SUMMARY OF BIRD STUDIES FOR THE ALPINE SATELLITE DEVELOPMENT PROJECT, 2013

Prepared for

ConocoPhillips Alaska, Inc.
P.O. Box 100360
Anchorage, AK 99510

and

Anadarko Petroleum Corporation
3201 C Street, Suite 603
Anchorage, AK 99503

Prepared by

Charles B. Johnson
Julie P. Parrett
Tim Obritschkewitsch
John R. Rose
Kristen B. Rozell
Pamela E. Seiser
Ann M. Wildman

ABR, Inc., Environmental Research & Services
P.O. Box 80410
Fairbanks, AK 99708

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ConocoPhillips Alaska, Inc. (CPAI), with assistance from Anadarko Petroleum Corporation, sponsored a series of aerial and ground-based surveys of bird populations on the Colville Delta and in the northeastern National Petroleum Reserve in Alaska (NE NPR-A) in 2013 in support of the Alpine Satellite Development Project (ASDP). Long-term aerial surveys of eiders, geese, swans, and loons were continued in 2013. A new task was added in 2013—a ground-based nesting study of niġlivik (greater white-fronted geese) in the CD5 area—as a permit stipulation from the North Slope Borough.

CPAI has conducted wildlife studies for many years on the central Arctic Coastal Plain to identify important wildlife areas that may need special consideration during new oilfield construction and to monitor the effects of oil development. This document is a summary of the bird surveys conducted in 2013 for the Alpine Satellite Development Project (ASDP), which includes the Colville Delta and adjacent portion of the NE NPR-A (Figure 1). The Alpine Satellite Development Project is composed of 4 active drill sites east of the Niġliq Channel (CD1, CD2, CD3 and CD4) and 2 more drill sites (CD5 is under construction and GTM1 is proposed) west of the Niġliq Channel.

The Alpine processing facility, main camp, and airstrip are based at CD1, connected by road to CD2, both drill sites were constructed between 1998 and 2000. During the second phase of construction, 2005–2006, CD3 was built on the outer delta and CD4 drill site was built on the Niġliq (Nechelik Channel). Construction of CD5 began in the winter of 2013–2014. Among the satellite drill sites, CD3 is unique because it is a roadless drill site, accessed by aircraft during summer and ice roads in winter. All satellite drill sites send oil to the existing Alpine Facility for processing.

Details on the 2013 studies can be found in 2 technical reports "Avian Studies for the Alpine Satellite Development Project, 2013," and "Eider Nest Searches at the CD3 Pad, Ice Road, and Spill-Response Sites on the Colville Delta, 2013," both prepared by ABR, Inc., a biological research company contracted by CPAI. Copies of these reports are sent to the Kuukpik Corporation offices in Nuiqsut and Anchorage

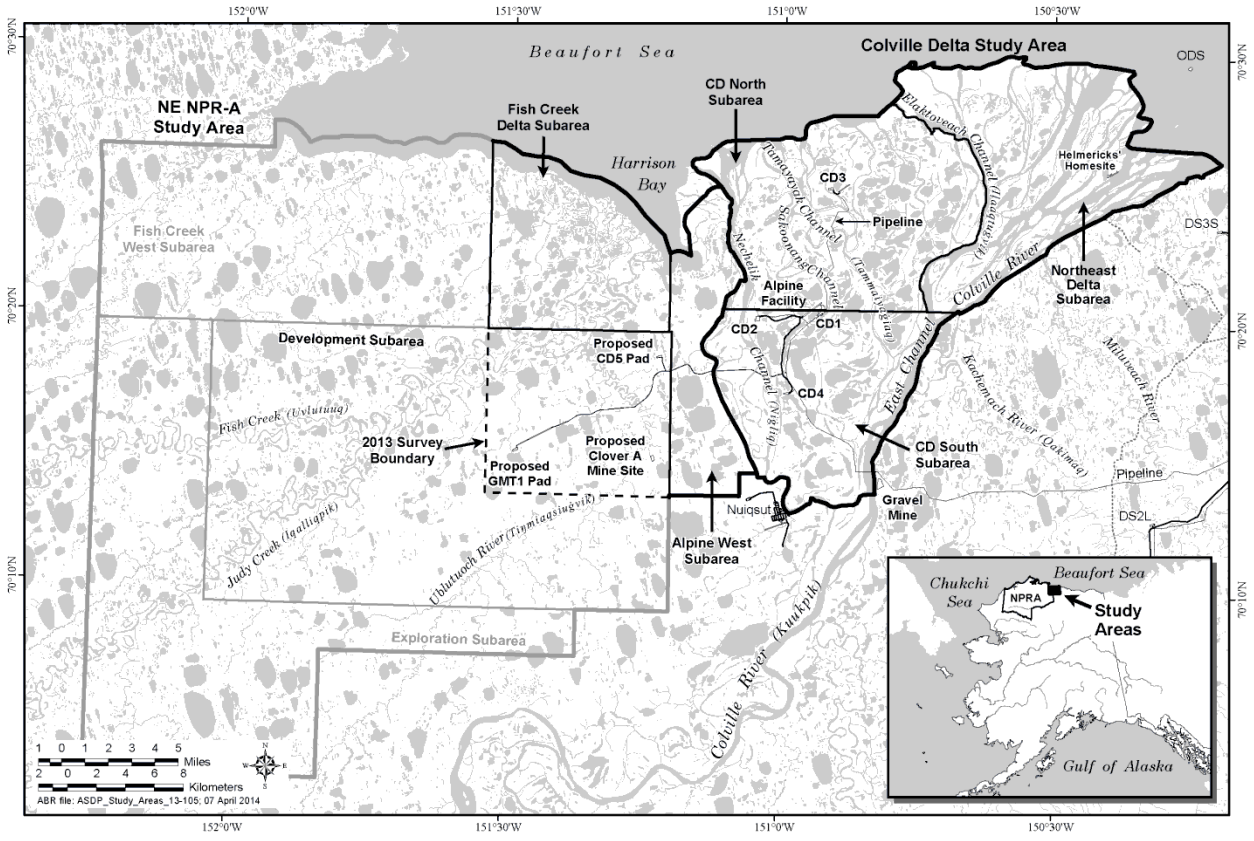

Figure 1. Wildlife study areas for the Alpine Satellite Development Project, Colville Delta and NE NPR-A study areas, Alaska, 2013.

and the Kuukpik Subsistence Oversight Panel (KSOP) office in Nuiqsut, as well as other northern communities, government agencies, and non-government organizations. Questions about the reports and studies can be directed to Caryn Rea, Environmental Studies Coordinator for ConocoPhillips, at (907) 265-6515.

Why We Study Wildlife

Wildlife surveys are used to gather information on the abundance, distribution, and habitat use of wildlife in the areas targeted for development before the construction of any oil production facilities. The Development Team at ConocoPhillips needs information on wildlife distribution and habitat use to avoid or minimize impacts from new oil facilities. Similar surveys are conducted after construction so that scientists can compare wildlife abundance and distribution before and after

oilfields are built. These “before and after” studies focus on species that are important to subsistence users (for example, niġliq [geese] and tuttu [caribou]), birds with declining populations (qaqsrauq [red-throated loon]), birds on the U.S. Fish and Wildlife Service’s threatened species list (qavaasuk [spectacled eider] and igniquaqtuq [Steller’s eider]), candidates for listing (tuullik [yellow-billed loon], and birds that breed primarily or only on the Arctic Coastal Plain (qiŋalik [king eider]). Species that prey on waterfowl or their nests are also monitored, such as nauyavasrugruk (glaucous gull).

Local Knowledge and Input

Each year CPAI seeks public involvement in our studies through meeting or actual involvement in field work. Over the past 14 years, we have met with representatives of the North Slope Borough and with Nuiqsut residents at various community meetings. CPAI attends Kuukpik Corporation board meetings every year to share information on activities on the Colville River Delta and in NE NPR-A. In most years, an open house was held in Nuiqsut to allow residents to visit with ABR and CPAI scientists and to share information and discuss concerns for resources in the Colville and NE NPR-A areas. In 2010, CPAI and ABR biologists attended a science fair at Trapper School during the day followed by an open community meeting in the evening where ABR presented findings of recent research in the Colville Delta and NE NPR-A areas. Input from these meetings was used to coordinate our field survey schedules to avoid conflicts with subsistence activities in the area. In addition to these meetings, subsistence representatives have accompanied ABR scientists on their wildlife surveys in various years. In 2011, Chris Long, a subsistence representative from Nuiqsut, assisted biologists during tuullik (yellow-billed loon) surveys. James Taallak helped us with our wildlife studies in 2009. Mark Ahmakak (2002–2004), Doreen Nukapigak (2001 and 2003), and Gordon Matumeak (2002) all joined our wildlife surveys at different times as representatives of the Kuukpik Subsistence Oversight Panel.

In past years, CPAI has provided opportunities for Nuiqsut elders to visit proposed exploration sites and study locations. In 2003, we flew 2 groups of Nuiqsut

elders to exploration sites to solicit their input on potential issues associated with development or exploration activities. CPAI also visited subsistence cabins near study areas in 2003 with the late Joeb Woods, Sr., and the late Ruth Nukapigak. In July 2005, Joeb Woods, Sr., took an ABR biologist in his boat to the Tammaiyaġiaq (Tamayayak) to check on qavaasuk (spectacled eider) and tuullik (yellow-billed loon) nests and exchange information about how wildlife and the delta have changed over time. In July 2009, 2 elders from Nuiqsut, Joeb Woods, Sr., and Lydia Sovalik, and a facilitator, James Taallak, flew to the west side of Niġlik to talk to ABR's nest searching crew. The elders reviewed the boundaries of their native allotments and described their family's history in the area. The locations of 2 grave sites in the area were discussed, and our study plans were adjusted to stay a respectful distance away from those locations.

Throughout the 2013 summer field season, CPAI sent weekly updates to the Kuukpik Corporation and KSOP to be posted on bulletin boards in the post office, store, local government offices, and community center in Nuiqsut. The updates reported on the timing and location of surveys conducted the previous week and the schedule of surveys for the coming week. We posted these reports to inform residents where our scientists were going to be working and, if they saw a conflict with their subsistence activities, so that they would call the CPAI Helicopter Logistics Coordinator. Communications were increased in 2013 with daily conference calls between CPAI, KSOP, and the Native Village of Nuiqsut, so that local residents could report potential conflicts between helicopter flights and subsistence activities. In further efforts to reduce subsistence-helicopter conflicts, a subsistence advisor was hired by CPAI through Umiaq to participate in the daily calls and provide information about hunting activities being conducted by Nuiqsut residents.

Through information provided by KSOP field representatives, CPAI has reduced air traffic over fish and hunting camps. In 2004, CPAI provided KSOP field representatives with radios and Global Positioning System (GPS) equipment to communicate with CPAI helicopter pilots when aircraft might interfere with subsistence hunting or fishing. Helicopter surveys were redirected several times in

2009 to avoid hunters and occupied camps in the Fish Creek area, when James Taallak communicated these potential conflicts to our survey team. In 2012 ABR added an extra battery pack to the time-lapse cameras to reduce number of visits to the tuullik (yellow-billed loon) nests and to reduce the amount of helicopter traffic especially in the Fish Creek area.

Where We Study Wildlife

The Colville Delta study area is a 213 square-mile region that stretches from Nuiqsut to the coast and from the Niġliq (Nechelik Channel) eastward to the East Channel of the Kuukpik (Colville River; Figure 1). Aerial surveys of most of the Colville Delta have been conducted since 1992. Foot surveys for nests are used for detailed information on nest distribution of small or cryptic nesting birds in specific areas where development is proposed. ABR started foot surveys for nesting birds on the Colville Delta in 1992 and has conducted foot surveys of the CD3 drill site area from 2000 to 2007 and of the CD4 drill site area from 2000 to 2002. From 2009 to 2013, eider nest searches also were conducted in areas scheduled for off-pad work, as required by the Endangered Species Act to avoid disturbance of nesting eiders by clean-up or spill prevention crews.

The NE NPR-A study area is on the west side of the Niġliq (Nechelik Channel) and the current studies are conducted in a 124 square mile area that encompasses Fish Creek and 3 proposed development sites that are part of the ASDP: drill site CD5, drill site GMT1, and the Clover A gravel mine site. ABR has conducted wildlife surveys in NPR-A since 1999 but the number and types of surveys have varied over the years.

How We Conduct Our Studies

Four basic techniques are used to conduct wildlife studies in the Colville Delta and NE NPR-A study areas:

1. aerial surveys are used to monitor abundance and distribution of large and easily spotted birds over a large area,
2. foot surveys are used to find nests of small or hard-to-see birds in specific areas where development is proposed,

3. time-lapse cameras monitor nesting yellow-billed loons and record nest attendance, timing of nest hatch or failure, and causes of nest failure, and
4. temperature recorders in goose and eider nests record the date of hatch or failure for measuring nest survival.

Aerial Surveys

The bird studies are primarily conducted with aerial surveys because of the large size of the study areas and the narrow time frame in which surveys must be completed to get good counts. Aerial surveys (in helicopters or airplanes) covered most of the Colville Delta and NE NPR-A study areas, but avoided the area within 3 miles of the village of Nuiqsut and within 1.5 miles of the Helmericks' homesite so that residents would not be disturbed by overflights. Aerial surveys are conducted at the highest altitude possible (to reduce disturbance to people and wildlife) while still collecting useful data. Surveys conducted from aircraft allow biologists to cover a large area in a short amount of time, but these surveys can only be used for large, easily seen birds and mammals. Niġliq (goose), qugruk (tundra swan), qavaasuk (spectacled eider), and tuullik (yellow-billed loon) are all counted from the air. In the 1980's, the U.S. Fish and Wildlife Service established standard survey procedures for counts of waterfowl from airplanes. Government agencies request that ABR also follow these same survey procedures and continue to use airplanes, so results of these surveys can be compared with those of other studies. However, airplanes are not the best aircraft for all wildlife surveys. For example biologists need the slow speed and mobility of helicopters if they want to detect nests along lake shorelines. Therefore, helicopters are better for counting tuullik (yellow-billed loon), which nest on islands and shorelines of lakes. Nest searches are conducted on foot for qavaasuk (spectacled eiders) and niġlivik (greater white-fronted geese) because their nests are not easily seen from the air.

What time of year do we conduct surveys?

ABR conducts each annual survey close to the same date each year, because the timing affects the number of animals counted. For example, pre-nesting eider surveys are conducted in the second week of June when the male eiders are still paired with females (see Table 1 for dates and details). Without the colorful males present, many of the females cannot be seen from the airplane. Mid-to- late June is when surveys are flown for tuullik nests (yellow-billed loons), because they nest on deep lakes where ice may prevent some tuullik from nesting any earlier. In the late summer, after the young are large enough to see from the air, we conduct brood surveys for qugruk (tundra swan) and niġliq (goose). In 2013, ABR completed 1 aerial survey for qavaasuk (spectacled eider pairs), 2 aerial surveys for qugruk (tundra swan nests and broods), 1 aerial survey for niġliq (goose broods), including niġlinġaq (brant) and kaŋuq (snow geese), and weekly surveys throughout the summer to locate and monitor survival of tuullik (yellow-billed loon) nests and young.

What surveys occur on the ground?

ABR set up time-lapse cameras near tuullik nests to reduce helicopter surveys that would otherwise be needed to monitor nest survival. These cameras took 1 to 2 photos of nests every minute, recording nest attendance, how long the nests survived, and whether the nests hatched. In 2013, nest searches were conducted on foot in the CD5 area during 10–20 June for niġlivik (greater white-fronted geese) to determine how many nested before construction and to measure nesting success. When goose nests were found, their eggs were counted and aged to determine when they were laid, and temperature monitors were used to record when the nests hatched or failed. These data can be used to measure small changes in nesting success, which might occur with construction of CD5, increases in predators, or changes in weather.

Another nest search was conducted on the Colville Delta on 20–30 June for qavaasuk (spectacled eiders), a federally listed threatened species. Every year beginning in 2009, ABR has conducted surveys on foot in late June for nesting

Table 1. Avian surveys conducted in the Colville Delta and the NE NPR-A study areas, Alaska, 2013.

Survey Type Season Survey Area	Number of Surveys	Survey Dates	Aircraft[a]	Transect Width (km)	Transect Spacing (km)	Aircraft Altitude (m)	Notes
Eider survey							
Pre-nesting							
Colville Delta	1	14–15 June	C185	0.4	0.4	30–35	100% coverage
NE NPR-A	1	13–14 June	C185	0.4	0.8	30–35	50% coverage
Yellow-billed Loon surveys[b]							
Nesting-	1	19–21 June	206L	-	-	60–75	All lakes ≥5 ha and adjacent lakes
Brood-rearing	1	21–22 Aug.	206L	-	-	60–90	Yellow-billed Loon territory lakes
Nest and brood monitoring	15 (1/week)[c]	26 June–24 Sept.	206L	-	-	60–90	Lakes with active nests and broods
Tundra Swan surveys							
Nesting	1						
Colville Delta		20–26 June	C185	1.6	1.6	150	100% coverage
NE NPR-A		26–27 June	C185	1.6	1.6	150	100% coverage
Brood-rearing	1	20–21 Aug.	C185	1.6	1.6	150	100% coverage, all areas
Goose surveys							
Brood-rearing	1	26 July	PA-18	-	-	75–150	Coastal and lake-to-lake pattern
Greater White-fronted Goose							
Ground nest searches-	1	12–21 June	-	-	-	-	40 plots, 10 ha in size, CD5 area
Nest fate monitoring	1	16–17 July	-	-	-	-	Post-hatch visits to nest sites

[a] C185 = Cessna 185 fixed-wing airplane; 206L = Bell "Long Ranger" helicopter; PA-18 = Piper PA-18 "Super Cub" fixed-wing airplane
[b] Pacific and Red-throated loons, nests, and broods, and Glaucous and Sabine's gull nests and broods were recorded incidentally
[c] Total includes the brood-rearing survey conducted on 21–22 August

qavaasuk around the CD3 drill pad, along the ice road and at spill-response staging sites in the Colville Delta. These nest searches are conducted in advance of clean-up crews and spill-response workers who are working on the tundra, possibly disturbing eiders while on their nests. The nest searches provide CPAI with nest locations, which workers then avoid during the critical nesting season.

What we found in 2013

The 2013 studies included several long-term studies and the introduction of one new study. Aerial surveys continued to be conducted for the following species: qavaasuk (spectacled eider), qiŋalik (king eider), igniqauqtuq (Steller's eider), qugruk (tundra swan), niġliŋġaq (brant), kaŋuq (snow goose), tuullik (yellow-billed loon), and nauyavasrugruk (glaucous gull). Cameras were again placed at several tuullik nests for monitoring nest survival and identifying nest predators. Nest searches were conducted for the 5th year on foot for qavaasuk at specific locations on the Colville Delta slated for off-pad activities (tundra clean-up or placement of spill response booms). And nest searches in the CD5 area gathered pre-development data on niġlivik (greater white-fronted goose) distribution and nesting success.

Results of 2013 aerial surveys generally indicated average to above average numbers of breeding adults and below average productivity as measured by number of nests, nesting success, or production of young, with few exceptions. Production of young was particularly poor for tuullik (yellow-billed loons), in both the Colville Delta and NE NPR-A study areas, whereas qugruk (tundra swans) did much better in NE NPR-A than on the Colville Delta,

Eider Surveys

In the Colville Delta study area, above average numbers of qavaasuk (spectacled eiders) and below average numbers of qiŋalik (king eiders) were present during the pre-nesting survey in 2013. ABR counted 63 qavaasuk and 38 qiŋalik on an aerial survey flown on June 10th–14th (Figure 2). Qavaasuk prefer areas close to the coast, and few qavaasuk are seen south of the Alpine Facility (Figure 2). In the NE NPR-A study area, ABR counted a record number of qavaasuk, 17 adults, and an above

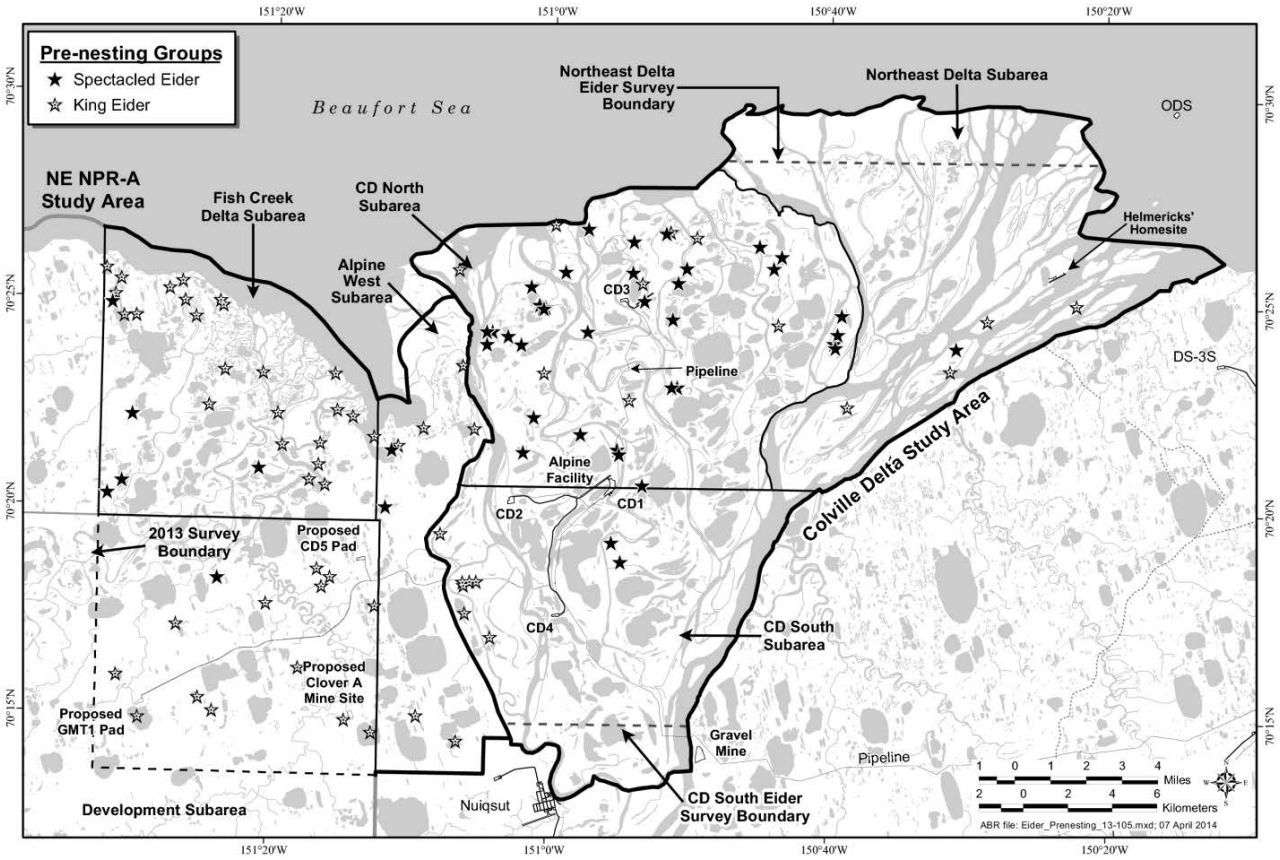

Figure 2. Qavaasuk (spectacled eider) and qiŋalik (king eider) groups during pre-nesting, Colville Delta and NE NPR-A study areas, Alaska, 2013.

average number of qiŋalik, 118 adults on the aerial survey (Figure 2). In late June 2013, ABR visited 7 spill-response sites on the Colville Delta (Figure 3) where Alaska Clean Sea placed oil booms, anchors, and containers. Spill-response sites generally are located on river banks where the habitat is dry and shrubby, which is not typical qavaasuk nesting habitat. However, ABR did find potential nesting habitat around these 7 sites. Only 1 site contained a qavaasuk nest. Nest searches for eiders also were conducted around the CD3 pad and along the ice road connecting CD3 to CD2 in order to find eider nests before cleanup crews worked in the area. In 2013, ABR located 2 qavaasuk nests near the CD3 pad, and 3 qavaasuk nests along the route of the ice road. CPAI uses this information to modify activities of field crews in order to decrease potential disturbance to nesting eiders. CPAI delayed clean-up crews from working on the tundra near the nest sites until after nesting season was over.

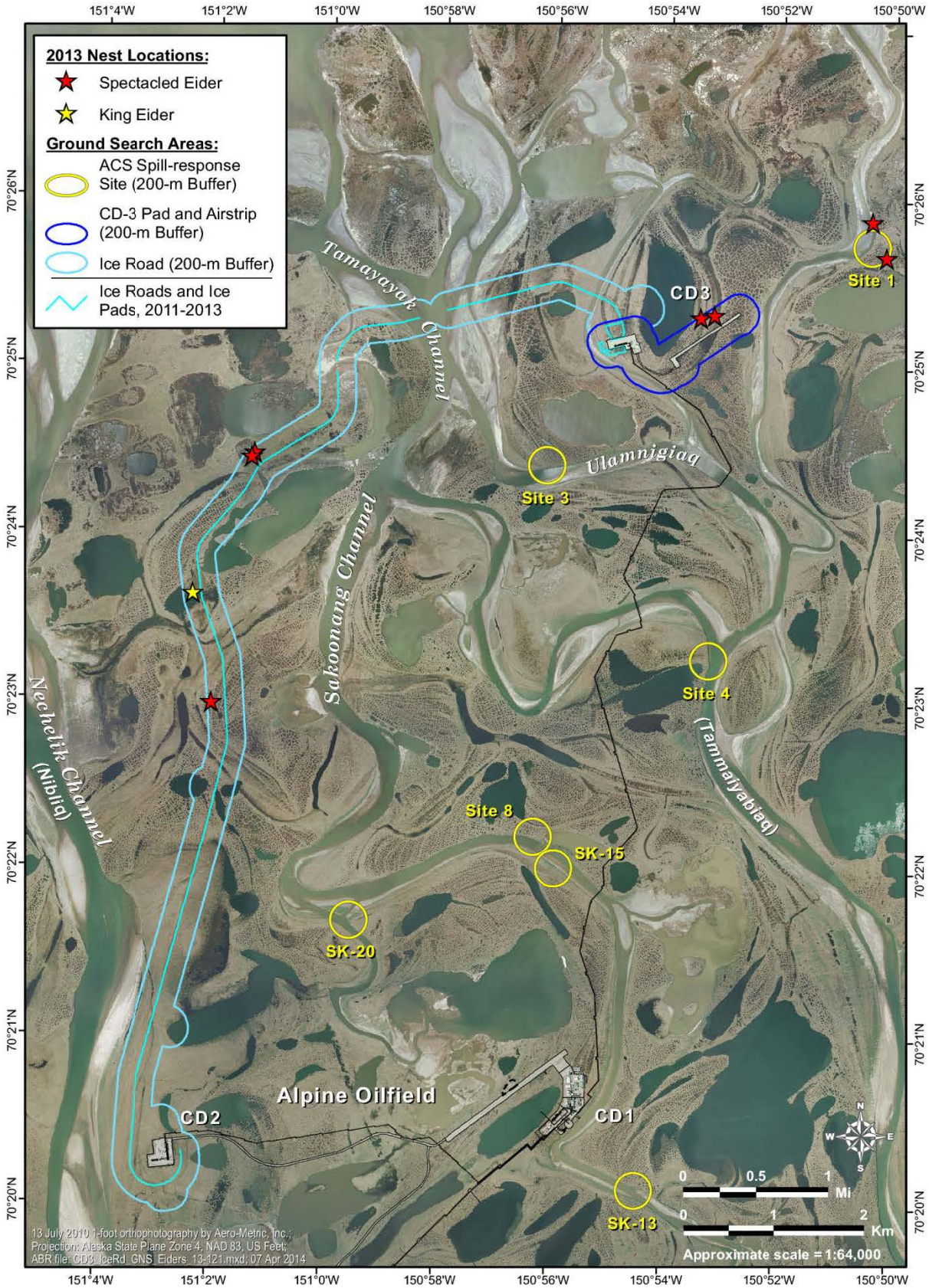

Figure 3. Qavaasuk (spectacled eider) and qiŋalik (king eider) nests in the Colville Delta study area, Alaska, 2013.

Tuullik (Yellow-billed Loon) Surveys

In 2013, tuullik (Yellow-billed Loons) produced one of the lowest numbers of chicks and broods since surveys began in either study area. River flooding caused by rapid warming and ice jams in early June had a major effect on Yellow-billed Loons on the Colville Delta in 2013. High water on lakes prevented pairs from nesting on many traditional territories. Although the number of Yellow-billed Loons counted during the nesting survey (67 birds) was above the 19-year mean, the number of nests (12) was well below average (Figure 4) and territory occupancy by nests (40%) was the lowest ever. Tuullik nest sites in NE NPRA were unaffected by the major river flooding and a normal number of nests were counted in 2013. Most of the 14 nests in NE NPR-A were found in lakes along the Uvlutuuq and Iqalliqpik (Fish and Judy creeks).

After hatch, ABR continued to fly weekly helicopter surveys to monitor the survival of young tuullik (yellow-billed loons) in both the Colville Delta and NE NPR-A study areas. Estimating how many young survive from each nesting attempt is important for understanding whether the population and breeding areas are healthy. Loons were monitored from hatch to 24 September, the last day the helicopter was available for surveys. On the last survey, young ranged in age from 66 to 72 days old, and 2 broods were flight capable. In the Colville Delta, 7 pairs of tuullik hatched eggs and by the final survey, 5 pairs remained with 6 young and 2 more pairs likely departed with flight capable young. Despite a low hatch rate on the Colville Delta, chick survival was high; only one of young was lost in 2013. In NE NPR-A, 1 pair of loons hatched eggs; but no chicks survived.

Thirteen Yellow-billed Loon nests on the Colville Delta and 9 in NE NPR-A were monitored with time-lapse cameras (Figure 4). Nesting success for camera-monitored nests on the Colville Delta and NE NPR-A was low, 31% and 13%, respectively. The use of cameras allowed us to document how much time tuullik spent on or off their nests. For example in 2013, tuullik at hatched nests on the Colville Delta spent 92% of their time on nests, whereas tuullik at failed nests spent 87% of their time on nests.

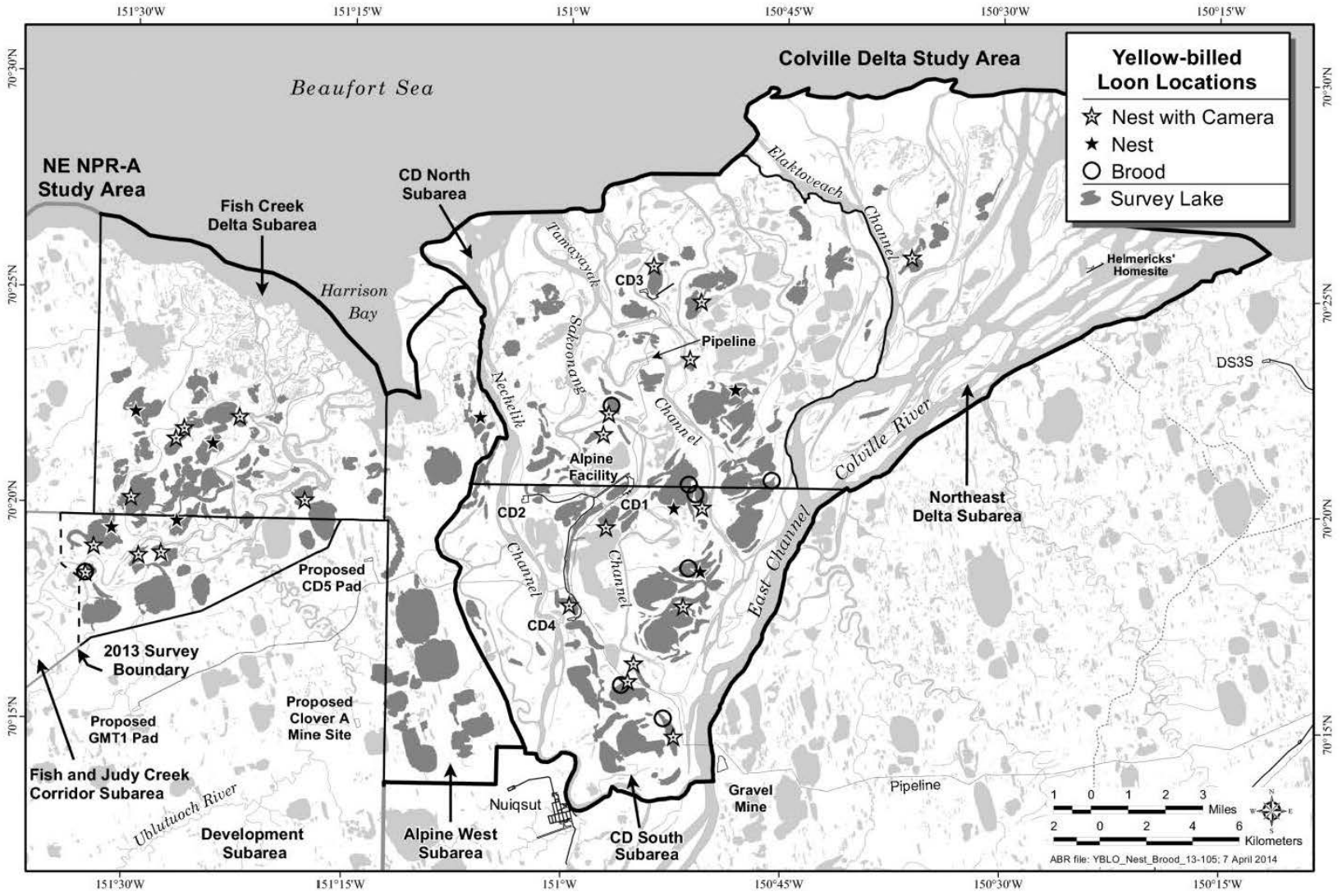

Figure 4. Tuullik (yellow-billed loon) nests and broods, Colville Delta and NE NPR-A study areas, Alaska, 2013.

Data from camera-monitored nests indicated that predation was the main cause of tuullik nest failure, with nauyavasrugruk (glaucous gulls), kayuqtuq (red foxes), being the primary predators and occasionally migiaqsaayuk (parasitic jaegers). In 2013, we captured the images of 3 different bear at 4 tuullik nests. That same year, we documented a bald eagle taking a tuullik nest.

Qugruk (Tundra Swan)

Counts of qugruk (tundra swan) nests were about average in 2013, but brood counts and size of broods were lower than average. Thirty-nine qugruk nests were found during the June aerial survey of the Colville Delta study area, which is higher than average (Figure 5). Only 13 qugruk broods were counted on the brood-rearing survey, which is low compared to the long-term average of 25 broods. Both nests and broods appear evenly distributed across the Colville Delta study area.

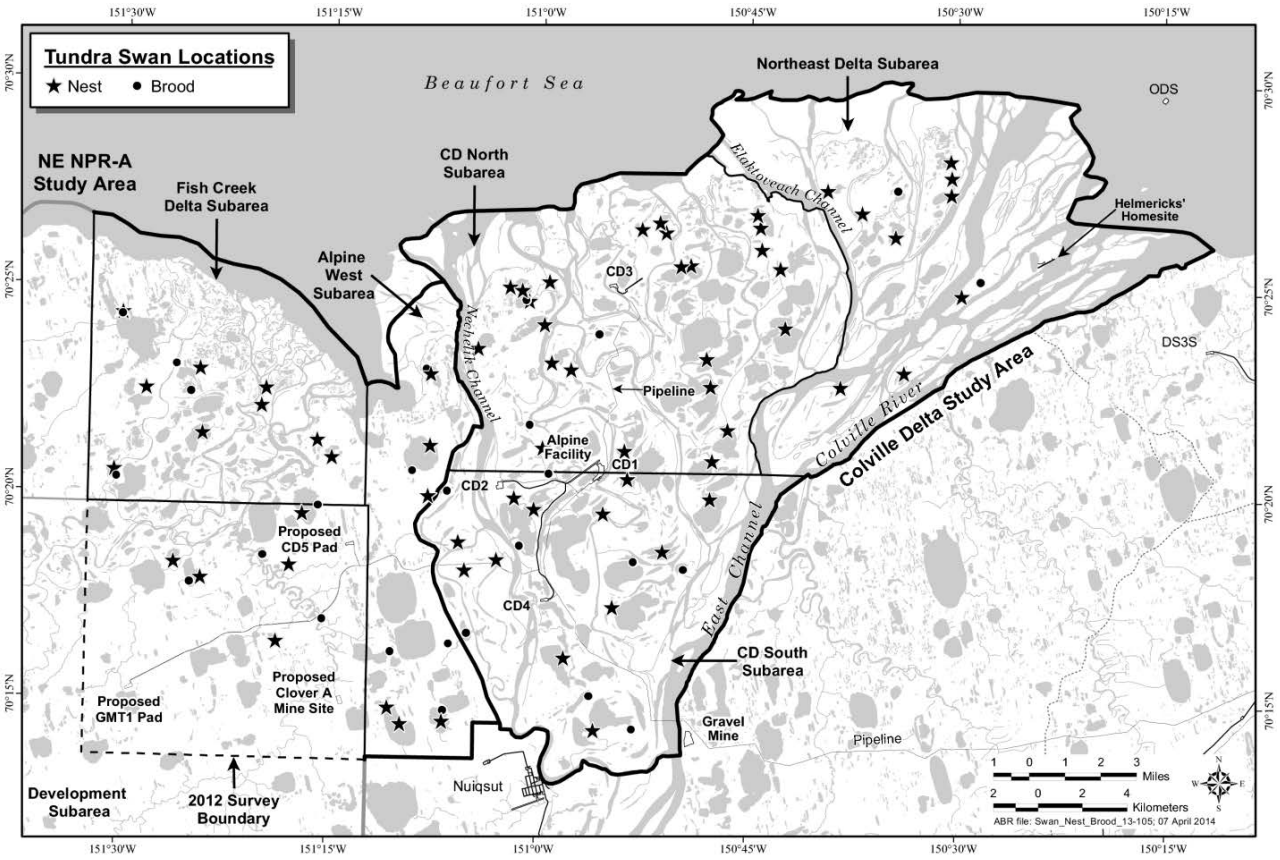

Figure 5. Qugruk (tundra swan) nests and broods, Colville Delta and NE NPR-A study areas, Alaska, 2013.

In the NE NPR-A study area, 15 qugruk nests were found during the aerial survey in 2013 (Figure 5). Ten qugruk broods were counted during the August brood-rearing survey, which was above average, but broods size was low (1.8 young per group), similar to brood sizes on the Colville Delta.

Niġliq (Goose) Surveys

Nest survival of niġlivik (greater white-fronted geese) was studied on 40 plots (each 25 acres in size) in the CD5 drill site area of NE NPR-A (Figure 6). Plots contained 0 to 8 nests. The overall density of niġlivik nests was the highest we have seen documented. From the age of eggs, we calculated that 9 June was average date that geese started to lay eggs and 13 June was the average start date for incubation.

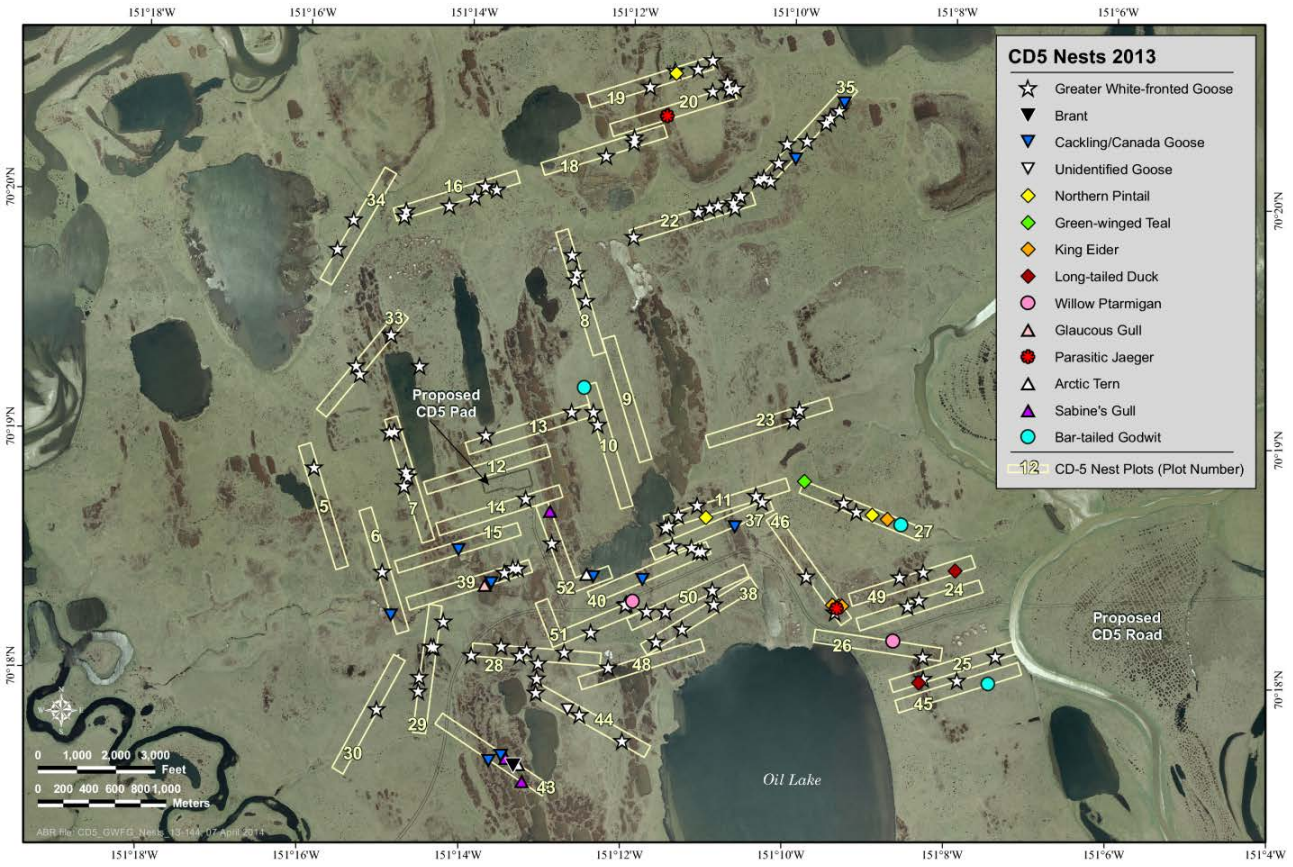

Figure 6. Niġlivik (greater white-fronted goose) nests in 40 study plots adjacent to the future site of the CD5 drill pad, NE NPR-A study areas, Alaska, 2013.

Thirty-eight of 87 nests on plots were instrumented with temperature sensors to monitor nest survival. Nesting success was 54% for nests without temperature sensors, similar to the 53% success for nests with sensors. The average daily survival rate for instrumented nests was 97%.

Niġlinġaq (brant) and kaŋuq (snow goose) production is measured by numbers of adults and young counted in coastal areas in late July. Our results for the 2013 aerial survey indicated low productivity in 2013. On the Colville Delta, ABR counted 439 adult niġlinġaq with 356 goslings, and 1,568 kaŋuq with 866 goslings (Figure 7). In NE NPR-A study area ABR counted 1,346 niġlinġaq with 403 goslings, and 182 kaŋuq with 130 young. The majority of niġlinġaq and kaŋuq seen in the NE NPR-A study area were in coastal areas near the Fish Creek Delta.

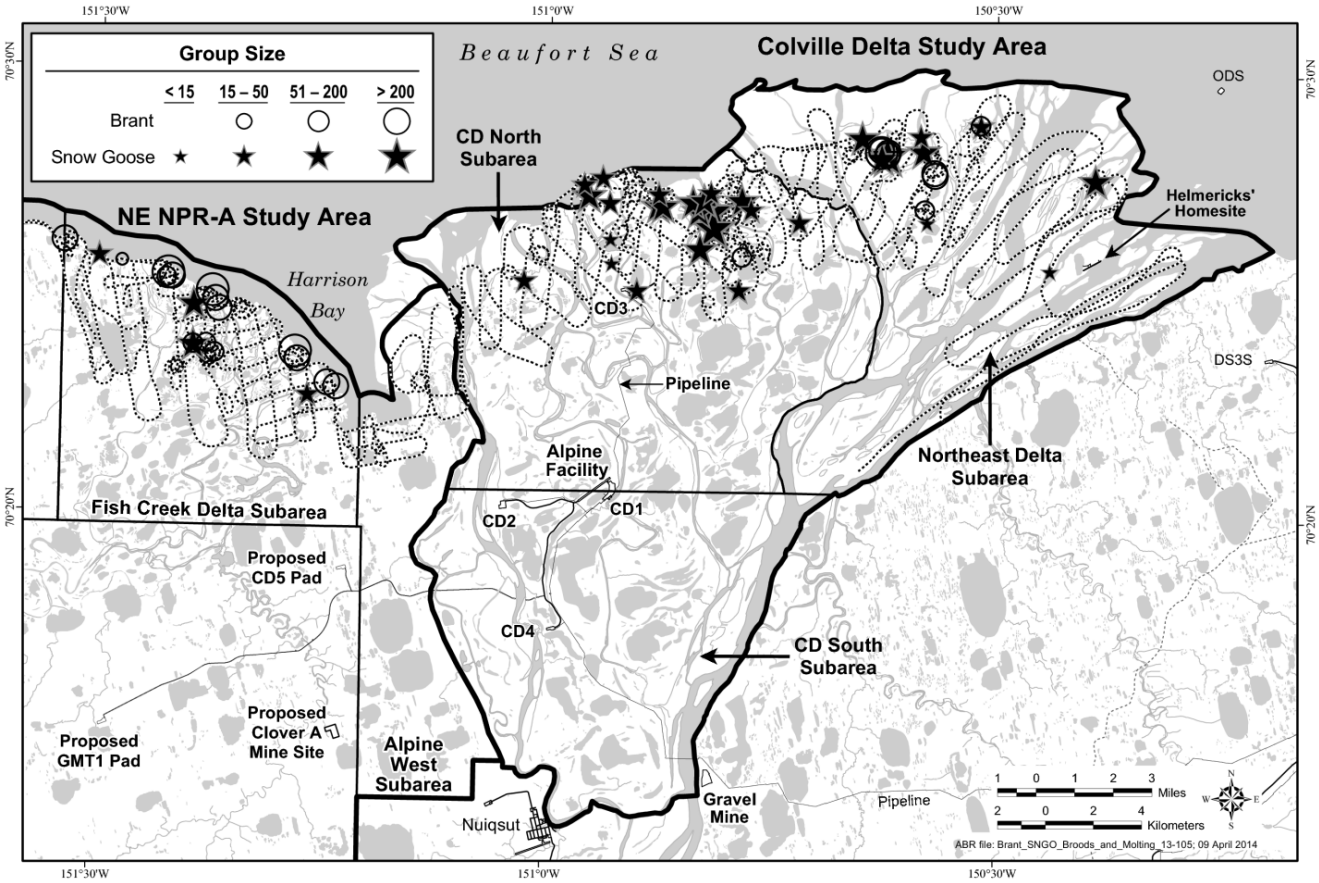

Figure 7. Niġlinġaq (brant) and kaŋuq (snow goose) brood-rearing groups, Colville Delta and NE NPR-A study areas, Alaska, 2013.

Nauyavasrugruk (Gull) nests

Nauyavasrugruk (glaucous gull) was included in the list of wildlife surveyed because it is a predator of other birds' eggs, and because its numbers in other places have tended to increase around human settlements. Biologists monitor how many of these birds use the study area because they can affect the nesting success of other birds. Counts of nauyavasrugruk are recorded during aerial surveys for tuullik (yellow-billed loons).

On the Colville Delta, 50 lakes surveyed every year for tuullik since 2002 were used to monitor nauyavasrugruk nests. On the 50-lakes the number of nauyavasrugruk nests has increased between 2002 and 2013 at an annual rate of 5 percent. Delta-wide ABR counted 67 nauyavasrugruk nests on the Colville Delta (Figure 8). During August, ABR surveyed for nauyavasrugruk broods and counted 25 adult nauyavasrugruk and 56 young in the Colville Delta study area.

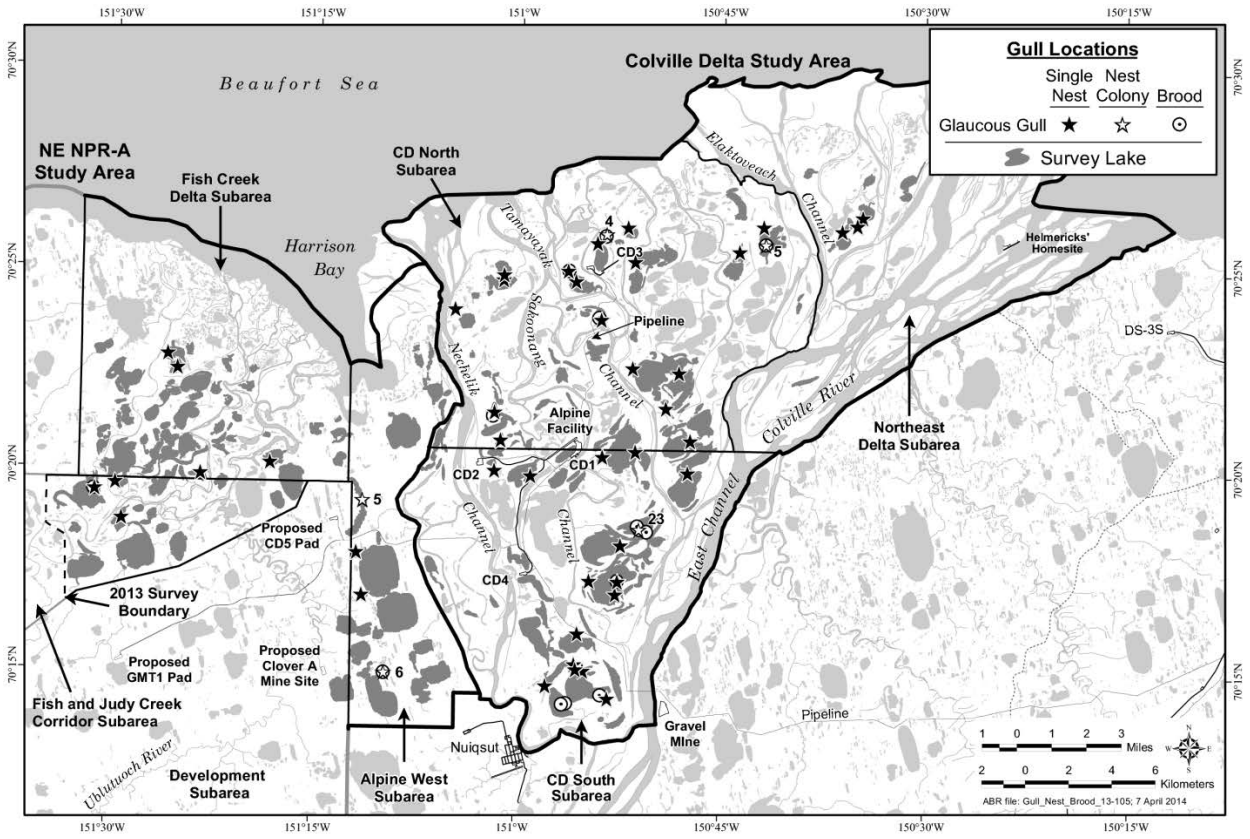

Figure 8. Nauyavasrugruk (glaucous gull) and iqirgagiak (Sabine's gull) nests and broods, Colville Delta and NE NPR-A study areas, Alaska, 2013.

In the NE NPR-A study area, ABR counted 20 nauyavasrugruk nests from the air. During the August brood-rearing survey, 11 adults and 14 young were counted in the NE NPR-A study area. Young gulls from some nests were flight capable at the time of the brood-rearing survey, and consequently some young may have been missed if they had already moved away from nest lakes.

Next Steps

ConocoPhillips first sponsored wildlife surveys in the Colville Delta in 1992, and in 1999 they expanded wildlife surveys into the NE NPRA study areas, resulting in long-term data sets on the abundance of several bird species and the habitats that are most important to those species. Over the years, various field techniques such as aerial surveys, ground-based nests searches, temperature sensors in nests, and time-lapse cameras at nest sites, have been used to monitor the health of targeted bird populations. ConocoPhillips and ABR will gather information with similar methods in 2014 and continue as before to consult with Nuiqsut residents, the North Slope Borough, and state and federal agencies.