Loon	Bar-tailed Godwit	Wilson's Snipe	Sabine's Gull		Arctic Tern	Parasitic Jaeger	
CD-3 Pad and Airstrip	4	-	34	-	-	3	-	-	-	1	-	2	-	-	-	1	2	1	1	48
CD-2 to CD-3 Ice Road	-	2	122	1	10	2	1	3	1	4	1	5	1	2	1	2	-	-	1	159
ACS Spill-response Sites																				
Site 3	-	-	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7
Site 4	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
SK-13	-	-	7	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	8
SK-15	-	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5
Total of Spill-response Sites	0	0	19	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	21

<sup>a</sup> Nest belonging to either Cackling or Canada goose

every 3 years) remain on the list for nest searches when maintenance activities occur during the eider breeding season. In 2012, only 4 ACS sites were scheduled for spill response activities after 9 June, thus requiring a nest search. The next year that activities are scheduled for the 3 pipeline sites is 2013.

### SUMMARY

Four Spectacled Eider nests (2 active and 2 inactive) and 2 unidentified eider nests (all inactive) were found in the CD-3, ice road, and spill-response search areas in 2012. We found no Steller's Eiders or their nests in any of the areas searched in 2012, which is consistent with past results of nest search efforts on the delta. No nests of Steller's Eiders have been documented on the Colville River Delta despite nearly annual search efforts from 1992 to 2012. Observations of Steller's Eiders on the Colville River Delta are rare. Only 3 sighting of Steller's Eiders have been recorded between 1992 and 2012; 5 were in a group seen on the outer delta in 1995, a pair was seen near CD-3 in 2001, and a male in flight was observed in 2007.

Between 2009 and 2012, we visited 19 spill-response sites and 3 pipeline-bridge sites and found eider nesting habitat varied in quality and abundance among the sites (Table 2; Seiser and Johnson 2010, 2011a, 2011b). We found that 10 of these 22 sites either lack eider nesting habitat (Site 7, NK-6, Kach-A), contain nesting habitat low in quantity or quality (Anchor 1, Mil-A, Mil-C, NK-8, Site 2), or have degraded and unusable nesting habitat (e.g., flare at SK-14A, remnant snow berms at SK-14B). The USFWS, CPAI, and ABR agreed to omit these 10 sites, reducing the list of sites to 12 locations. Most of these omitted sites are adjacent to suitable nesting habitat for eiders, however, and should be re-evaluated if equipment or activity locations are shifted in future years.

The remaining 9 spill-response sites and 3 pipeline-bridge sites contain habitat that could potentially attract nesting Spectacled Eiders. Assuming there will be continued human activity at these sites during the breeding season, we recommend continuing nest searches at these 12 sites (Table 2). Pipeline-bridge crossings are on a 3-year inspection cycle and they were last

inspected in 2010; therefore, we expect to revisit the pipeline-bridge sites in 2013.

Because of the relatively high density of eiders along the ice road between CD-2 to CD-3 and around the CD-3 pad and airstrip, we recommend continuing nest searches in these areas during the breeding season. The areas searched along the ice road and around CD-3 have abundant habitat suitable for nesting Spectacled Eiders. We have found Spectacled Eider nests near the CD-3 pad and airstrip in all 4 years that searches have been conducted, and we have found Spectacled Eider nests along the ice road in 3 of 4 years (Seiser and Johnson 2010, 2011a, 2011b). As long as clean-up and other off-pad activities are scheduled in these areas during the breeding season (between 9 June and 30 July), we recommend prior searches for Spectacled Eider nests to ensure that human-caused disturbance to nesting eiders can be avoided.

Table 2. Site descriptions and eider habitat assessments for 19 spill-response equipment sites and 3 pipeline bridge sites on the Colville River Delta, Alaska, 2009–2012.

Site Name	Location	Site Description	Wildlife Habitat <sup>a</sup>	Habitat Description	Nesting Habitat Present <sup>b</sup>	Search History / Nesting Records	Years Searched	Search in Future Years?	Comments																																																						
Anchor 1	N 70.35003	Western bank of the Nechelik Channel	NWWM,	Shrubs, low-relief low-center polygons	Yes	No/No	2009	No	Marginal nesting habitat because of prevalence of shrubs. Few ponds.																																																						
	W 151.07447		MSSM, PWM				2010 2011			Anchor 2	N 70.35828	Western bank of the Nechelik Channel	PWM,	Shrubs, low-relief low-center polygons	Yes	No/No	2009	Yes	Marginal nesting habitat because of prevalence of shrubs. Large and small ponds present.	W 150.07022	DOWIP	2010 2011	Kach-A	N 70.23750	Kachemach River, just north of the pipeline	MSSM	Small pocket of wet meadow surrounded by drier habitat	No	No/No	2011	No	Poor habitat because NWM is <10% of the total area, and the surrounding area is occupied by shrubs.	W 150.45838	MTTU NWM TLDS	Mil-A	N 70.24403	Miluveach River, just north of the pipeline	PWM	Diverse site, west side well drained, east side is MSSM grading to PWM	Yes	No/No	2011	No	Conexes are located on a well-drained bluff. Search area on the opposite bank, near boom anchor point, contained marginal nesting habitat.	W 150.29674	MSSM TLDS	Mil-C	N 70.37038	Shoreline and islands ~800 m upstream of Miluveach River mouth	NWWM,	NWM on river banks, BAR and SKT on islands	Yes	No/No	2010	No	No habitat mapping available for this site; marginal nesting habitat on both banks and islands based on appraisal in field.	W 150.51505	BAR, SKT	NK-6	N 70.360-7	Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge
Anchor 2	N 70.35828	Western bank of the Nechelik Channel	PWM,	Shrubs, low-relief low-center polygons	Yes	No/No	2009	Yes	Marginal nesting habitat because of prevalence of shrubs. Large and small ponds present.																																																						
	W 150.07022		DOWIP				2010 2011			Kach-A	N 70.23750	Kachemach River, just north of the pipeline	MSSM	Small pocket of wet meadow surrounded by drier habitat	No	No/No	2011	No	Poor habitat because NWM is <10% of the total area, and the surrounding area is occupied by shrubs.	W 150.45838	MTTU NWM TLDS	Mil-A	N 70.24403	Miluveach River, just north of the pipeline	PWM	Diverse site, west side well drained, east side is MSSM grading to PWM	Yes	No/No	2011	No	Conexes are located on a well-drained bluff. Search area on the opposite bank, near boom anchor point, contained marginal nesting habitat.	W 150.29674	MSSM TLDS	Mil-C	N 70.37038	Shoreline and islands ~800 m upstream of Miluveach River mouth	NWWM,	NWM on river banks, BAR and SKT on islands	Yes	No/No	2010	No	No habitat mapping available for this site; marginal nesting habitat on both banks and islands based on appraisal in field.	W 150.51505	BAR, SKT	NK-6	N 70.360-7	Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge	No	No/No	2009	No	No nesting habitat at this site for eiders or most other species of waterfowl.	W 15-.05275	MSSM						
Kach-A	N 70.23750	Kachemach River, just north of the pipeline	MSSM	Small pocket of wet meadow surrounded by drier habitat	No	No/No	2011	No	Poor habitat because NWM is <10% of the total area, and the surrounding area is occupied by shrubs.																																																						
	W 150.45838		MTTU NWM TLDS				Mil-A			N 70.24403	Miluveach River, just north of the pipeline	PWM	Diverse site, west side well drained, east side is MSSM grading to PWM	Yes	No/No	2011	No	Conexes are located on a well-drained bluff. Search area on the opposite bank, near boom anchor point, contained marginal nesting habitat.	W 150.29674	MSSM TLDS	Mil-C	N 70.37038	Shoreline and islands ~800 m upstream of Miluveach River mouth	NWWM,	NWM on river banks, BAR and SKT on islands	Yes	No/No	2010	No	No habitat mapping available for this site; marginal nesting habitat on both banks and islands based on appraisal in field.	W 150.51505	BAR, SKT	NK-6	N 70.360-7	Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge	No	No/No	2009	No	No nesting habitat at this site for eiders or most other species of waterfowl.	W 15-.05275	MSSM																			
Mil-A	N 70.24403	Miluveach River, just north of the pipeline	PWM	Diverse site, west side well drained, east side is MSSM grading to PWM	Yes	No/No		2011	No	Conexes are located on a well-drained bluff. Search area on the opposite bank, near boom anchor point, contained marginal nesting habitat.																																																					
	W 150.29674		MSSM TLDS				Mil-C	N 70.37038			Shoreline and islands ~800 m upstream of Miluveach River mouth	NWWM,	NWM on river banks, BAR and SKT on islands	Yes	No/No	2010	No	No habitat mapping available for this site; marginal nesting habitat on both banks and islands based on appraisal in field.	W 150.51505	BAR, SKT	NK-6	N 70.360-7	Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge	No	No/No	2009	No	No nesting habitat at this site for eiders or most other species of waterfowl.	W 15-.05275	MSSM																															
Mil-C	N 70.37038	Shoreline and islands ~800 m upstream of Miluveach River mouth	NWWM,	NWM on river banks, BAR and SKT on islands	Yes	No/No		2010	No	No habitat mapping available for this site; marginal nesting habitat on both banks and islands based on appraisal in field.																																																					
	W 150.51505		BAR, SKT				NK-6	N 70.360-7			Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge	No	No/No	2009	No	No nesting habitat at this site for eiders or most other species of waterfowl.	W 15-.05275	MSSM																																											
NK-6	N 70.360-7	Eastern bank of the Nechelik Channel.	TLDS,	Low willow shrubs and non-patterned grass/sedge	No	No/No		2009	No	No nesting habitat at this site for eiders or most other species of waterfowl.																																																					
	W 15-.05275		MSSM																																																												



Table 2. Continued.

Site Name	Location	Site Description	Wildlife Habitat <sup>a</sup>	Habitat Description	Nesting Habitat Present <sup>b</sup>	Search History / Nesting Records	Years Searched	Search in Future Years?	Comments
NK-8	N 70.36606 W 15-.06483	NW bank of the Nechelik Channel.	PWM, MSSM	Low willow shrubs with some polygons, river bank with polygon troughs	Yes	No/No	2009 2010 2011	No	Marginal nesting habitat because of prevalence of shrubs; contains some polygonal areas.
Site 1	N 70.42874 W 150.85064	Container on western bank, site includes both sides of the Tamayayak	NWM, PWM, BAR, SOW	Vegetated areas on west side are predominately NWM and PWM; opposite bank is mostly barren.	Yes	Yes <sup>c</sup> /Yes	2009 2010 2011	Yes	Eider nesting habitat consists of polygon ponds 100 m inland from the container; nesting habitat is easily delineated from the rest of the site by distinct rise in elevation above the current river bank and container location.
Site 2	N 70.43417 W 150.90533	Container on western bank, site includes both sides of the of the West Ulamnigïaq	MSSM, PWM, NWM, BAR, SM, SKT	Half of site is vegetated. MSSM is on the west bank and on the east bank SM with NWM grades into PWM	Yes	Yes <sup>c</sup> /No	2009 2010 2011	No	Marginal nesting habitat; site borders better nesting habitat; driftwood lines indicate flooding is common at this site; in future, search only east side.
Site 3	N 70.40692 W 150.93553	Container on northern bank of Ulamnigïaq; site spans the channel and mud flats on south bank	NWM, PWM, BAR	North bank is 50% NWM and 50% PWM	Yes	Yes <sup>c</sup> /Yes	2009 2010 2011 2012	Yes	Eider nesting habitat on the north side; a Spectacled Eider nested 160 m from the spill response conex in 2011 and 207 m from the conex in 2009. Two female Spectacled Eiders observed flying in 2012.

Table 2. Continued.

Site Name	Location	Site Description	Wildlife Habitat <sup>a</sup>	Habitat Description	Nesting Habitat Present <sup>b</sup>	Search History / Nesting Records	Years Searched	Search in Future Years?	Comments
Site 4	N 70.38775 W 150.88718	Container on western bank of the Tamayayak	PWM, MSSM, DOWIP, BAR	~30% dry, low-relief PWM; ~10% high-relief PWM; ~10% DOWIP; ~50% channel and mud bars	Yes	No/No	2009 2010 2011 2012	Yes	Suitable habitat in low-relief areas and along lake. Marginal nesting habitat in the high relief area.
Site 7	N 70.39152 W 150.92881	Container on NW bank of Tamayayak; site includes mud bar in the of middle channel	NWM, TLDS, BAR	Well-drained NWM and low shrubs along the river channel	No	No/No	2009 2011	No	No suitable nesting habitat; area dry and shrubby; no lakes within 200 m. Location has been updated to the 2011 location of conex.
Site 8	N 70.37003 W 150.93819	Predominately on the northern bank of the Sakoonang Channel. Site barely spans the channel.	PWM, TLDS, BAR	~20% low-relief PWM, ~30% high-relief PWM, and ~50% shrub habitats (MSSM & TLDS) on north bank, TLDS and BAR on south bank	Yes	No/No	2009 2010 2011	Yes	Nesting habitat limited to PWM bordering the large deep lake NE of Site 8. Two female Spectacled Eiders observed flying over the site in 2010.
Site 9	N 70.43531 W 150.99748	Container on eastern side of Tamayayak.	SM, SKT, BAR	Salt-affected vegetation and abundant drift wood on east bank, river channel and BAR	Yes	No/No	2009 2010 2011	Yes	Suitable nesting habitat with sparse vegetation; better habitat ~250 m east of the container in low-center polygon area; area probably used extensively by molting/brood-rearing geese in late July and early-mid August.

Table 2. Continued.

Site Name	Location	Site Description	Wildlife Habitat <sup>a</sup>	Habitat Description	Nesting Habitat Present <sup>b</sup>	Search History /		Search in Future Years?	Comments
						Nesting Records	Years Searched		
SK-13	N 70.33506 W 150.90711	Both banks of Sakoonang just south of Alpine	PWM, NWM, TLDS, BAR	Low-relief PWM with narrow bands of TLDS, BAR, and NWM	Yes	Yes <sup>d</sup> /No	1998–2000 2009 2011 2012	Yes	Potential eider nesting habitat in areas of PWM. In 2011, a Spectacled Eider pair was sighted 550 m north of SK-13.
SK-14A	N 70.33975 W 50.92675	Site is adjacent to the Alpine flare pit; on the Sakoonang.	PWM, NWM, TLDS, BAR	Gravel pad, high-relief polygons, and shrubs are on the NW bank. The east bank contains TLDS, NWM, and PWM.	Yes	Yes <sup>d</sup> /No	1996–2001 2009	No	Marginal nesting habitat because of shrubs and habitat modification. The NW bank habitat is modified by gravel pad and flare and SE bank is relatively dry. Previous searches have not found eider nests.
SK-14B	N 70.34325 W 150.91836	Site is NW of the Alpine boat ramp	PWM, NWM, TLDS, BAR	PWM, gravel pad and NWM on NE bank, TLDS and PWM on SW bank	Yes	Yes <sup>d</sup> /No	1996–2001 2009 2010	No	Eider nesting habitat adjacent to the Alpine gravel pad and to a lesser degree on the east side of the channel. Snow banks on the pad edge may delay availability. Previous searches have not found eider nests.
SK-15	N 70.36514 W 150.91869	~2.5 km north of Alpine and next to a pipeline bridge on the Sakoonang	PWM, NWM, MSSM, TLDS, BAR	TLDS, NWM, and BAR on NW bank, MSSM with aquatic centers on SE bank	Yes	No/No	1998 1999 2009-2012	Yes	Nesting habitat on both sides of the channel in areas of PWM and NWM.
SK-20	N 70.361156 W 150.99228	Near the intersection of channels on the Sakoonang	PWM, NWM, TLDS, BAR	10% PWM, 50% low relief MSSM, 40% riverine habitats	Yes	No/No	2009	Yes	Nesting habitat on both sides of the channel in areas of PWM, but not in the willows on the island.

Table 2. Continued.

Site Name	Location	Site Description	Wildlife Habitat <sup>a</sup>	Habitat Description	Nesting Habitat Present <sup>b</sup>	Search History / Nesting Records	Years Searched	Search in Future Years?	Comments
Sakoonang Pipeline Bridge	N 70.36444	First Colville	PWM,	PWM on NE	Yes	Yes <sup>d</sup> /No	1998	Yes	Potential nesting habitat in polygons in the southwest end of the site. Marginal nesting habitat on the NE side because of prevalence of shrubs.
	W 150.91888	River channel-crossing north of Alpine, adjacent to SK-15	NWM, TLDS, BAR	bank, SW bank is shrubs with low-centered polygons in PWM			1999 2010		
Tamayayak Pipeline Bridge	N 70.39277	Second Colville	PWM,	PWM and NWM	Yes	No/No	2010	Yes	Willows along channel margins, suitable nesting habitat away from channels.
	W 150.90805	River channel-crossing north of Alpine	NWM, TLDS, BAR	on north bank, south bank is barrens, shrub, and NWM					
Ulammigiaq Pipeline Bridge	N 70.39277	Third Colville	PWM,	PWM and NWM	Yes	Yes <sup>c</sup>	2000–2007	Yes	The majority of this site contains suitable nesting habitat.
	W 150.90805	River channel-crossing north of Alpine	NWM, BAR	on north bank, south bank is NWM			2010		

<sup>a</sup> Wildlife Habitats = Salt Marsh (SM), Salt-killed Tundra (SKT), Deep Open Water without Islands (DOW), Deep Open Water with Islands or Polygonized Margins (DOWIP), Shallow Open Water without Islands (SOW), Nonpatterned Wet Meadow (NWM), Patterned Wet Meadow (PWM), Moist Sedge-Shrub Meadow (MSSM), Moist Tussock Tundra (MTTU), Tall, Low, Dwarf Shrub (TLDS), and Barrens (BAR)

<sup>b</sup> Areas containing SM, SKT, DOWIP, DOW, SOW, NWM, PWM, or DPC (Deep Polygon Complex)

<sup>c</sup> CD-3 nest searches conducted during 2000–2007; Spectacled Eider and unidentified eider nests were found at these sites during some years (Johnson et al. 2008b)

<sup>d</sup> Alpine nest searches conducted in 1995–2001 (Johnson et al. 2003b)

## LITERATURE CITED

- Anderson, B. A., and B. A. Cooper. 1994. Distribution and abundance of Spectacled Eiders in the Kuparuk and Milne Point oilfields, Alaska, 1993. Report for ARCO Alaska, Inc., and the Kuparuk River Unit, Anchorage, AK, by Alaska Biological Research, Inc., Fairbanks, AK. 71 pp.
- Johnson, C. B., B. E. Lawhead, J. R. Rose, A. A. Stickney, and A. M. Wildman. 1997. Wildlife studies on the Colville River Delta, Alaska, 1996. Fifth annual report for ARCO Alaska, Inc. and Kuukpik Unit Owners, Anchorage, AK, by ABR, Inc., Fairbanks, AK.
- Johnson, C. B., R. M. Burgess, B. E. Lawhead, J. R. Rose, A. A. Stickney, and A. M. Wildman. 2000. Wildlife studies in the CD North study area, 2000. Report for PHILLIPS Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks, AK. 96 pp.
- Johnson, C. B., R. M. Burgess, B. E. Lawhead, J. R. Rose, A. A. Stickney, and A. M. Wildman. 2002. Wildlife studies in the CD North study area, 2001. Second annual report for PHILLIPS Alaska, Inc., Anchorage, by ABR, Inc., Fairbanks, AK. 114 pp.
- Johnson, C. B., R. M. Burgess, B. E. Lawhead, J. P. Parrett, J. R. Rose, A. A. Stickney, and A. M. Wildman. 2003a. Wildlife studies in the CD North study area, 2002. Third annual report prepared for ConocoPhillips Alaska, Inc., Anchorage by ABR, Inc., Fairbanks.
- Johnson, C. B., R. M. Burgess, B. E. Lawhead, J. Neville, J. P. Parrett, A. K. Prichard, J. R. Rose, A. A. Stickney, and A. M. Wildman. 2003b. Alpine Avian Monitoring Program, 2001. Fourth annual and synthesis report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK. 194 pp.
- Johnson, C. B., R. M. Burgess, A. M. Wildman, A. A. Stickney, P. E. Seiser, B. E. Lawhead, T. J. Mabee, J. R. Rose, and J. E. Shook. 2004a. Wildlife studies for the Alpine Satellite Development Project, 2003. Annual report for ConocoPhillips Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK. 155 pp.
- Johnson, C. B., A. Zusi-Cobb, A. M. Wildman, A. A. Stickney, and B. A. Anderson. 2004b. Biological assessment for Spectacled and Steller's eiders in the Alpine Satellite Development Project area. Report for ConocoPhillips Alaska, Inc., Anchorage, AK and Anadarko Petroleum Corporation Anchorage, AK, by ABR, Inc., Fairbanks, AK. 119 pp.
- Johnson, C. B., R. M. Burgess, A. M. Wildman, A. A. Stickney, P.E. Seiser, B. E. Lawhead, T. J. Mabee, A. K. Prichard, and J. R. Rose. 2005. Wildlife studies for the Alpine Satellite Development Project, 2004. Second annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK. 129 pp.
- Johnson, C. B., J. P. Parrett, and P. E. Seiser. 2006. Spectacled Eider monitoring at the CD-3 development, 2005. Annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK.
- Johnson, C. B., J. P. Parrett, and P. E. Seiser. 2007. Spectacled Eider monitoring at the CD-3 development, 2006. Annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK.
- Johnson, C. B., A. M. Wildman, J. P. Parrett, J. R. Rose, T. Obritschkewitsch, and J. E. Shook. 2008a. Avian studies for the Alpine Satellite Development Project, 2007. Fifth annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK.
- Johnson, C. B., J. P. Parrett, and P. E. Seiser. 2008b. Spectacled Eider monitoring at the CD-3 development, 2007. Annual report for ConocoPhillips Alaska, Inc., and Anadarko Petroleum Corporation, Anchorage, by ABR, Inc., Fairbanks, AK.

*Literature Cited*

- Jorgenson, M. T., J. E. Roth, E. R. Pullman, R. M. Burgess, M. Reynolds, A. A. Stickney, M. D. Smith, and T. Zimmer. 1997. An ecological land survey for the Colville River Delta, Alaska. Report for ARCO Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK.
- King, J., and C. Dau. 1997. Expanded aerial searches for Steller's Eiders on the Arctic Coastal Plain of Alaska, 1997. Unpublished report by U.S. Fish and Wildlife Service, Fairbanks, AK. 4 pp.
- Quakenbush, L. T., R. H. Day, B. A. Anderson, F. A. Pitelka, and B. J. McCaffery. 2002. Historical and present breeding season distribution of Steller's Eiders in Alaska. *Western Birds* 33: 99–120.
- Seiser, P. E., and C. B. Johnson. 2010. Eider nest searches at the CD-3 pad, ice road, and spill-response sites on the Colville River Delta, 2009. Report for ConocoPhillips Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK. 13 pp.
- Seiser, P. E., and C. B. Johnson. 2011a. Eider nest searches at the CD-3 pad, ice road, and spill-response sites on the Colville River Delta, 2010. Report for ConocoPhillips Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK. 15 pp.
- Seiser, P. E., and C. B. Johnson. 2011b. Eider nest searches at the CD-3 pad, ice road, and spill-response sites on the Colville River Delta, 2011. Report for ConocoPhillips Alaska, Inc., Anchorage, AK, by ABR, Inc., Fairbanks, AK. 14 pp.
- USFWS (U.S. Fish and Wildlife Service). 2004. Final biological opinion for the Alpine Satellite Development Project. Fairbanks Field Office, USFWS, Fairbanks, AK. 62 pp.