



**March 2012**

## **GAHCHO KUÉ PROJECT**

# **2011 Wildlife Supplemental Monitoring Report**

**Submitted to:**  
De Beers Canada Inc.

**REPORT**



**Report Number:** 11-1365-0001/DCN-044

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## 2011 WILDLIFE SUPPLEMENTAL MONITORING REPORT

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### 1.0 INTRODUCTION

De Beers Canada Inc. (De Beers) is proposing to develop the Gahcho Kué Project (Project), a diamond mine in the Northwest Territories (NWT). The Project is located in the North Slave region of the NWT at Kennedy Lake, approximately 140 kilometres (km) northeast of Łutsek'e and 280 km northeast of Yellowknife (Figure 1-1).

Baseline studies have been conducted to support the Environmental Impact Assessment (EIS) for the Project and the Environmental Impact Review (EIR) Process. These data were reported in the December 2010 EIS (De Beers 2010). Baseline data reported in the 2010 EIS are sufficient to support the environmental assessment within the EIS. However, De Beers is committed to ongoing data collection in advance of regulatory approval of and the permitting process for the Project. As such, supplemental baseline data have been collected in 2011, and will continue to be collected and reported annually, until such time that these activities are no longer required prior to Project construction or evolve into future monitoring programs associated with an approved Project.

The purpose of collecting and reporting the supplemental baseline data for the Project is to support a consistent and transparent baseline program. In general, the goals of the supplemental data collection are to:

- a) reduce uncertainty and increase the level of confidence in impact predictions;
- b) broaden the baseline areas of investigation; and
- c) contribute to long-term future monitoring and adaptive management of the Project.

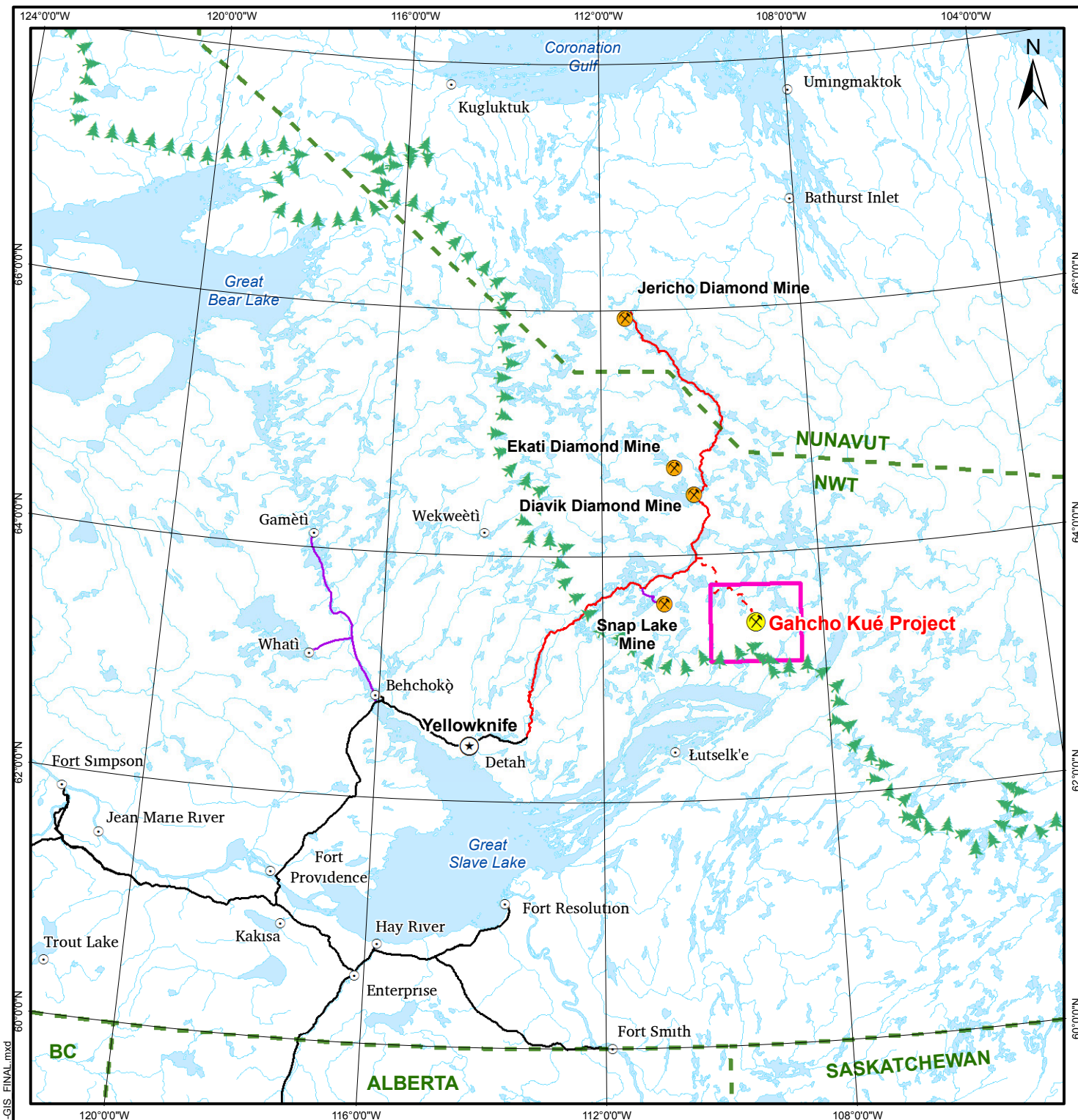
The focus of the 2011 supplemental data collection reported herein is wildlife. More specifically, during 2011, surveys for caribou, grizzly bear, wolf, wolverine, water birds, and raptors were undertaken. The objectives of these baseline studies were:

- to enhance the baseline database on species presence, abundance, distribution, and habitat use in the regional study area (RSA); and
- to contribute additional pre-disturbance data for monitoring direct and indirect effects during Project construction and operation.

The wildlife RSA is defined by a rectangle with an area of 5,600 square km (70 km by 80 km), centered on the Project site (Figure 1-2). The RSA was designed to capture the large-scale direct and indirect effects of the Project on wildlife populations with wide distributions. Various baseline studies of wildlife have occurred since 1996 to provide estimates of variation in species presence, abundance, distribution, and habitat use in the RSA. Wildlife species monitored to date include caribou, grizzly bear, wolf, fox, wolverine, muskoxen, moose, upland birds, water birds, and raptors.

Recent discussions between the Government of the Northwest Territories, Department of Environment and Natural Resources (ENR), diamond mine operators, mine monitoring agencies, and community organizations have resulted in changes to wildlife effects monitoring program objectives and methods (Marshall 2009; Handley 2010). These changes are reflected in the 2011 wildlife baseline studies for the Gahcho Kué Project, where applicable.





## LEGEND

- Gahcho Kué Project
- Existing Mine
- Territorial Capital
- Populated Place
- Highway
- Existing Winter Road
- Tibbitt-to-Contwoyto Winter Road
- Winter Access Road
- Watercourse
- Waterbody
- Territorial/Provincial Boundary
- Treeline
- Regional Study Area

## NOTES

Base data source: The Atlas of Canada

## GAHCHO KUÉ PROJECT

### Location of the Gahcho Kué Project

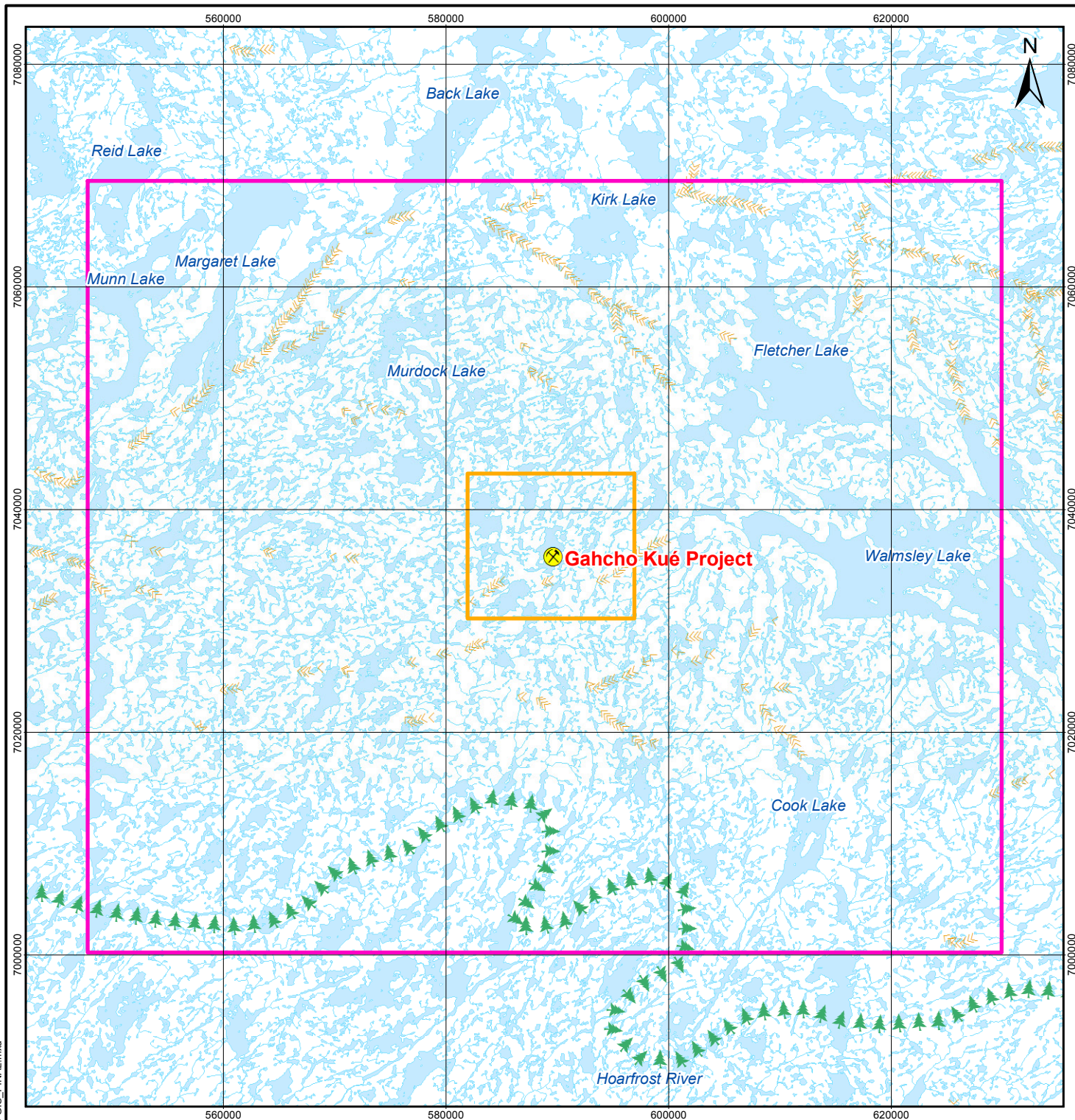
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Scale: 1:5,000,000	
100 50 0 100	
Kilometres	



FILE NO: B2011-Wild-001-GIS	DATE: December 12, 2011
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**Figure 1-1**





## LEGEND

- Gahcho Kué Project
- Local Study Area
- Watercourse
- Regional Study Area
- Waterbody
- Esker
- Treeline

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Wildlife Study Area Boundaries

PROJECTION: UTM Zone 12      DATUM: NAD83

Scale: 1:500,000  
  
 Kilometres



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**Figure 1-2**



## 2.0 METHODS

The following section describes the methods used in the 2011 wildlife surveys for caribou, grizzly bear, wolf, wolverine, water birds and raptors. Pete Enzoe of Łutselk'e assisted with wildlife baseline surveys in 2011.

### 2.1 Caribou

The Bathurst caribou herd was one of the largest barren ground caribou herds in the NWT. In 1996, the rounded mean population size ( $\pm$  95% confidence interval) was estimated at 349,000  $\pm$  95,000 (Case et al. 1996; Gunn et al. 1997). The most recent survey, conducted in June 2009, estimated the number of animals to be 31,900  $\pm$  10,900 (Adamczewski et al. 2009). According to collared caribou movements, Bathurst caribou move through the RSA during the northern migration to the calving grounds near Bathurst Inlet, and during the post-calving migration to the wintering grounds south of the tree line. Individuals from the Ahiak/Beverly herd may also migrate through or overwinter in the RSA.

Baseline surveys for caribou in 2011 included:

- a northern migration aerial survey in April; and
- an early winter aerial survey in November.

The objective of the northern migration aerial survey was to record caribou and measure the relative occurrence of caribou trails in the RSA. A trail was defined as a path in the snow where a group of caribou had passed. Eleven transects spaced at 8 km intervals and 70 km in length were surveyed from a Fount Bushawk airplane travelling at approximately 120 kilometres per hour (km/h) and 80 metres (m) above ground level. Two observers counted the number of caribou snow trails visible from either side of the aircraft and recorded snow trail locations with a GPS.

The objective of the early winter survey was to estimate numbers, group composition, and behaviour of caribou within the RSA. Eleven transects spaced at 8 km intervals and 70 km in length were surveyed from a Bell 206 helicopter flying approximately 150 km/h and 120 m above ground level. Two observers counted caribou and recorded locations with a GPS. Group composition was classified as either nursery (groups with calves) or non-nursery (groups without calves). The dominant behaviour type was characterized as feeding, bedded, standing, walking, trotting, or running and recorded for each caribou group observed. The survey was scheduled to occur when locations of satellite collared caribou in the Bathurst and Ahiak/Beverly herds provided by ENR, indicated caribou were approaching the RSA.

### 2.2 Grizzly Bear

Barren-ground grizzly bears may be sensitive to human disturbance and may avoid mineral developments (Johnson et al. 2005). Alternately, some grizzly bears may be attracted to human activity and the odours associated with developments in remote areas, which can lead to dangerous interactions between humans and bears, and the destruction of bears. These same concerns are applicable to black bears, which are known to occur in the RSA.

Limited success of previous surveys to detect changes in grizzly and black bear activity and distribution from searches for bear sign (e.g., tracks, digs, and scat) at the Project and other mine developments in the NWT has resulted in testing of alternative study designs that will address problems with detection of species presence.



Occupancy models (e.g., MacKenzie et al. 2002) represent a stronger approach because they account for imperfect detection and have been successfully applied to bear monitoring elsewhere (e.g., Boulanger et al. 2009). Occupancy can be defined as the proportion of the study area where grizzly bears (or wolverine [see Section 2.4]) are present during the sampling period. Hair snagging methods can be used in an occupancy modeling design and can resolve confounding issues associated with earlier programs such as distinguishing between grizzly and black bear species or failure of observers to detect bear sign when present.

The objective of the grizzly bear program was to gather baseline information for grizzly bear presence (activity) and distribution in the RSA. A new approach using hair snagging methods was tested in 2010 and 2011. Forty hair snagging stations were distributed throughout the RSA wetland community types (e.g., sedge wetland and riparian habitats). Wetland habitat locations were selected to increase the chance that bears would encounter the hair snagging stations, as inferred from patterns of seasonal diet and habitat preferences of barren-ground grizzly bears (Gau et al. 2002; McLoughlin et al. 2002). Stations were constructed of three, 4-foot lengths of 2x4 lumber, bolted together in their centre and wrapped with barbed wire. A non-reward lure was attached to the centre of each station to attract bears. Minor changes to the survey occurred in 2011 in attempt to improve capture of bear hair. These changes included:

- surveying in summer and autumn as opposed to spring and summer in 2010;
- visiting stations four times after initial setup as opposed the three times in 2010; and
- using different non-reward lures than in 2010.

Following deployment and application of lure, stations were inspected for bear hair approximately every 10 days. During each station survey, two observers inspected every barb for hair. Hair present was collected with forceps and stored in a key envelope, identified to species by a community assistant or expert, and archived (for possible DNA fingerprinting). Residual hair that could not be removed from the barbed wire was burned with a torch so that it was clean. Fresh lure was applied to each station after the first, second, and third series of inspections. The probability of grizzly bear presence and detection was determined using occupancy model estimation in Program PRESENCE (MacKenzie et al. 2006).

### 2.3 Wolf

Based on recent input from ENR, monitoring wolf denning activity does not effectively measure mine-related effects (Marshall 2009, Handley 2010). The objective of the 2011 wolf den survey was to provide regional information to ENR on the annual relative activity or distribution of wolf dens in the RSA.

Wolf den activity and distribution were measured by a survey of 19 historic dens discovered at esker complexes in the RSA during 1999 and 2005. Known dens were visited by helicopter. Each den was inspected by two observers for fresh sign (e.g., animals, tracks, scat, fur or prey bones) as evidence of recent use.

### 2.4 Wolverine

Wolverines inhabiting the Arctic and sub-Arctic have large home ranges and depend primarily on carrion, especially caribou, for food (Pasitschniak-Arts and Larivière 1995; Mulders 2000). The home range of adults can vary from 48 to 917 km<sup>2</sup>. Wolverines in the western provinces and the NWT are listed as a species of special





concern on Schedule 3 of the *Species at Risk Act* (SARA 2011), while the government of the NWT lists their status as sensitive (WGGS 2010).

Wolverines, like grizzly bears, may show avoidance of areas with human activities (Krebs et al. 2007), but also may be attracted to odours and potential food sources associated with human activity. For example, analysis of winter track surveys at the Diavik and Snap Lake mines indicates that in some years the occurrence of wolverine tracks was statistically higher near mine sites (DDMI 2007; Golder 2008, 2011). Wolverines attracted to mine sites may have an increased risk of mortality. The objectives of the monitoring program are to gather baseline information on the relative presence (activity) and distribution of wolverines in the RSA, and provide feedback for adaptive management of future mining operations, if required.

Wolverine activity and distribution were measured by monitoring the occurrence of snow tracks along fifty-one 4 km long transects at varying distances up to 25 km from the Project site. Wolverine monitoring at other mines indicates that the zone of influence (in this case, attraction) around an operating mine is likely less than 15 km (DDMI 2007; Golder 2008, 2011). Thus, the wolverine study design for the Project is adequate to measure effects across distances similar to those at other northern diamond mine developments.

Transect locations were selected using stratified random sampling. The wolverine study area (25 km radius area around the Project site) was divided into a 2 km by 2 km grid of cells. Traditional knowledge (DDMI 2007) and science (Johnson et al. 2005) have identified boulder, heath boulder, and shoreline as habitats positively correlated with wolverine occupancy, therefore, these habitats were chosen for placement of survey transects. The boulder and heath boulder content of each cell was calculated using geographic information system (GIS) software. Fifty-one cells were randomly selected that contained boulder and heath boulder habitat. A straight 4 km long transect was positioned and oriented to traverse a maximum amount of boulder and heath boulder habitat and shoreline based on a 2.5 km buffer area within selected cells. The size of the buffer was based on the daily movement distances of wolverines (Hornocker and Hash 1981).

Each transect was surveyed by two observers driving parallel on snowmobiles at a maximum speed of 15 km/h and spaced 25 m apart to reduce the chance of missing tracks. The location of all wolverine tracks encountered was recorded with a GPS. Surveys of transects occurred during March and again in April in an attempt to survey each transect twice. The second survey allows a detection probability of snow tracks to be estimated to reduce bias in measures of occurrence (MacKenzie et al. 2002). The probability of wolverine snow track presence and detection was determined using occupancy model estimation in the Program PRESENCE (Hines 2006).

Weather events such as snowfall and wind prior to and during surveys influence the number of tracks observed. Fresh snowfall can fill tracks and a wind speed of 7.7 metres per second (m/s) is sufficient to move dry snow along the ground (Li and Pomeroy 1997). To account for these weather effects, surveys did not occur during snowfall or at winds above 7.7 m/s, and were not initiated until at least 24 hours following these weather conditions. Track counts were adjusted using the minimum number of days since the end of these weather conditions. The resulting Track Density Index (TDI) was estimated according to the following formula:

TDI = number of tracks encountered per survey distance (km) per days since last snowfall or wind speed threshold.



### 2.5 Water Birds

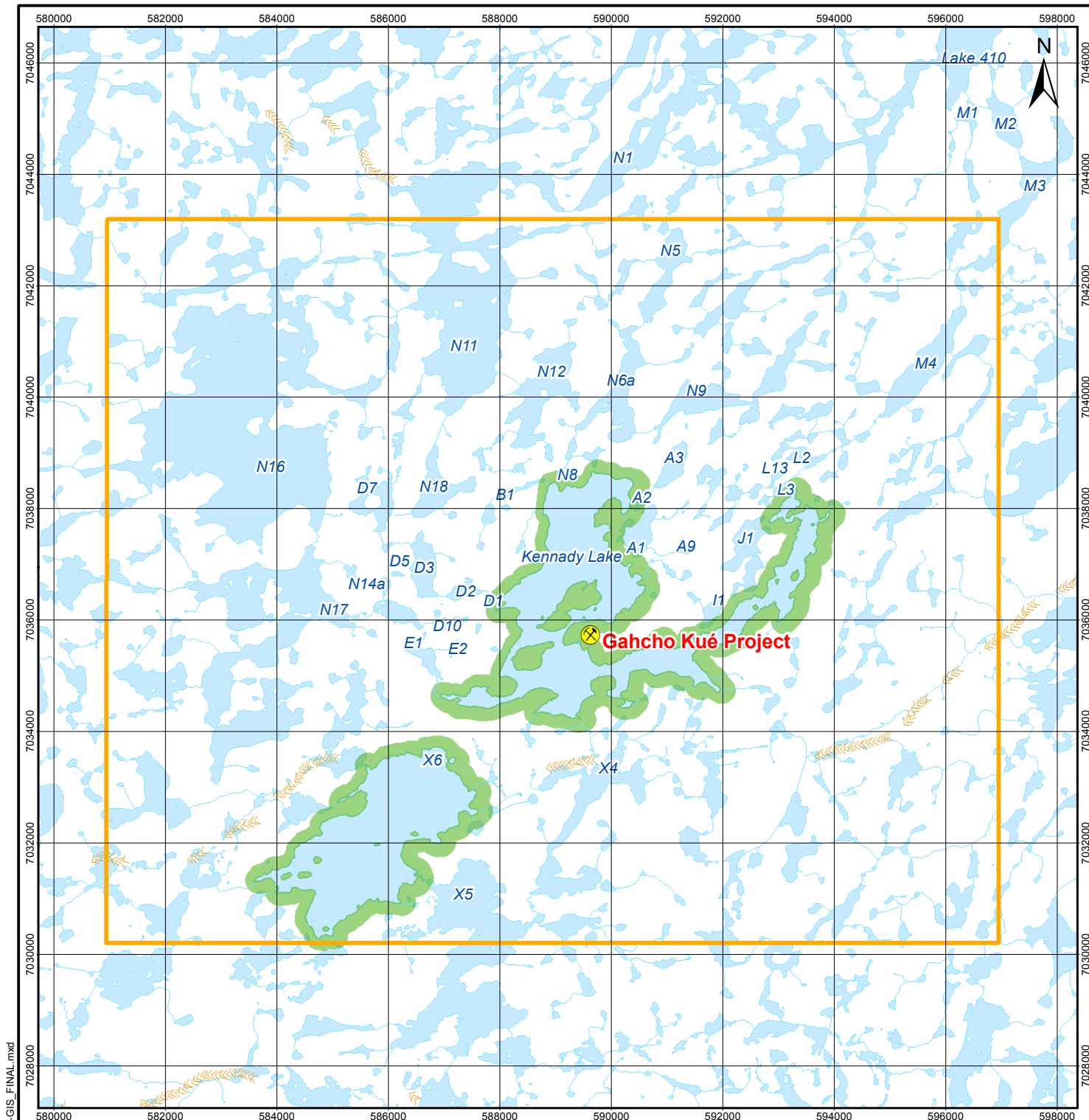
The current Project design includes isolating and dewatering a portion of Kennedy Lake. The objective of the water bird survey was to determine species occurrence and composition of water birds (ducks, geese, loons, and grebes) at Kennedy Lake and a reference water body of similar size (Lake X6).

The presence of water birds (ducks, geese, loons, and grebes) at Kennedy and X6 lakes was determined by aerial survey. The survey was performed by helicopter at 50 m above ground level and at a speed of 80 km/h. The survey route followed the shoreline of each lake and their islands (Figure 2-1). Smaller water bodies occurring within 200 m of Kennedy and X6 shoreline were also included in the survey.

### 2.6 Raptors

Raptors are birds of prey and include falcons, hawks, eagles, and owls. The combination of low nest density and high temporal variation in occupancy and productivity of raptor nests limits their use for monitoring mine-related effects (Marshall 2009; Handley 2010). However, periodic information of occupancy and productivity from surveys of raptor nests in the RSA is useful to the National Peregrine Falcon Recovery Program. Thus, the objective of the 2011 raptor monitoring program was to determine occupancy and productivity of raptor nests in the RSA as a regional contribution to national monitoring initiatives. Known perch sites were also surveyed each year for signs of nesting activity.

The presence of adults, eggs and young were determined by helicopter survey of known nest locations from late-May to mid-June. Nests were considered occupied if at least one adult bird was observed attending a nest or in close proximity. If visible, the number of eggs was determined. A second survey of occupied nests was completed during July to determine nest success. Nests were considered successful if at least one chick was observed. Disturbance to breeding raptors from the survey helicopter was kept as short as possible and surveys were not done during rain.



## LEGEND

- Gahcho Kué Project
- Lakes Surveyed
- Watercourse
- Local Study Area
- Waterbody
- Esker

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:50,000

## GAHCHO KUÉ PROJECT

### Water Bird Aerial Surveys, 2011

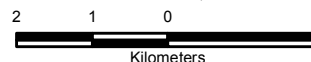
PROJECTION:

UTM Zone 12

DATUM:

NAD83

Scale: 1:100,000



FILE No:

B2011-Wild-002-GIS

DATE:

December 12, 2011

JOB NO:

11-1365-0001

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**Figure 2-1**



### 3.0 RESULTS

#### 3.1 Caribou

An aerial survey for caribou and snow trails was completed on May 11, 2011. Twenty-three sets of caribou snow trails were recorded in the RSA. The number of trails per observation ranged from 1 to 30 (Figure 3-1). Trails were distributed throughout the RSA but were most prevalent in the northwest quarter. On average, 0.22 trails were observed per km of transect surveyed (1 trail every 4.5 km). No caribou were observed.

An early winter survey for caribou was completed on November 14, 2011. Limited daylight hours allowed only 9 of 11 transects to be completed; two transects on the east side of the RSA were not surveyed. In total, 101 caribou were observed in three groups ( $n = 10, 6,$  and  $85$ ) within the survey transects (Figure 3-2). Calves were present in two of the three groups. The dominant group behaviour types observed for caribou groups included standing, bedded, alert, and walking.

#### 3.2 Grizzly Bear

Forty hair snagging stations were activated by applying fresh lure on July 19 and 20, 2011. Four surveys for the presence of bear hair occurred August 5 and 6, August 19 and 20, September 1 and 2, and September 15 and 16, 2011. The number of stations with grizzly bear hair was four, one, zero, and one stations during the first, second, third, and fourth surveys, respectively, or at 15% (6 of 40) of the stations. Hair snags never occurred more than once at the same station. Stations where grizzly bear hair was detected were located from 19 km to 42 km away from the Project site (Figure 3-3). Black bear hair was not observed at any of the stations based on observations made in the field.

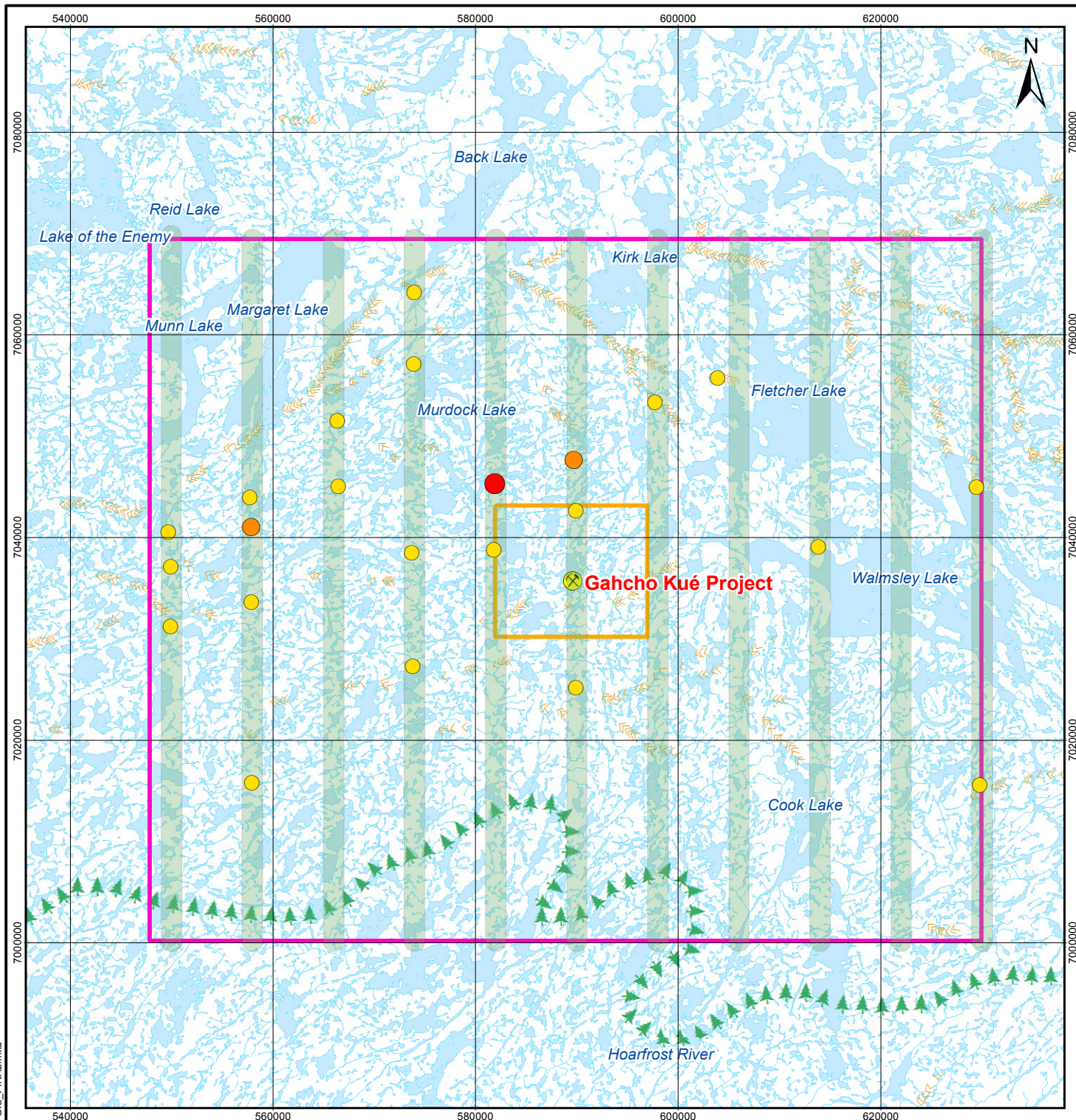
The probability estimate ( $\pm 1$  standard error) of grizzly bear presence in the RSA using hair detection data from all four surveys was 1.0 ( $\pm 0.0$ ) and should be considered unreliable. The average probability of grizzly bear hair detection was 0.04 ( $\pm 0.02$ ), among the four surveys. Sparse hair presence and no re-occurrence at the same station resulted in low and imprecise detection and an inflated occupancy estimate with no precision.

More recent discussions (November 2011) on the hair snagging study design for grizzly bears have occurred among the mining companies, independent monitoring agencies, and ENR. A new study design for the Snap Lake and Kennady Lake region has been developed using sampling protocols that will be consistent with the methods used at Ekati and Diavik in the Lac de Gras region. The approach is intended to provide regional information on grizzly bear densities and demographic rates to ENR for their use in assessing and managing cumulative effects.

#### 3.3 Wolf

Surveys of dens were completed June 10, 2011. None of the dens surveyed had evidence of current occupancy by wolves (Figure 3-4). A red fox was observed near one den but was not to be using it. This information was provided to ENR.





## LEGEND

- |  |                    |  |                                    |
|--|--------------------|--|------------------------------------|
|  | Gahcho Kué Project |  | Number of Caribou Snow Trails      |
|  | Watercourse        |  | 1 - 10                             |
|  | Waterbody          |  | 11 - 20                            |
|  | Esker              |  | 21 - 30                            |
|  | Treeline           |  | Survey Transect                    |
|  |                    |  | Wildlife Local Study Area (LSA)    |
|  |                    |  | Wildlife Regional Study Area (RSA) |

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Location of Caribou Snow Trails, Northern Migration, 2011

PROJECTION: UTM Zone 12  
DATUM: NAD83

Scale: 1:550,000  
10 5 0 10  
Kilometres



FILE No:  
B2011-Wild-009-GIS

DATE:  
December 12, 2011

JOB NO:  
11-1365-0001

REVISION NO:  
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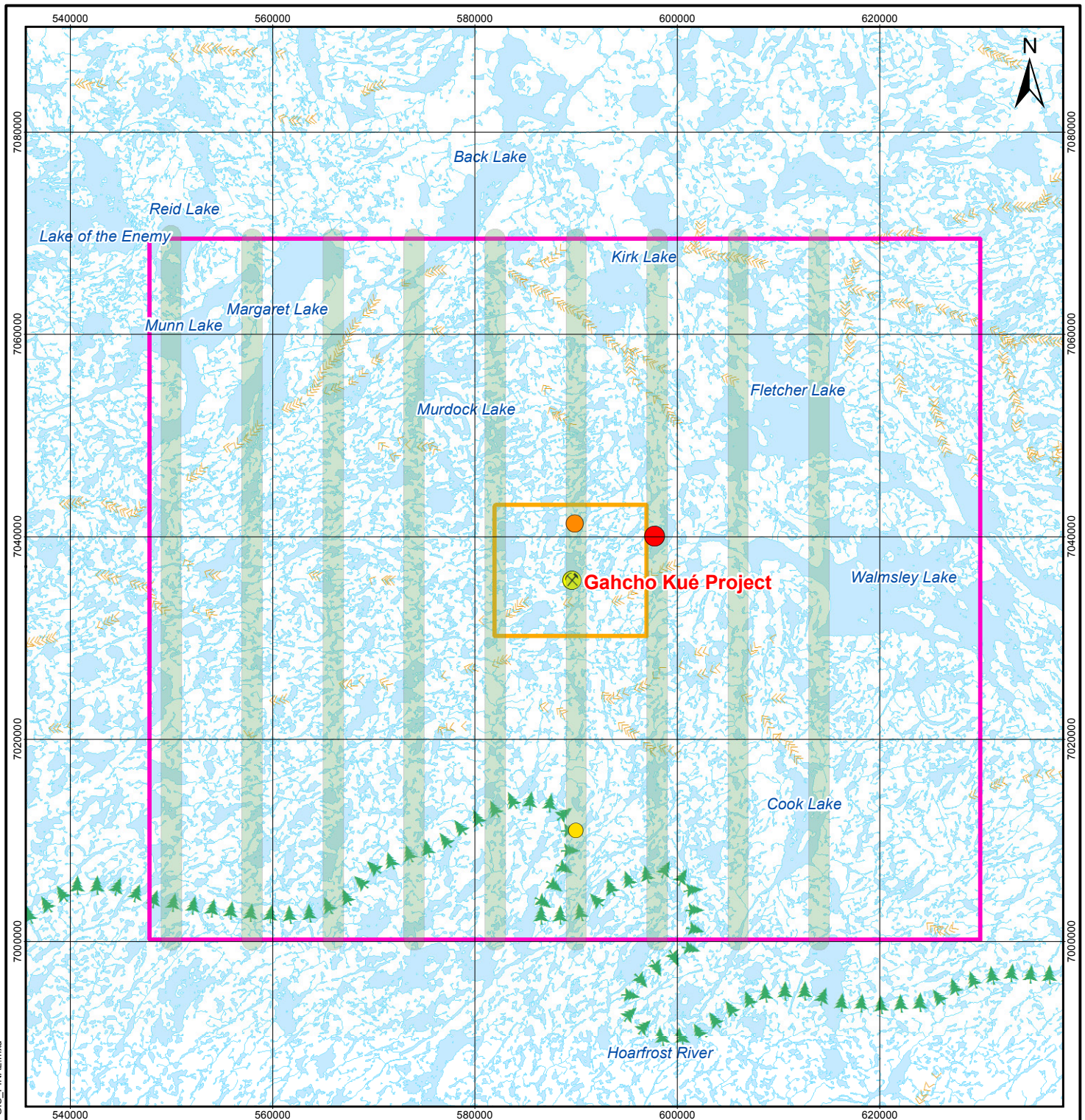
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CHECK:  
JV

**Figure 3-1**





## LEGEND

- |  |                                    |  |                   |
|--|------------------------------------|--|-------------------|
|  | Gahcho Kué Project                 |  | Number of Caribou |
|  | Watercourse                        |  | 6                 |
|  | Waterbody                          |  | 10                |
|  | Esker                              |  | 85                |
|  | Treeline                           |  | Survey Transect   |
|  | Wildlife Local Study Area (LSA)    |  |                   |
|  | Wildlife Regional Study Area (RSA) |  |                   |

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Observations of Caribou, November, 2011

PROJECTION:  
UTM Zone 12

DATUM:  
NAD83

Scale: 1:550,000  
10 5 0 10  
Kilometres



FILE No:  
B2011-Wild-007-GIS

DATE:  
December 12, 2011

JOB NO:  
11-1365-0001

REVISION NO:  
1

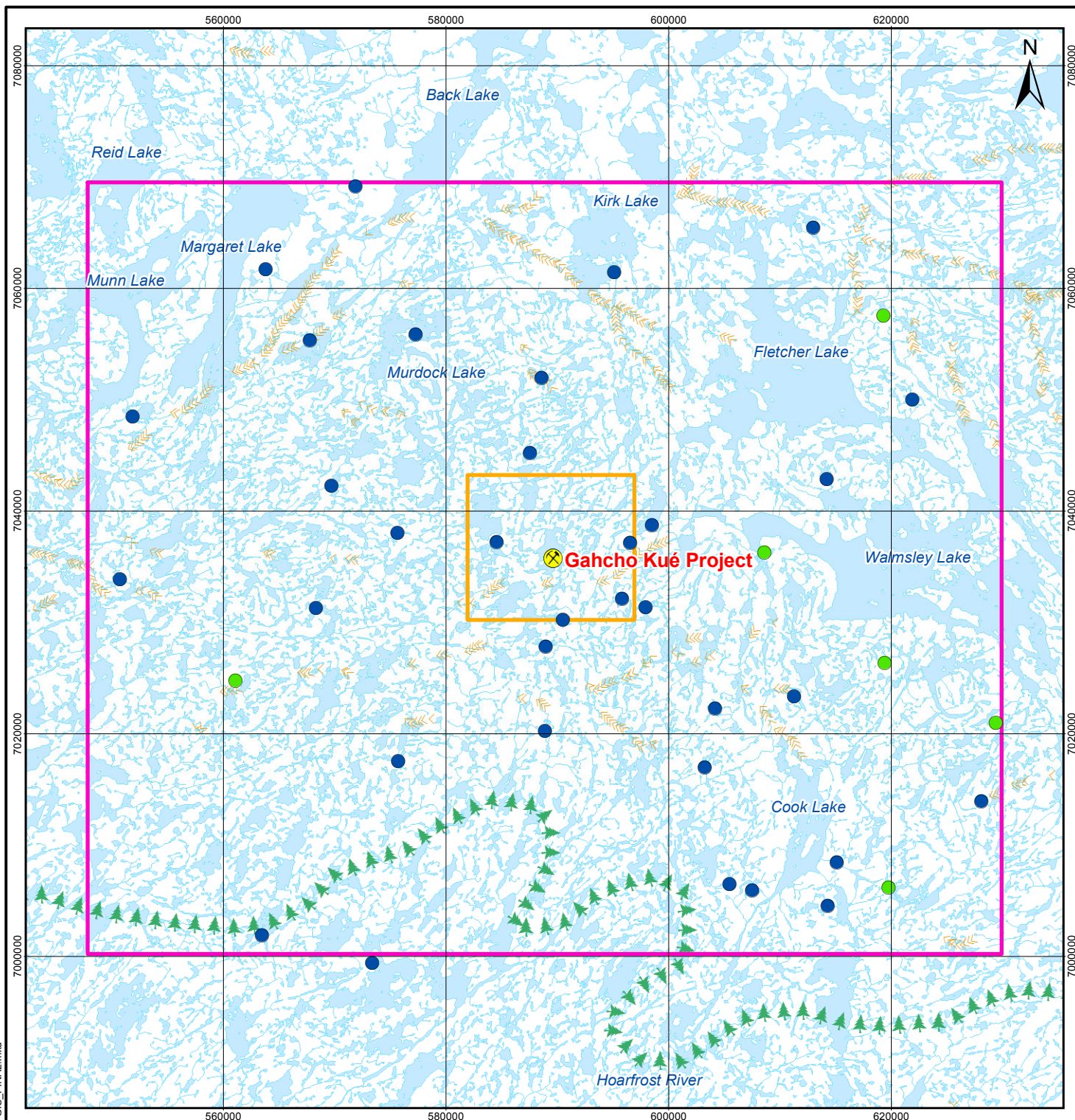
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JV

**Figure 3-2**





## LEGEND

- |                    |                          |
|--------------------|--------------------------|
| Gahcho Kué Project | <b>Presence of Hairs</b> |
| Watercourse        | No                       |
| Waterbody          | Yes                      |
| Esker              | Local Study Area         |
| Treeline           | Regional Study Area      |

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Grizzly Bear Hair Snagging Stations, 2011

PROJECTION: UTM Zone 12  
DATUM: NAD83

Scale: 1:500,000  
10 5 0 10  
Kilometres

FILE No: B2011-Wild-003-GIS

DATE: December 12, 2011

JOB NO: 11-1365-0001

REVISION NO: 1

OFFICE: GOLD-CAL

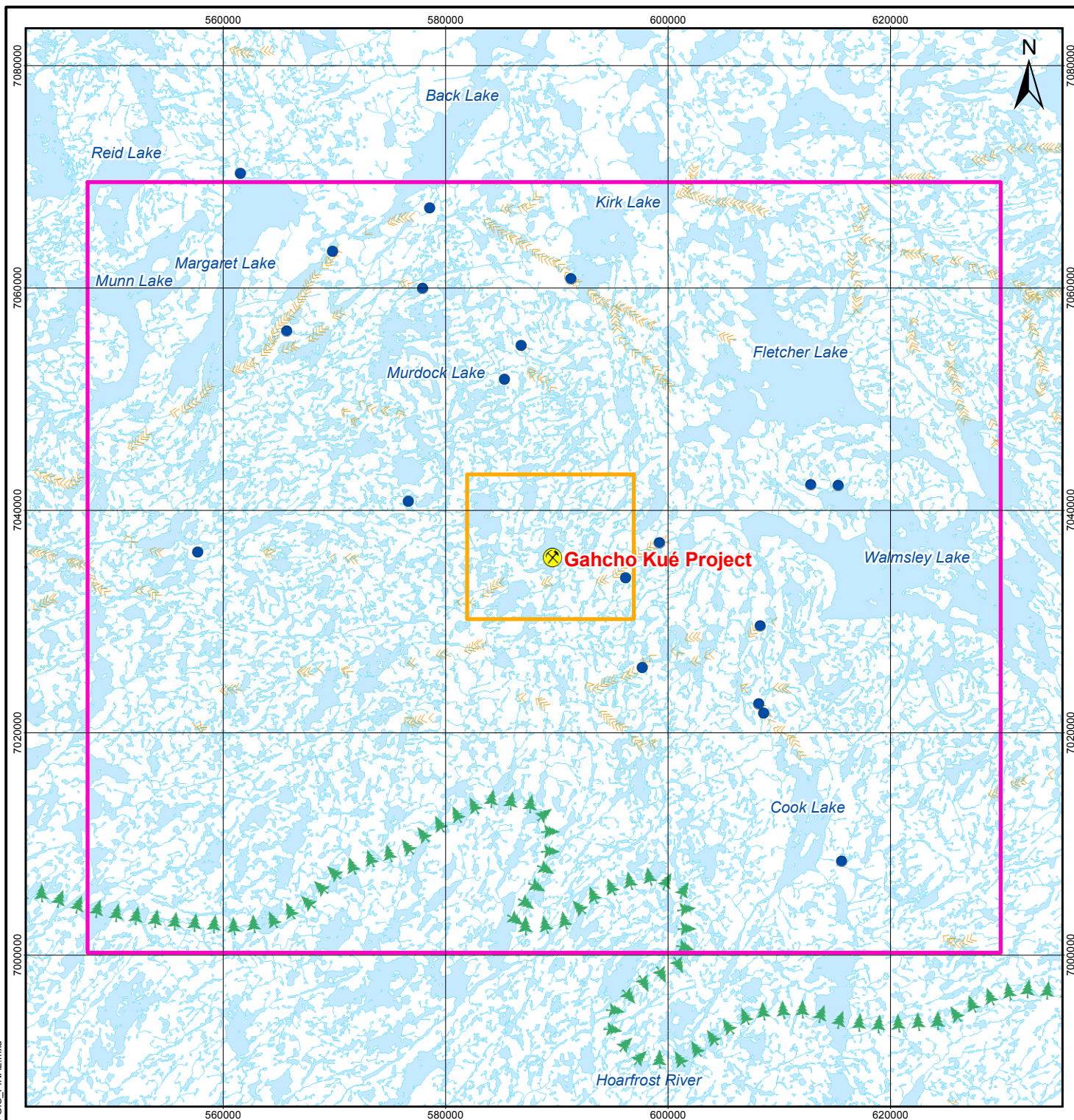
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**Figure 3-3**



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### LEGEND

-  Gahcho Kué Project
-  Unoccupied Den
-  Watercourse
-  Wildlife Local Study Area (LSA)
-  Waterbody
-  Wildlife Regional Study Area (RSA)
-  Esker
-  Treeline

### NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Wolf Dens Surveyed, 2011

PROJECTION: UTM Zone 12      DATUM: NAD83

Scale: 1:500,000  
10      5      0      10  
Kilometres



FILE No: B2011-Wild-008-GIS      DATE: December 12, 2011

JOB NO: 11-1365-0001	REVISION NO: 1
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**Figure 3-4**



### 3.4 Wolverine

Snow track surveys for wolverines were completed from March 29 to April 2, 2011, and again from April 15 to 19, 2011. Fifty-one transects were surveyed twice. One transect in a forested area was relocated as it could not be surveyed due to deep and melting snow conditions for the second consecutive year.

Ten wolverine tracks were detected on eight transects during the first survey, while 11 tracks on 10 transects were detected on the second survey. Wolverine tracks were encountered on 33% (17 of 51) of the transects at varying distance and direction from the Project (Figure 3-5). During the surveys, an additional 15 incidental wolverine tracks were recorded while observers moved between transects.

Average TDI ( $\pm 1$  standard error) was 0.02 ( $\pm 0.01$ ) between both surveys ( $n = 102$  transects) during 2011. Probability estimates of occupancy and detection were 0.83 ( $\pm 0.34$ ) and 0.37 ( $\pm 0.14$ ), respectively, after accounting for the effect of weather conditions (i.e., days since last snowfall or threshold wind speed).

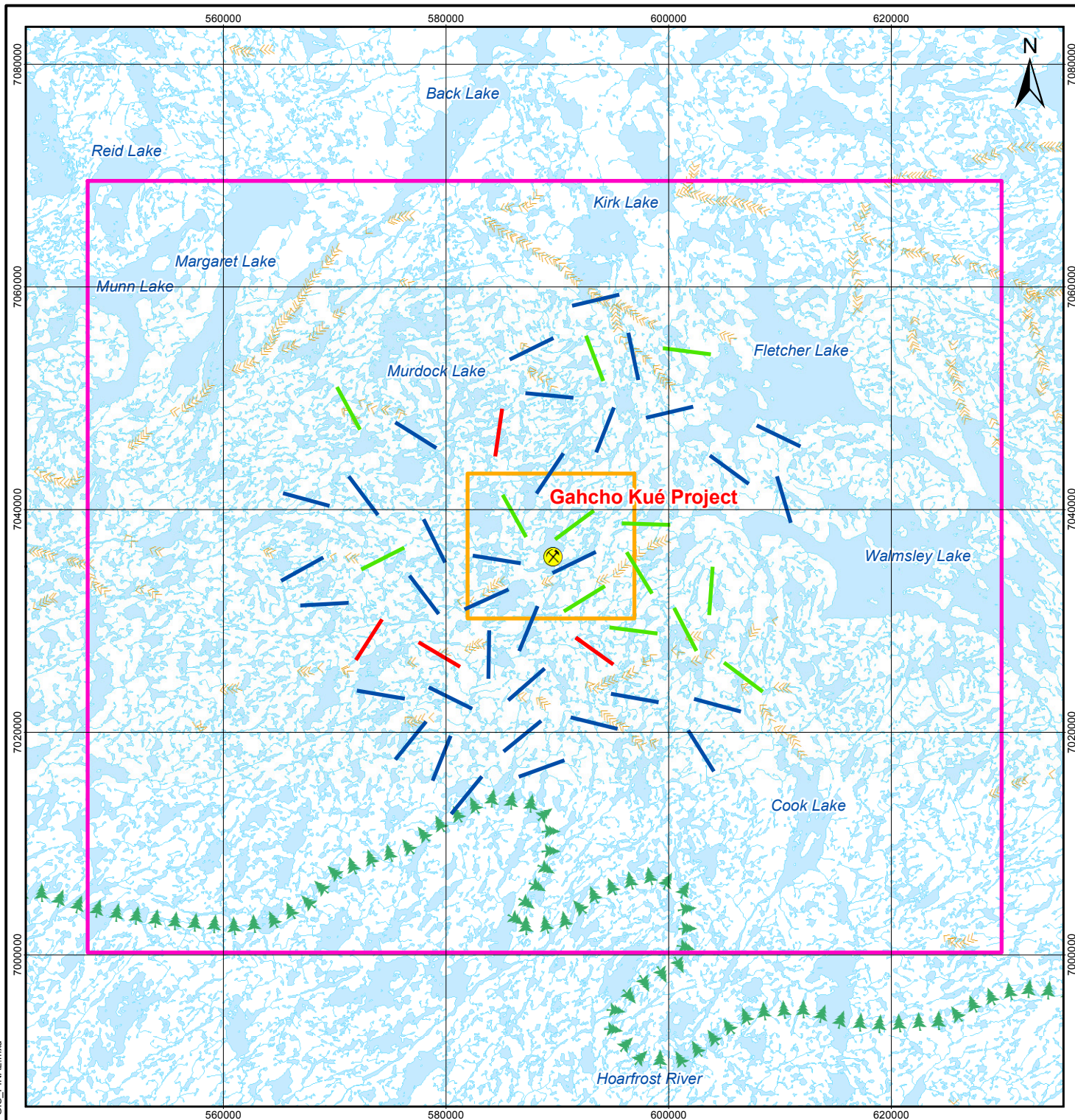
### 3.5 Water Birds

The aerial survey for water birds at Kennedy and X6 lakes occurred on June 10, 2011 (Figure 2-1). The number of species and individuals recorded were similar for Kennedy and X6 lakes (Table 3-1). Of those observed, yellow-billed loon, common loon and white-winged scoter are considered overwater-nesting species. No water bird nests were observed during the survey.

**Table 3-1 Water Birds Observed During an Aerial Survey of Kennedy and X6 Lakes**

Species Observed	Kennedy Lake	Lake X6
Common merganser	5	5
Red-breasted merganser	4	2
Yellow-billed loon	3	2
Common loon	2	0
Herring gull	1	0
White-winged scoter	0	2





## LEGEND

- |  |                    |                                |
|--|--------------------|--------------------------------|
|  | Gahcho Kué Project | <b>Snow Track Observations</b> |
|  | Watercourse        | 0                              |
|  | Waterbody          | 1                              |
|  | Esker              | 2                              |
|  | Treeline           | Local Study Area               |
|  |                    | Regional Study Area            |

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Wolverine Snow Track Transects, 2011

PROJECTION: UTM Zone 12      DATUM: NAD83

Scale: 1:500,000  
  
 Kilometres



FILE No: B2011-Wild-004-GIS      DATE: December 12, 2011

JOB NO: 11-1365-0001	REVISION NO: 1
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**Figure 3-5**



### 3.6 Raptors

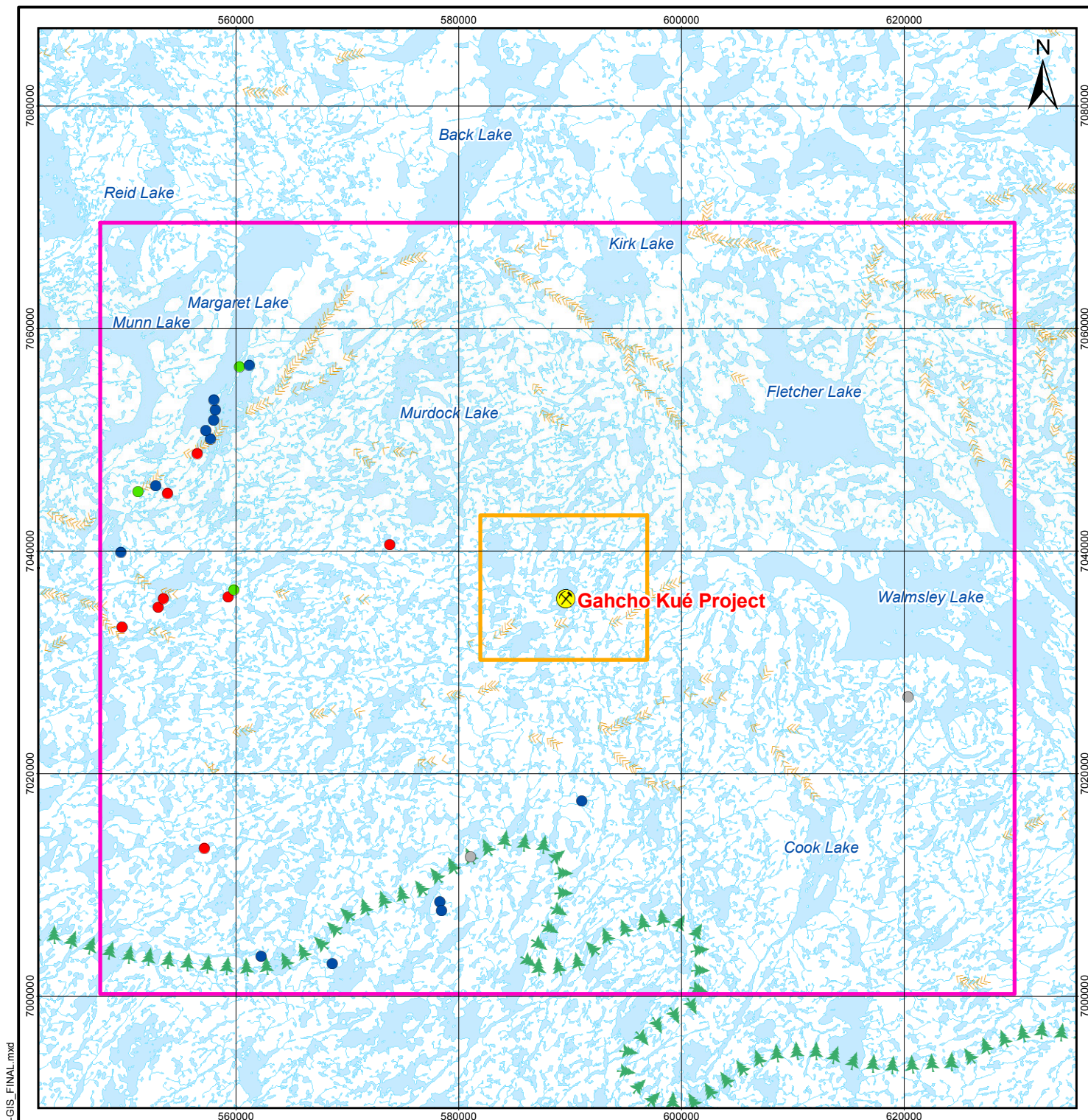
Raptor occupancy surveys of 24 nests and 5 perches were completed June 10, 2011. Nests occupied by adult raptors or containing eggs were visited July 5, 2011, to determine nest success. Three of the 24 nests were occupied by common ravens and were excluded from the analysis. Eleven of 21 (52%) available nests were occupied by raptors and 8 (73%) of the occupied nests hatched at least one chick (Figure 3-6; Table 3-2). None of the raptor perches surveyed for nesting activity were occupied. Currently, all known raptor nests in the RSA occur greater than 18 km from the Project site and the majority are located near Margaret Lake. The remaining nests are located in the southern half of the RSA (Figure 3-6).

**Table 3-2 Survey Results for Occupancy and Productivity of Raptor Nests**

Species	Nests Occupied	Number Successful	Nest Success <sup>(a)</sup> [%]
Rough- legged hawk	2	1	50
Peregrine falcon	6	4	67
Gyr Falcon	3	3	100
<b>Total Observed</b>	<b>11</b>	<b>8</b>	<b>73</b>

<sup>(a)</sup> Percent nest success = number successful ÷ number occupied x 100.





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## LEGEND

- |                    |                     |
|--------------------|---------------------|
| Gahcho Kué Project | Not Surveyed        |
| Watercourse        | Unoccupied Nest     |
| Waterbody          | Occupied Nest       |
| Esker              | Successful Nest     |
| Treeline           | Local Study Area    |
|                    | Regional Study Area |

## NOTES

Base data source: National Topographic Base Data (NTDB) 1:250,000

## GAHCHO KUÉ PROJECT

### Raptor Nest Surveys, 2011

PROJECTION: UTM Zone 12	DATUM: NAD83
----------------------------	-----------------

Scale: 1:500,000	
10	5 0 10
Kilometres	



FILE No: B2011-Wild-005-GIS	DATE: December 12, 2011
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JOB NO: 11-1365-0001	REVISION NO: 1
OFFICE: GOLD-CAL	DRAWN: DC CHECK: JV

**Figure 3-6**





### 4.0 SUMMARY AND CONCLUSIONS

In 2011, wildlife surveys were completed in the RSA for the Project to enhance the baseline database and contribute additional pre-disturbance data for monitoring effects during Project construction and operation. Surveys were completed for caribou, grizzly bear, wolf, wolverine, water birds, and raptors. Caribou snow trails were present in the RSA in spring, and indicate that caribou continue to move through the RSA during the Northern migration period. Although in low numbers, caribou were observed during an aerial survey of the RSA in early winter. Caribou groups with and without calves were present in the RSA. Hair snagging surveys for grizzly bears occurred in late summer to early fall, but the presence of hair at hair snagging stations was low and provided unreliable probability of occupancy estimates. Wolf dens were surveyed in June, but no wolves or active dens were observed. Wolverine tracks occurred at 33% of survey transects in the RSA during surveys in March and April. After accounting for the affects of weather, the probability of wolverine occupancy in the RSA was relatively high (83%) although track density was low. Several species of water birds were recorded at both Kennady and X6 lakes, including three overwater nesting species. Late spring and early summer surveys of raptor nests in the RSA during 2011 indicated that approximately half (52%) of the nests were used by raptor species and most of these were successful (73%).



### 5.0 CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

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### 7.0 ABBREVIATIONS

%	percent
±	plus minus
DDMI	Diavik Diamond Mines Inc.
De Beers	De Beers Canada Inc.
DNA	deoxyribonucleic acid
EIR	Environmental Impact Review
ENR	Environment and Natural Resources
GIS	geographic information system
GPS	global positioning system
km	kilometre
km/h	kilometres per hour
km <sup>2</sup>	square kilometres
m	metre
m/s	Metre per second
NWT	Northwest Territories
NWT	Northwest Territories
Project	Gahcho Kué Project
RSA	regional study area
SARA	<i>Species at Risk Act</i>
TDI	Track Density Index



### 8.0 GLOSSARY

<b>Abundance</b>	The number of individuals.
<b>Carrion</b>	The carcass of a dead animal.
<b>Community</b>	Group of co-existing organisms in an ecosystem.
<b>Density</b>	The number of individuals per unit area.
<b>Distribution</b>	The pattern of dispersion of an entity within its range.
<b>Ecosystem</b>	Ecological system consisting of all the organisms in an area and the physical environment with they interact.
<b>Habitat</b>	The physical space within which an organism lives, and the abiotic and biotic entities (e.g., resources) it uses and selects in that space.
<b>Habitat preference</b>	Used to describe the relative use of different locations (habitats) by an individual or species.
<b>Habitat use</b>	The way an animal uses (or <i>consumes</i> , in a generic sense) a collection of physical and biological entities in a habitat.
<b>Home range</b>	The area traversed by an animal during its activities during a specific period of time.
<b>Population</b>	Classically, a collection of interbreeding individuals.
<b>Precision</b>	The closeness to each other of repeated measurements of the same quantity
<b>Range</b>	The geographic limits within which an organism occurs.
<b>Raptor</b>	A carnivorous (meat-eating) bird; includes eagles, hawks, falcons and owls.
<b>Regional Study Area</b>	Defines the spatial extent related to the cumulative effects resulting from the project and other regional developments.
<b>Resource</b>	Any biotic and abiotic factor directly used by an organism.
<b>Riparian</b>	Refers to terrain, vegetation or simply a position next to or associated with a stream, floodplain or standing waterbody.
<b>Scale</b>	The resolution at which patterns are measured, perceived, or represented. Scale can be broken into several components, including geographic extent, resolution, and other aspects.
<b>Sedge</b>	Any plant of the genus <i>Carex</i> , perennial herbs, often growing in dense tufts in marshy places. They have triangular jointless stems, a spiked inflorescence and long grass-like leaves which are usually rough on the margins and midrib. There are several hundred species.
<b>Study area</b>	An arbitrary spatial extent chosen by the investigator within which to conduct a study.
<b>Transect</b>	A method of sampling vegetation, along a path or fixed line.
<b>Upland</b>	Ground elevated above the lowlands along rivers or between hills; highland or elevated land; high and hilly country.

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