March 2014

DIAVIK DIAMOND MINES (2012) INC.

2013 Wildlife Monitoring Report

Submitted to:
David Wells, Diavik Diamond Mines (2012) Inc.

REPORT

Report Number: 1313280001.7000

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Golder Associates

Executive Summary

As a requirement of the Environmental Agreement, Diavik Diamond Mines (2012) Inc. (DDMI) conducts a Wildlife Monitoring Program (WMP). The objective of the WMP is to collect information that will assist in determining if there are effects on wildlife in the study area and if these effects were accurately predicted in the Environmental Assessment. The WMP also allows the collection of data to determine the effectiveness of site-specific mitigation practices and the need for any modifications. The following report documents results collected for the 2013 WMP for the Diavik Diamond Mine located at Lac de Gras, Northwest Territories. The data were collected according to procedures outlined in Standard Operating Procedures. Where helpful, comparisons to the information gathered during the previous monitoring (2000 to 2012) and the pre-construction baseline (June 1995 to August 1997) have been included.

General observations in each program are as follows:

Landscape Changes:

- In 2013, the Mine footprint increased by 0.02 km^2. The total terrestrial landscape loss to date (10.12 km^2) from mining activities is below that predicted in the Environmental Effects Report.

Barren-ground Caribou

- The total caribou summer habitat lost to date is 2.6 habitat units; this remains below the prediction made in the Environmental Effects Report.
- Aerial caribou surveys were not required in 2013.
- A total of 90 ground-based caribou behavioural observations were completed in 2013. Distances of observations ranged from less than 2 km to greater than 30 km from Mine infrastructure, but more than 90% were greater than 30 km from the Mine.
- There was one natural caribou mortality reported in 2013; wolf tracks nearby indicate that it was due to predation. No caribou injuries were reported.
- No caribou were observed during the Processed Kimberlite Containment (PKC) area and rock pile surveys or during the road surveys in 2013.
- During 2013, the caribou traffic advisory remained at “No Concern” for the entire year, as caribou numbers on East Island did not exceed 100 at any given time.
- There were no actions taken to herd caribou away from potential hazards in 2013.

Grizzly Bear

- To date, the total direct grizzly bear habitat loss is 7.57 km^2, which is below the amount predicted in the Environmental Effects Report.
- Grizzly bear hair snagging studies were undertaken jointly by DDMI and Ekati in 2013 and a total of 4,705 hair samples were collected and submitted for DNA analysis.

- A total of 67 incidental sightings of grizzly bears were recorded at the Mine site during 2013 from 17 May until 30 August.
- No grizzly bear injuries or mortalities occurred during 2013; however a sow was relocated by the Government of the Northwest Territories from East Island on 30 August 2013.

Wolverine

- The snow track survey was completed in 2013.
- The wolverine hair snagging program was not completed in 2013 and is scheduled to resume in 2014.
- In 2013, a total of three wolverines were observed on East Island.
- No wolverine injuries or mortalities occurred during 2013

Falcons

- Pit Wall/Mine Infrastructure surveys were conducted 13 May 2013 until 23 September 2013. There were two active rough-legged hawk nests in the A418 pit, and one active peregrine falcon nest on the high wall behind the site services building.
- One common raven mortality and two peregrine falcon mortalities occurred at the Mine site in 2013.

Water Birds

- Water birds are utilizing Mine-altered waters, particularly the North Inlet but not earlier than the East and West Bays.

Wind farm

- Bird mortality monitoring was undertaken at the wind farm from 11 June to 23 August as per the Avian Post-Construction Follow-Up Plan. No bird carcasses were observed.

Waste Management

- At the WTA, improperly disposed material was found during 10% of inspections. Wildlife observed during WTA inspections included common raven, greater white-fronted goose, red fox and unknown gulls.
- At the Inert Landfill, improperly disposed material was found during 62% of inspections. Wildlife observed during landfill inspections included common raven and red fox.
- Throughout 2013, 11,466 units of aluminum containers ($1,146.60) and 13,534 units of plastic containers ($1,353.40) were recycled and the total monetary value was donated to charity.
- In 2013, over 20,000 pounds of copper and 2,000 pounds of aluminum were stripped from scrap cable for recycling; proceeds will be donated to charity.
- During 2013, approximately 280,665 litres of waste oil was collected and will be used in waste oil burning boilers in 2014.
- During the first year of operation, the wind farm generated 15,893 megawatt hours (MWh) of power; which represents a diesel savings of 3.8 million litres.

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1.0 INTRODUCTION

1.1 Background

Diavik Diamond Mines (2012) Inc. (DDMI or Diavik) conducted wildlife baseline studies from 1995 to 1997. Information gathered was used to describe ecological conditions found in the Lac de Gras area in support of the Mine Description and Environmental Assessment (DDMI 1998a, 1998b). Information was used by Diavik throughout the Mine design to identify mitigation practices to limit impacts on wildlife species and to formulate predictions of the effects on wildlife due to mining activities. This information was used to develop a Wildlife Monitoring Program (WMP) for the Diavik Diamond Mine (the Mine). Documents that were used in developing the WMP include:

- Comprehensive Study Report, *The Canadian Environmental Assessment Act* June 1999;
- Environmental Assessment Overview, Diavik Diamonds Project, September 1998;
- Environmental Effects Report (EER), Wildlife, Diavik Diamonds Project, September 1998; and
- Wildlife Baseline Report, Diavik Diamonds Project, Penner and Associates, July 1998.

A WMP (DDMI 2002) was designed specifically to monitor and manage wildlife issues of concern identified by communities and regulatory agencies. The program has evolved since the original design in response to trends observed in the data, changes to objectives, methods, logistics and cost-efficiencies. Rationale for change was based on effectiveness of data to test impact predictions, community concerns, adaptive management principles and availability of resources and logistics. Further, community visits occur annually and allow community members an opportunity to observe Mine site operations. During these visits if any proposed changes are being executed, discussion and feedback are obtained from the communities.

Due to the large degree of natural variation inherent in ecosystems, it is often difficult to detect indirect effects with only one or two years of data. Therefore a more comprehensive analysis and discussion of all data from the WMP is to be completed every three years, including 2013, but submitted as a separate report. For the intermediate years, the annual reports present findings from that year, and summarize cumulative data collected up to that year. If critical issues become apparent in the shorter term, then a discussion of these issues is presented in annual reports.

1.2 Objectives

The overall objectives of the WMP are to:

- collect information that will assist Diavik to determine if there are effects on wildlife and if these effects were accurately predicted in the EER;
- determine the effectiveness of mitigation practices intended to limit Mine-related effects on wildlife and whether or not these practices and policies require modification; and
- determine if new effects are found that were not predicted in the EER.

Objectives specific to valued components are presented in the following sections.

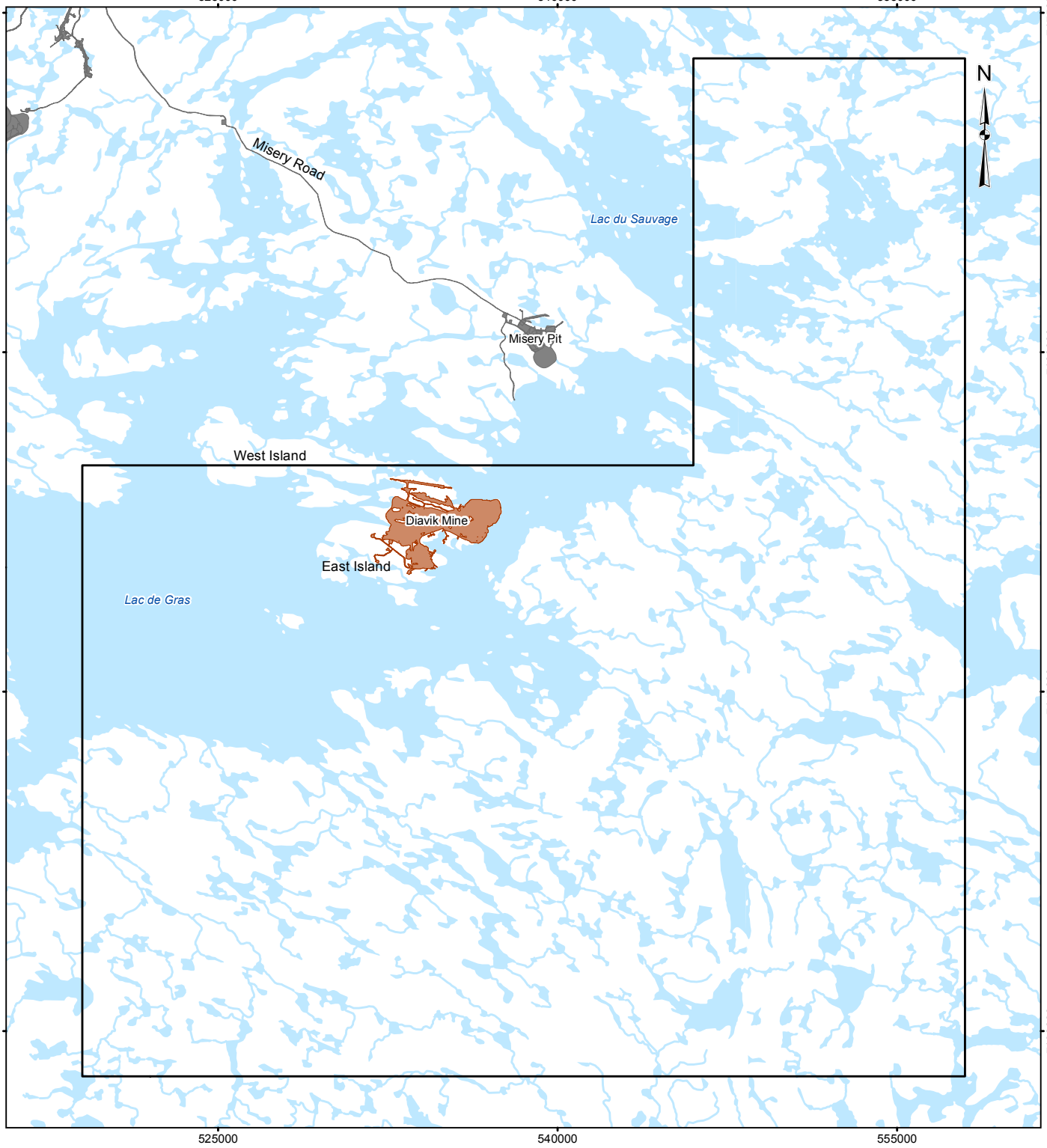
1.3 Study Area

The Mine is located on an island in eastern Lac de Gras (Figure 1). The wildlife study area includes a 1,200 square kilometers (km^2) area including the East and West islands, the aquatic habitats, many smaller islands in the northeast portion of Lac de Gras and the mainland along the southern, eastern and northern shores of Lac de Gras. An extension to the northwest was made to include the Lac du Sauvage narrows, an important caribou migration corridor (Penner 1998). The local study area during baseline studies (Penner 1998) covered an area of approximately 805 km^2.

The Mine footprint includes accommodation facilities, Mine operations buildings, haul roads, an airstrip, country rock piles, the A154/A418 Pit and Dike, and all Mine infrastructure (Figure 2). In 2012 the Mine footprint was expanded to include the wind farm and access roads to the wind farm. All haul roads required for mining activities to date are complete. Development of the underground Mine at the A154/418 in 2013 yielded 389,969 tonnes of waste and 1,949,207 tonnes of ore completed by year end. The average monthly population at Diavik in 2013 was 537 people, with a maximum of 574 people during February.

1.4 Report Organization

Within each section of the report, data are presented that will be tracked over the life of the Mine. Recommendations for enhancement to the WMP are presented at the end of each section for consideration, and will be incorporated into the WMP for subsequent years. The WMP is an evolving program that will reflect recommendations during previous years, as well as advances in Mine development. Changes will be captured in annual revisions of the WMP.



LEGEND

- DIAVIK WILDLIFE STUDY AREA BOUNDARY
- DIAVIK FOOTPRINT
- EKATI FOOTPRINT

10 0 10

SCALE 1:250,000 KILOMETRES

REFERENCE

BASE DATA: NTDB 1:250,000
DATUM: NAD83 PROJECTION: UTM ZONE 12

PROJECT

RioTinto

DIAVIK DIAMOND MINES INC.

TITLE

DIAVIK WILDLIFE STUDY AREA, 2013

Golder Associates

PROJECT		13-1328-0001	FILE No.	
DESIGN	KM	28 Jan. 2013	SCALE AS SHOWN	REV. 0
GIS	GI	18 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 1

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530000 532500 535000 537500

7152500

Airstrip
North Inlet
North Inlet
Pond 2
North Inlet Water Treatment Plant
A154 Dike
Pond 3
North Country Rock Pile
A154 Pit
Backfill Plant
Pond 4
Inert Landfill
Pond 1
Pond 13
Wind Turbine 1
Wind Turbine 2
PKC
Wind Farm
Processed Kimberlite Containment (PKC) Facility
A154/A418 Decline
A418 Pit
A418 Dike
Ammonium Nitrate Storage
Pond 5
Pond 10
Wind Turbine 3
Underground Fuel Bay
Lube Building
Truck Shop
Process Plant
East Bay
Wind Turbine 4
Freshwater Intake
West Bay
Main Camp
Boiler House
Waste Transfer Area
Sewage Treatment Plant
South Camp
Power Houses
Emulsion Plant
Pond 12
Lac de Gras
Pond 11
A21 Underground Decline
South Tank Farm

7150000

530000 532500 535000 537500

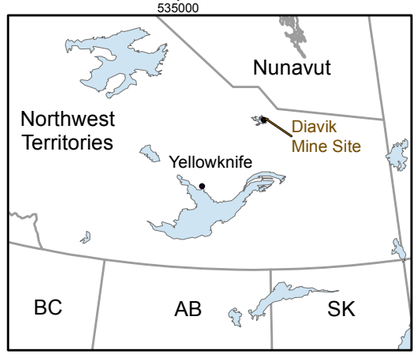
N

LEGEND

- INFRASTRUCTURE
- WATERFOWL MONITORING LOCATION

REFERENCE

2013 WORLDVIEW IMAGE OBTAINED FROM CLIENT.
PROJECTION: UTM ZONE 12 DATUM: NAD 83



1 0 1
SCALE 1:25,000 KILOMETRES

PROJECT
RioTinto
DIAVIK DIAMOND MINES INC.

TITLE
DIAVIK MINE SITE INFRASTRUCTURE, 2013

Golder Associates

PROJECT	13-1328-0001		FILE No.	
DESIGN	MG	04 Mar. 2014	SCALE AS SHOWN	REV. 0
GIS	RC	18 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 2

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2.0 LANDSCAPE CHANGES

2.1 Objectives and Scope

The intent of the landscape change program is to determine if landscape loss is within the extent predicted in the Environmental Effects Report (DDMI 1998b). East Island vegetation cover is predominantly characterized by heath tundra, and tussock/hummock landscape classes, but the Mine footprint also includes loss of shallow and deep water. The main effect of the Mine on the landscape is direct disturbance. This will be a long-term effect as the recovery of vegetation is slow in arctic environments (Burt 1997). The objective of this component of the WMP is:

To determine if direct vegetation/habitat loss due to the Mine footprint exceeds the prediction of 12.67 km^2.

In addition, Diavik conducts ongoing monitoring to determine if dust from the Mine is affecting vegetation communities and lichen chemistry near the Mine site. Permanent vegetation plots are assessed for vegetation species cover, composition and abundance; and metal concentrations are analyzed in lichen and soil samples. The results are assessed in relation to Diavik's dust fall monitoring data in the 2013 Comprehensive Vegetation and Lichen Monitoring Program (Appendix A).

2.2 Methods

A satellite image of the Mine site area was obtained and used to update the area of the current Mine footprint. This dataset is laid over the Ecological Landscape Classification (ELC) developed by Environment and Natural Resources (ENR) (Matthews et. al 2001). Each ELC type disturbed by the Mine was selected and area calculations were made to determine the area (km^2) of each habitat type replaced by the Mine footprint (Figure 3).

2.3 Results

As of December 2013, a total area of 10.12 km^2 has been altered since Mine construction in 2000. This represents a total loss of 79.9% of the predicted landscape disturbance (DDMI 1998a). ELC types at or slightly exceeding the predicted loss include riparian shrub, esker complex and bedrock complex (Table 1). The geographic extent of landscape disturbed from the Mine footprint can be seen in Figure 3. Values provided for ELC unit loss are estimates based on the predicted Mine footprint (DDMI 1998a), the actual Mine footprint and the ELC classification (Matthews et al. 2001).

2.4 Recommendations

Diavik will continue to monitor landscape disturbance as the Mine expands and will identify disturbance to ELC classes that exceed predicted values.

530000
532500
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537500

7152500

7150000

Lac de Gras

N

LEGEND

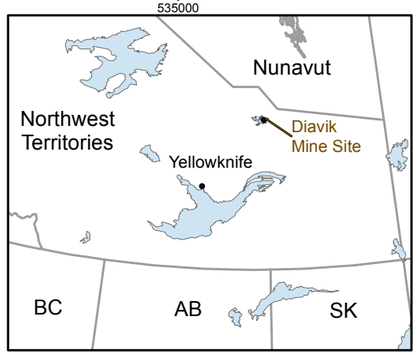
2013 MINE PERIMETER

DISTURBANCE (2002-2013)

- 2002
- 2003
- 2004
- 2005
- 2006
- 2007
- 2008
- 2009
- 2010
- 2011
- 2012
- 2013

REFERENCE

2013 WORLDVIEW IMAGE OBTAINED FROM CLIENT.
PROJECTION: UTM ZONE 12 DATUM: NAD 83



1 0 1
SCALE 1:25,000 KILOMETRES

PROJECT
RioTinto DIAVIK DIAMOND MINES INC.

TITLE
MINE FOOTPRINT EXPANSION BY YEAR, 2002-2013

Golder Associates

PROJECT	13-1328-0001		FILE No.	
DESIGN	MG	04 Mar. 2014	SCALE AS SHOWN	REV. 0
GIS	RC	18 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 3

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Table 1: Total and Predicted Ecological Landscape Classification Unit Loss, 2000 to 2013

ELC Type	Total Area (km²) Lost per Year													Predicted[c]
	up to 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Heath Tundra	1.45	1.89	2.02	2.38	2.62	2.76	2.93	2.97	3.03	3.00	3.01	3.20	3.20	3.68
Heath Bedrock (30% to 80%)	0.08	0.34	0.36	0.40	0.45	0.49	0.53	0.58	0.59	0.58	0.59	0.64	0.64	0.78
Health Boulder (30% to 80%)	0.26	0.64	0.73	0.96	1.07	1.24	1.43	1.49	1.52	1.5	1.53	1.62	1.63	1.89
Tussock/Hum mock	0.45	0.63	0.79	1.01	1.19	1.27	1.35	1.42	1.44	1.43	1.44	1.46	1.47	1.64
Sedge Wetland	0.02	0.03	0.04	0.09	0.16	0.16	0.17	0.21	0.21	0.21	0.21	0.22	0.22	0.26
Riparian Shrub	0.01	0.02	0.02	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Birch Seep & Shrub	0.03	0.05	0.06	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.11
Boulder Complex	0.01	0.02	0.02	0.03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05
Bedrock Complex	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.07	0.07	0.07
Esker	0.13	0.14	0.14	0.15	0.16	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.16
Disturbed[b]	0	0.05	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Shallow Water	0.11	0.23	0.23	0.26	0.29	0.34	0.35	0.35	0.35	0.34	0.34	0.36	0.36	0.48
Deep Water	0.15	1.80	1.81	1.82	1.93	2.17	2.19	2.19	2.19	2.12	2.12	2.13	2.13	3.46
Total[a]	**3.12**	**5.88**	**6.32**	**7.30**	**8.15**	**8.86**	**9.40**	**9.66**	**9.78**	**9.65**	**9.71**	**10.1**	**10.12**	**12.67**

km^2 = square kilometres; % = percent

[a] Any discrepancies in totals across the rows results from the rounding of numbers in annual columns for presentation purposes

[b] Disturbed includes areas that were already disturbed by exploration activities when the ELC was made.

[c] From DDMI 1998a.

3.0 BARREN-GROUND CARIBOU

Diavik is within the summer and fall/rut range of the Bathurst caribou herd (Gunn et. al. 2002). Caribou of this herd frequently forage and move through the Lac de Gras area during the summer and fall periods, sometimes following shorelines and onto the West and East Islands.

Bathurst caribou are not listed as species at risk under the federal Species at Risk Act or under Committee on the Status of Endangered Wildlife in Canada and are scheduled for assessment by the Northwest Territories Species at Risk Committee in December 2014. The current general status rank for barren-ground caribou is sensitive (NWT SAR 2014).

In 1996, the mean population size (± 95% confidence interval) of the Bathurst caribou herd was estimated at 349,000 ± 95,000 (Case et al. 1996; Gunn et al. 1997). The GNWT completed a survey in March 2012 and ENR estimated the number of caribou at 35,000 (ENR 2014). To support the recovery of all barren-ground caribou herds, the 2011 to 2015 NWT barren-ground caribou management strategy was developed (GNWT 2011). The overall goal of the strategy is to maintain numbers of caribou within their natural range of variation. The GNWT has outlined five objectives to obtain this goal:

- to engage co-management partners in monitoring and management of caribou;
- to ensure appropriate, up-to-date information is available for management decisions;
- to manage impacts of key factors affecting caribou that are within our control;
- to inform the public about the status of caribou and their role in management; and
- to maximize benefits from caribou for NWT residents.

The strategy outlined the need to monitor the effects of predators on caribou as predation was considered a factor that could be managed. Wolves are the most important year-round predator of barren-ground caribou and understanding wolf numbers could help understand fluctuations in caribou populations and thus provide information required to support management decisions. In 2013, Diavik provided in-kind support for a study on wolf-caribou dynamics on the summer range of the Bathurst caribou herd (Appendix B).

3.1 Caribou Habitat Loss

Physical alteration of the landscape reduces available caribou forage (DDMI 1998b). Habitat loss on East Island is expressed in habitat units (HUs) for caribou summer habitat. A habitat unit is the product of surface area and suitability of the habitat in that area to supply food for caribou and cover for predators (DDMI 1998b). Habitats were rated on a scale of 0 to 1 for their capability to support use for caribou, with values >0.30 regarded as highly suitable habitat and values <0.25 rated as low suitability for caribou. The area of each habitat type on East Island was multiplied by its habitat suitability value to determine the number of foraging habitat units available to caribou.

One objective of the caribou component of the WMP is to determine if direct summer habitat loss (in HUs) is greater than predicted. The following section summarizes methods used and results obtained. The impact prediction in the Environmental Effects Report (EER) (DDMI 1998b) is:

At full development, direct summer habitat loss from the project is predicted to equal 2.965 HUs.

Dust deposition can also alter the landscape either by positively influencing vegetation vigour through deposition of nutrients and increased snowmelt rates, or by reducing plant growth by coating leaves and adversely changing soil chemistry. Either scenario leads to a change in plant community structure; these changes may either attract or deter caribou. Dust from Diavik's mining activities is monitored and information on the 2013 program can be found in the Dust Deposition Monitoring Program 2013 Annual Report (DDMI 2014).

3.1.1 Methods

Using the ELC unit loss (Table 1) the area (km^2) of ELC lost was multiplied by its habitat suitability value (DDMI 1998b) to determine habitat units lost (HUs).

3.1.2 Results

Direct summer habitat loss to date from the Mine is approximately 2.6 HU (Table 2). As noted above (Table 1), ELC unit loss is at or below the level predicted in the EER. Similarly, total direct losses of summer habitat units for caribou are currently below that predicted in the EER.

Table 2: Caribou Summer Habitat Unit Loss to 2013

ELC Type	Habitat Suitability Value	ELC Loss to 2013 (km^2)	Habitat Unit Loss to 2013
Heath Tundra	0.37	3.2	1.184
Heath Boulder	0.4	1.63	0.652
Riparian Shrub	0.46	0.03	0.014
Bedrock Complex	0.27	0.07	0.019
Tussock/Hummock	0.3	1.47	0.441
Sedge Wetland	0.28	0.22	0.062
Esker	0.3	0.17	0.051
Birch Seep & Shrub	0.11	0.1	0.011
Boulder Complex	0.21	0.04	0.008
Heath Bedrock	0.23	0.64	0.147
Total	**-**	**7.57**	**2.589**

Any discrepancies in totals result from the rounding of numbers for presentation purposes.

3.2 Changes to Movement

Mining activities have the potential to decrease the use of habitat adjacent to human developments for caribou due to behavioural disturbance (DDMI 1998b; Boulanger et al. 2012). Miller and Gunn (1979) described disturbance in relation to wildlife as "the phenomenon, which resulted from the introduction of unfamiliar stimuli into an animal's environment brought about by the presence of human activities".

The current objective for this component of the WMP is to determine if the area around the Mine where caribou distribution is altered (the Zone of Influence or ZOI) due to mining activities is greater or less than predicted. The following section summarizes the methods used and results obtained from aerial surveys. The revised impact predictions presented by Handley (2010) are:

To determine whether the zone of influence changes in relation to Mine activity.

To determine if caribou behaviour changes with distance from the mines.

From 2002 through 2009, Diavik completed weekly aerial surveys, weather permitting, within a study area that surrounds the Mine site. In 2009, the survey area was aligned with that of Ekati Diamond Mine to improve sampling efficiencies while covering a larger area. In 2012, aerial surveys were conducted in collaboration with the Ekati Diamond Mine.

A recent analysis of the aerial survey data, estimated a 14 km zone of influence around the Ekati-Diavik Mine complex (Boulanger et al. 2012). Re-analysis of the same data using similar techniques is unlikely to change results or conclusions. Therefore, analysis of aerial survey data was not completed as part of the three-year comprehensive analysis of data collected by the WMP (Appendix C). Instead, an analysis of caribou movement was completed for the Lac de Gras area that investigated the response of caribou to mines and natural environmental factors such as wind direction, topography, habitat, lakes, and insect harassment using high frequency GPS locations of Bathurst caribou during 2009 to 2013.

Caribou aerial surveys were not completed in 2013. Diavik and Ekati requested to omit the zone of influence requirements for the caribou monitoring program in 2013; the request was approved by ENR on 2 May 2013.

3.3 Changes to Behaviour

Information collected on the activity of caribou is used to determine whether a change in behaviour occurs in relation to distance from mining activities. Ground-based behavioural observations, or scan sampling, is conducted to provide data on changes in caribou behaviour as they move closer to or further from the Mine. Monitoring is conducted cooperatively with the Ekati Mine as Ekati regularly has caribou close to Mine infrastructure. The location of the Diavik Mine on East Island is better suited to collecting observations further from the mines.

3.3.1 Methods

Caribou groups were scanned every 8 minutes for a minimum of 4 observations and a maximum of 8 observations. For each scan, the number of animals exhibiting each type of behaviour was recorded. Individual caribou activities were recorded as feeding, bedded, standing, alert, walking, trotting, or running. Individuals were classified as feeding when they were actually foraging or searching for food (i.e., walking with head down). The GPS location was recorded, and observations were conducted during the summer and autumn; the bulk of observations were conducted in the fall when more caribou were passing through the area. Group composition was classified, and the number of animals in the group was recorded. Thus, the response variable is caribou behaviour, while the covariates include distance from Mine, season, and group composition. In order to control for the effects of habitat, all observations were performed within one habitat type (tundra with <30% bedrock or boulders). For the scan observations, weather conditions such as wind speed and direction, temperature, and type of precipitation were documented.

Response of caribou to stressors was also assessed. In the event that a stressor was introduced during scan sampling, the observers noted the time and recorded the response of caribou to stressors as “no reaction” or “exhibiting a reaction”. The reaction of the majority of the group was used in selecting the category. Estimated distance (m) from the stressor was also recorded. Stressors included type of wildlife, type of aircraft, type of vehicle, and blasts from pits. The observers then waited until the animals resumed their previous behaviour (usually 1 to 2 minutes), and would begin scanning observations again.

3.3.2 Results

A total of 90 caribou groups were scanned during 2013 (Appendix D). The observations were categorized into distance categories listed in Table 3. Further analysis will be undertaken when sufficient data are collected for caribou within 5 km of mining activities.

Table 3: Number of Caribou Groups Observed by Distance from Mine Infrastructure, 2013

Distance from Mine Infrastructure	Number of Caribou Groups Observed
≤2 km	1
2 to 8 km	0
8 to 15 km	0
15 to 20 km	4
20 to 30 km	0
>30 km	85

Note: ≤ = less than or equal to, km = kilometers, > = greater than.

Behaviour scan sampling of caribou groups indicated that the average (± 1 SE) percent time spent bedded was 15.1% (3.2), feeding was 49.2% (4.0) and alert or moving was 32.0% (4.8) for 38 groups with calves present. For 52 caribou groups without calves, average percent time bedded was 14.7% (3.0), feeding was 49.5% (3.8) and alert or moving was 28.6% (3.8). Activity scans reported for Bathurst caribou on their post-calving and summer range indicated that the mean percent time caribou groups spent bedded was 12.8% (1.5), feeding was 44.2% (1.6), standing was 3.2% (0.5), and walking was 27.2% (2.3) during 2007 to 2009 (Witter et al. 2012). The estimates behavioural activity of caribou groups observed by Diavik staff are consistent with those described by Witter et al. (2012).

3.4 Changes to Distribution

Deflection of caribou movements due to mining activities was predicted (DDMI 1998b). Information collected from aerial surveys and caribou collar locations is used to examine the distribution of caribou within the wildlife study area. These observations are then compared with predicted trends in movement. The impact prediction in the EER (DDMI 1998b) is:

> *During the northern (spring) migration, caribou would be deflected west of East Island and during the southern migration (fall), caribou would move around the east side of Lac de Gras.*

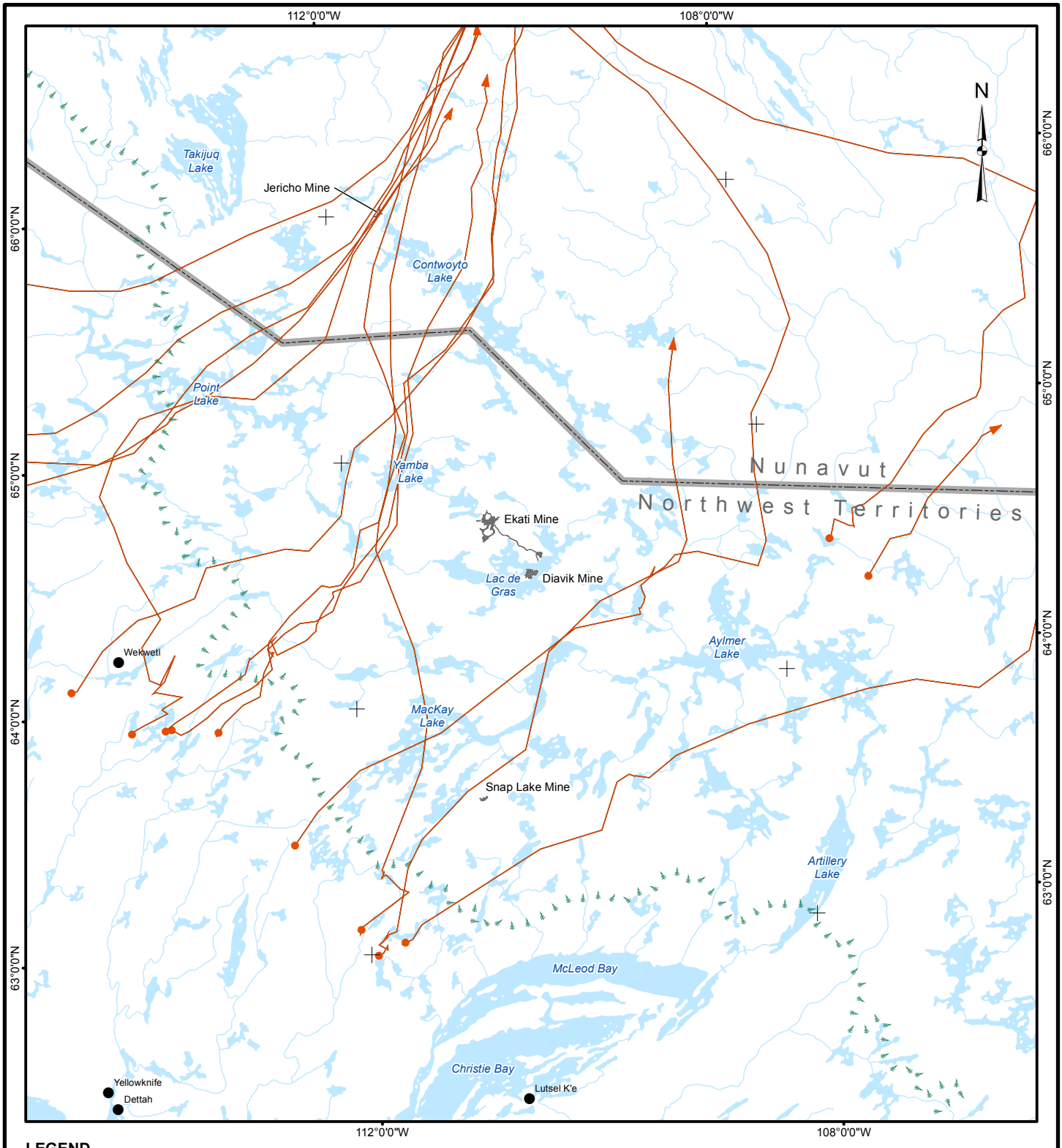
3.4.1 Methods

ENR provided daily data on the geographic location of collared cows and this information was used to illustrate general locations of the Bathurst caribou herd during migration periods. Movements of collared Bathurst caribou during the 2013 northern and southern migrations are included in this report.

3.4.2 Results

The northern migration is defined by the period when Bathurst caribou cows leave the winter range in the forest, and migrate north to the calving grounds, typically in May (Gunn et al. 2002). During the northern migration, data from satellite-collared caribou show that the majority of collared females in the Bathurst herd travelled west of Lac de Gras during the 2013 northern migration (Figure 4). The nearest collar to pass the Mine was approximately 10 km distant from Lac de Gras, so there is insufficient data to test the deflection prediction.

The southern migration starts with the return from the calving ground in July, to the fall rut ending 31 October of any given year (Gunn et al. 2002). In 2013, collared caribou distribution during the fall rut was further north than usualand all collars were still north of Diavik through 31 March. (Figure 5). The 2011 comprehensive analysis (Golder 2011) showed that from 2002 to 2010, the majority of collared caribou traveled adjacent to or through the southeast corner of the study area.



LEGEND

- POPULATED PLACE
- NORTHERN MIGRATION (MAY 1 - MAY 31)
- TERRITORIAL BOUNDARY
- TREELINE
- WATERCOURSE
- MINE FOOTPRINT
- WATERBODY

100 0 100

SCALE 1:2,500,000 KILOMETRES

REFERENCE

CARIBOU DATA SUPPLIED BY ENVIRONMENT AND NATURAL RESOURCES, GNWT, 2013.
BASE DATA: 1:2 MILLION SCALE FROM THE ATLAS OF CANADA.
DATUM: NAD83 PROJECTION: NWT LAMBERT CONFORMAL CONIC

PROJECT

RioTinto

DIAVIK DIAMOND MINES INC.

TITLE

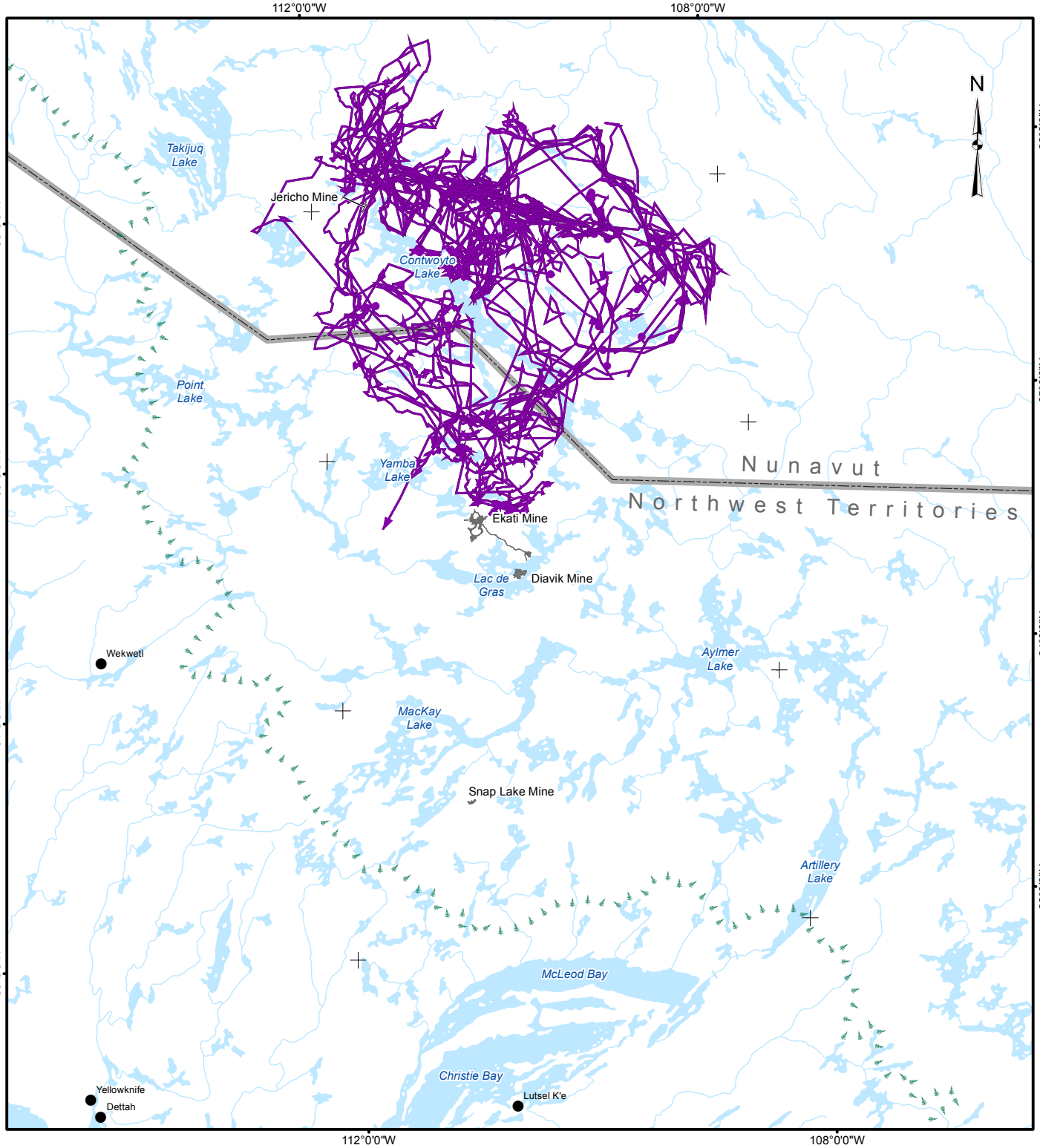
NORTHERN MIGRATION OF BATHURST CARIBOU HERD, 2013

Golder Associates

PROJECT		13-1328-0001	FILE No.	
DESIGN	KM	28 Jan. 2013	SCALE AS SHOWN	REV. 0
GIS	GI	18 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 4

I:\2011\11-1328\11-1328-0038\Mapping\MXD\Wildlife\Fig4_BathurstCaribou2013_NorthernMig_20140320.mxd



LEGEND

- POPULATED PLACE
- SOUTHERN MIGRATION (JULY 1 - OCTOBER 31)
- TERRITORIAL BOUNDARY
- TREELINE
- WATERCOURSE
- MINE FOOTPRINT
- WATERBODY

100 0 100

SCALE 1:2,500,000 KILOMETRES

REFERENCE

CARIBOU DATA SUPPLIED BY ENVIRONMENT AND NATURAL RESOURCES, GNWT, 2013.
BASE DATA: 1:2 MILLION SCALE FROM THE ATLAS OF CANADA.
DATUM: NAD83 PROJECTION: NWT LAMBERT CONFORMAL CONIC

PROJECT

RioTinto

DIAVIK DIAMOND MINES INC.

TITLE

SOUTHERN MIGRATION OF BATHURST CARIBOU HERD, 2013

Golder Associates

PROJECT		13-1328-0001	FILE No.	
DESIGN	KM	28 Jan. 2013	SCALE AS SHOWN	REV. 0
GIS	GI	19 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 5

I:\2013\11-1328\11-1328-0038\Mapping\MXD\Wildlife\Fig5_BathurstCaribou2013_SouthernMig_20140320.mxd

3.5 Mortality

Mineral development in the Bathurst caribou herd range caused concerns about increased mortality, which include vehicle collisions, aircraft collisions, and accidents associated with caribou in hazardous areas around mining activities (DDMI 1998b). Mitigation practices and policies have been implemented to reduce the potential for mortalities such as, wildlife have the right-of-way on all roads, communicating the presence of caribou via radio, and the caribou traffic advisory. The objective for this program is to determine if the number of caribou deaths or injuries associated with Diavik activities is greater than predicted. The following section summarizes methods applied and the results produced from incident reporting and road observations. The impact prediction in the EER (DDMI 1998b) is:

Mine-related mortality is expected to be low.

3.5.1 Methods

Mine-related caribou mortalities that occur are reported to Environment personnel through the submission of incident reports. The Environment department follows up on any incident and completes the necessary documentation. ENR is consulted for mitigation or disposal procedures. The information is tabulated and provided for annual comparisons.

3.5.2 Results

There were no Mine-related caribou mortalities or injuries in 2013. One natural caribou mortality was recorded at the Mine in 2013 (Appendix E).

On 26 April, a caribou carcass was found frozen and scavenged along the Air Strip Road adjacent to the N17 Laydown. A single set of wolf tracks were present in the area and it was determined that the mortality was likely caused by predation. Environment personnel collected the carcass and an investigation was completed along with an incident report. The carcass was removed from East Island to avoid attracting predators and scavengers.

A summary of natural and Mine-related caribou mortalities from baseline through 2013 is provided in Table 4. The only Mine-related caribou mortality reported at Diavik to date occurred in 2004.

Table 4: Caribou Mortalities on East Island, 2000 to 2013

	Baseline[(a)]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Natural Caribou Mortalities on East Island	8	7	1	1	0	2	0	0	1	0	0	0	1	1	1
Mine-related Mortalities	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0

[(a)] Includes data from 1995 to 1997.

3.6 Caribou Advisory

The objective of the Caribou Advisory Monitoring program is to make certain that workers are aware of the approximate numbers of caribou on or near East Island. This raises general awareness so that employees are alert to the likelihood that mitigation could be triggered. The number of animals on the island and in specific areas dictates which mitigation practices will be undertaken (e.g., haul road closure, speed reduction).

3.6.1 Methods

Various methods were used to determine whether or not animals were present in the vicinity of East Island, which included reports from pilots and workers, Environment department road surveys on East Island and using the satellite collar locations provided by ENR. If animals were reported in the general area, ground surveys were initiated. Ground-based surveys are completed by Environment personnel travelling in vehicles along the haul roads twice per day during a caribou advisory and documenting approximate caribou numbers.

Road observations were conducted twice a week from the beginning of August to the end of October to determine if caribou were using areas adjacent to haul roads. These roads are chosen to represent the greatest degree of dust deposition. Information collected includes the number of caribou encountered at various distances (on road, <50 m of road, 50 to 200 m of road and greater than 200 m from the road), dominant behaviour of group, group size and group composition. East Island was divided into four haul road sections (Figure 6) for a total of 9.8 kilometres of roads surveyed.

At the same time that road surveys are conducted, the Processed Kimberlite Containment (PKC) area and rock piles are also monitored. The purpose is to determine if caribou use the PKC and rock piles for insect relief or as a water supply. In addition to worker observations, this program would also help in detecting caribou if they were to become trapped in the PKC.

3.6.2 Results

During 2013, caribou numbers on the island did not exceed 100 at any given time; therefore the caribou traffic advisory remained at “No Concern” for the entire year. There were six incidental observations of caribou, totalling 71 individuals between April and November (Table 5)

Table 5: Caribou Incidental Observations on East Island, 2013

Date	Number	Location	Comments
28 April 2013	38	NW of Airport	Approx. 5 yearlings
09 May 2013	8	North of Runway	
17 May 2013	6	Near Emulsion Plant	
18 May 2013	7	Near AN Road	One calf
19 May 2013	9	SE of Airport	
17 October 2013	3	Airport	3 bulls

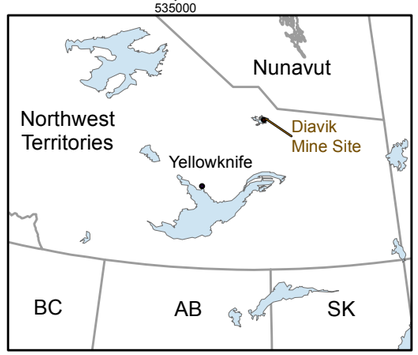
Caribou road surveys and PKC and rock pile monitoring occurred between 5 August and 30 October. Results are attached to this report as Appendix F. No caribou were observed during the PKC and rock pile surveys or during the road surveys in 2013.

LEGEND

- INFRASTRUCTURE
- CARIBOU ROAD SCAN

REFERENCE

2013 WORLDVIEW IMAGE OBTAINED FROM CLIENT.
PROJECTION: UTM ZONE 12 DATUM: NAD 83



1 0 1
SCALE 1:25,000 KILOMETRES

PROJECT
RioTinto DIAVIK DIAMOND MINES INC.

TITLE
CARIBOU ROAD OBSERVATION LOCATIONS, 2013

Golder Associates

PROJECT	13-1328-0001		FILE No.	
DESIGN	MG	04 Mar. 2014	SCALE AS SHOWN	REV. 0
GIS	RC	18 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 6

I:\2011\11-1328\11-1328-0038\Mapping\MXD\Wildlife\Fig6_Caribou_Road_Observations_20140320.mxd

3.7 Caribou Herding

When caribou are present on East Island their movements are monitored so that Mine site personnel are aware of their presence and relative location. Of particular importance from a safety perspective (both human and animal) is caribou presence near hazardous areas (such as the airstrip and blast areas). When caribou are sighted adjacent to potentially hazardous areas, Diavik implements its standard operating procedure (SOP) for caribou herding.

3.7.1 Methods

The method used to move caribou away from hazardous areas consists of the slow advancement of Environment Department personnel behind the caribou, encouraging the movement of the animals in a safe direction.

3.7.2 Results

Herding was not required in 2013.

3.8 Recommendations

3.8.1 Changes to Caribou Distribution

Currently surveys for caribou on or near haul roads, rock piles and PKC are completed at least weekly from August through October. These surveys are ineffective at detecting caribou on the Mine site that are not already detected and reported to the Environment Department by mine site employees, environment staff completing other monitoring programs, and pilots. It is recommended that caribou surveys of the Mine site commence when:

- Caribou are spotted on East Island;
- Caribou are within 5 km of East Island based on collar data and/or pilot observations.

Aerial surveys do not provide feedback on the operation and adaptive management of the Mine site. It is recommended that aerial survey be further postponed in favour of other studies that will either examine mechanisms that may cause caribou to avoid the Mine, and/or support the GNWT Barren-ground Caribou Management Strategy (GNWT 2011).ENR plans to convene a working group to discuss conditions under which aerial surveys should be reinstated.

3.8.2 Changes to Caribou Behaviour

Diavik will focus monitoring of caribou activity budgets that describe changes to behaviour at distances between 2 and 30km o the site.. Diavik would also consider implementing and monitoring insect trap stations in the study area, with assistance from ENR. This information could be linked with behavioural observations to better understand the influence of human and natural factors on changes in caribou energy balance.

4.0 GRIZZLY BEAR

4.1 Objectives and Scope

The barren-ground grizzly bear (*Ursus arctos*) ranges throughout most of the Northwest Territories. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) considers the grizzly bear as *Special Concern* in 2012; however, they currently have no status under NWT or Federal species at risk legislation (NWT SAR 2014). Grizzly bear are scheduled for assessment by the NWT Species at Risk Committee in December 2016 (NWT SAR 2014).

Grizzly bears have low population densities, low reproductive rates and are sensitive to human activity (DDMI, 1998b). While some grizzly bears may avoid mineral developments (Johnson et al. 2005), others may be attracted to human activity through odours associated with development. The barren-ground grizzly bears of the NWT are unique, as they have not been subjected to exploitation and habitat changes and remain relatively undisturbed from human activity (McLoughlin et al. 1999).

Impacts to grizzly bears from mining may occur through direct mortality, habitat suitability reduction and direct habitat loss. The focus of the monitoring program is to estimate direct habitat loss, monitor grizzly bear presence and distribution, and report Mine-related mortalities.

4.2 Habitat Loss

Grizzly bears use a wide variety of vegetation and habitats types. Studies of grizzly bears in the Northwest Territories have led to understanding their seasonal habitat preferences (McLoughlin et al. 2002). Loss of habitat may result in negative effects on grizzly bears. The objective of the Grizzly Bear Habitat Loss Monitoring component of the WMP is to determine if direct habitat loss for grizzly bear from the Mine footprint is within the amount predicted in the Environmental Effects Report (EER) (DDMI 1998b). Habitat loss is calculated to determine if actual habitat loss is different from the predicted loss (DDMI 1998b):

> *At full development, direct terrestrial habitat loss for grizzly bear from the project is predicted to be 8.67 km^2.*

4.2.1 Methods

Methods used to determine grizzly bear habitat loss are similar to that described in Section 2.2. Grizzly bear habitat is assumed to include all terrestrial habitats (i.e., all landscape types in Table 1 except for deep water, shallow water and disturbed).

4.2.2 Results

Cumulative direct grizzly bear habitat loss resulting from the Mine in 2013 was 7.57 km^2, which is below that predicted in the EER.

4.3 Presence and Distribution

Mining activities can impact the presence of grizzly bears due to disturbance and habitat loss (DDMI 1998b). Vegetation loss and changes to caribou distribution from mining activities may also impact the presence and distribution of grizzly bears (Gau and Case 1999; Johnson et al. 2005).

Monitoring is completed to determine if mining activities influence the presence of grizzly bears in the study area. The predicted effect is:

> *Mine development is not predicted to influence the presence of grizzly bears in the area.*

The revised impact prediction proposed by Handley (2010) is:

> *To determine if Mine related activities influence the relative abundance and distribution of grizzly bears in the study area over time.*

The presence of bear sign within and adjacent to seasonal high quality habitats was used as an index of habitat use by grizzly bears within the Diavik study area (Golder 2008). However, surveys for grizzly bear sign were

discontinued in 2009 due to limited success in detecting grizzly bear presence, and distribution from searching for bear sign (e.g., tracks, digs, and scat). As a result, the Mine and developments in the NWT adopted an alternative study design capable of providing information on grizzly bear relative abundance and distribution (Marshall 2009; Handley 2010). In 2010, a pilot study using a hair-snagging technique was initiated to assess its effectiveness in determining grizzly bear abundance in the Diavik wildlife study area. In April 2012, a request was made on behalf of Diavik, BHP Billiton Canada and De Beers Canada to undertake a joint grizzly bear hair-snagging program that encompassed Ekati, Diavik, Snap Lake and Gahcho Kué (Rescan 2012a). Following discussions and clarification of methods (Rescan 2012b), the program was initiated in June 2012.

4.3.1 Methods

Ekati, De Beers, and Diavik jointly completed the regional grizzly bear hair snagging to determine if Mine-related activities influence the relative abundance and distribution of grizzly bears over time. The study area consisted of 113 stations, arranged in a grid pattern spaced at approximately 12 km by 12 km. A wooden tripod with a fixed base and the legs wrapped in barbed wire was used to collect grizzly bear hair for DNA analysis. Site location for the wooden tripod was placed in high quality grizzly bear habitat (esker, riparian area, upland meadow, wetland meadow) to increase the likelihood of capturing grizzly bear hair. Non-reward lures (cured cows blood, fish oil, seal oil and sweeter scented oils) were used to attract the bears to the tripods. The lures were poured on the top of the posts and down the legs, and in the centre of the ground to encourage a bear to squeeze between the legs. The posts were not relocated between each sampling period; therefore, a novel scent combination was used each session to prevent habituation.

At the end of each session, all grizzly bear hair was removed from the tripod and placed in a paper envelope. Each grouping of hair was stored separately, and supporting information such as the tripod identification, date, and location on tripod were recorded. The hair samples were sent to Wildlife Genetics International for DNA fingerprinting.

Incidental observations of grizzly bears are also recorded. Incidental observations are typically made by site staff, who report them to Environment Department staff. Typically, each independent grizzly bear observations is recorded, irrespective of whether they are of the same bear.

4.3.2 Results

4.3.2.1 Grizzly Bear Hair Snagging Program

There were six sampling sessions between 17 June and 21 August, 2013 and stations were surveyed every 10 to 14 days (Appendix G). Session dates overlap because as some stations are deployed others could be rechecked at the same time.

During each session 113 hair snagging stations were deployed (Table 6). Non-reward lures used at each station remained consistent among all stations during a session with the exception of Session 4 when two lures were used (fish oil and seal oil). During each session 46% to 57% of posts captured grizzly bear hair. A total of 4,705 hair samples were collected and submitted to Wildlife Genetics International for DNA fingerprinting.

Table 6: Diavik/Ekati Grizzly Bear Program Hair Collection Summary, 2013

Session	Date (2013)	Bait	Number of Posts with a Capture	Percent of Posts with a Capture	Number of Hair Samples
1	June 17 to July 2	Blood	64	57%	609
2	June 27 to July 13	Seal Oil	53	47%	815
3	July 7 to July 21	Blood	60	53%	703
4	July 17 to July 31	Fish Oil and Seal Oil	60	53%	788
5	July 27 to August 11	Blood	64	57%	1,006
6	August 6 to August 21	Sweet Oil	52	46%	784

4.3.2.2 Incidental Observations

Incidental observations of grizzly bear on East Island from 17 May to 30 August included 67 sightings over 47 days, one of which included an observation of two cubs (Table 7) (Appendix H). During this time, there were an average of 537 people at the Mine. The number of incidental observations of grizzly bears does not appear to be influenced by the number of people on site (Table 7).

Table 7: Average Camp Population and Number of Incidental Grizzly Bear Observations, 2002-2013

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Average Camp Population	1100	470	397	646	716	747	979	562	579	630	629	537
Grizzly Bear Observations on East Island	5	19	24	43	21	41	5	22	44	56	97	67

4.4 Mortality

Although there is some interaction between the Diavik Diamond Mine and grizzly bears, every effort is made to immediately report any animals that come into contact with the Mine site. Bear awareness instruction is provided to raise employee awareness, and contributed to the timely reporting of bears approaching site, which limits unwanted interactions. Despite mitigation, Mine activities may lead to grizzly bear mortalities, injuries or relocations from year to year. The specific impact prediction in the EER (DDMI 1998b) is:

Mortalities associated with mining activities are predicted to be 0.12 to 0.24 bears per year.

4.4.1 Methods

Mine-related incidents and mortalities are reported to Environment staff for documentation in a detailed incident investigation and report. Environment staff follows up on any incident and complete the necessary documentation. ENR is consulted for mitigation or disposal procedures.

4.4.2 Results

There were no grizzly bear mortalities in 2013, one relocation effort and 52 deterrent events (Table 8). Note that on two of the observations the wildlife report was lost; however, the observation dates were cross-referenced with the deterrent database and deterrents were used on those two occasions.

Table 8: Grizzly Bear Deterrent Actions, Incidents and Mortalities, 2000 to 2013

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days with Bear Visitations on East Island	15	14	5	15	24	34	20	34	5	22	44	41	77	47[(a)]
Days Deterrent Actions were Utilized	10	8	2	6	20	23	8	20	3	18	40	31	65	52
Relocations	0	1	0	1	0	0	0	0	0	0	0	0	1	1
Mortalities	0	0	0	0	1	0	0	0	0	0	0	0	0	0

(a) On 47 separate days, 67 grizzly bear observations were recorded.

The relocation effort took place in the East Shallow Bay Area, led by ENR Biologist Dean Cluff on 30 August 2013 (Appendix I). The grizzly bear had been observed on the island for several weeks and was not responding to deterrents. The grizzly bear was shot with a tranquilizer where the South Haul Road crosses between Pond 1 and Seep 2008. The ENR Biologist determined that the grizzly bear was a 2.5 year old female; a tag was placed on the bear's right ear (#G759). The grizzly bear was moved to a location 90 km southeast of Diavik. There were no further incidental observations of bears on East Island after this relocation.

Deterrents used to assist with moving bears away from infrastructure include trucks, bear bangers, rubber bullets, cracker shells, banging rocks, gun cocking, flares, bean bags, screamers, whistlers, air horns, and helicopter. The helicopter is used to deter bears that are frequenting the island for extended periods of time or is used when other deterrent actions are not effective. In 2013, there were 19 occasions when a helicopter was required for deterrent action.

Construction began at the Diavik Mine in the year 2000. The calculated Mine mortality rate over the past ten years is 0.07, which is below the range predicted during the environmental assessment.

4.5 Recommendations

Diavik participated in regional grizzly bear monitoring in collaboration with Dominion Diamond Ekati Corporation and De Beers Canada Inc. in 2013. After De Beers completes additional surveys in the southern study area in 2014, the long-term frequency of this program will be determined. Diavik will continue to support and be involved in this program.

5.0 WOLVERINE

5.1 Objectives and Scope

Wolverine (*Gulo gulo)* are annual residents in the Lac de Gras region (DDMI 1998b). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) considered the western population of wolverines as Special Concern in 2003; however, they currently have no status under NWT or Federal species at risk legislation. Wolverine are scheduled for assessment by the NWT Species at Risk Committee in December 2015 (NWT SAR 2014).

Wolverine home ranges have been estimated at 126 km^2 for adult females and 404 km^2 for adult males (Mulders 2000). The feeding behaviour of wolverine may result in their attraction to camps and habituation if they receive a food reward. This potential has been demonstrated during baseline, construction, and operations in the Lac de Gras area, when wolverine have on occasion become attracted and habituated to developments.

5.2 Presence and Distribution

The objective of this component of the WMP is to determine if mining activities are influencing the presence of wolverines in the study area, and the revised impact prediction determined in Handley (2010) is:

To provide estimates of wolverine abundance and distribution in the study area over time.

To meet this objective, Diavik is currently participating in a joint research program coordinated among Dominion Diamond Ekati Corporation, the GNWT, and Diavik. This program involves hair sampling for DNA fingerprinting to estimate abundance of wolverine in the Lac de Gras region

5.2.1 Methods

Wolverine presence around the Mine was monitored in three ways: snow track surveys, hair-snagging and incidental observations at site.

5.2.1.1 Wolverine Snow Track Surveys

The snow track surveys began in 2003, and have been conducted with the assistance of a community member, when available. In 2008, Diavik revised the previous wolverine track survey to increase statistical power to detect changes in wolverine occurrence in the study area. Design changes included the placement of 40 survey transects of equal length (4 km long, total length=160 km) located in areas of preferred wolverine habitat including heath tundra or heath boulder habitat. The final locations of snow track survey transects were the result of a stratified random sampling process of potential locations in the study area, but some transects were relocated from the lake to areas of preferred wolverine habitat (based on Traditional Knowledge), including heath tundra and heath tundra boulder habitats. Each route is driven once by snowmobile in March or April and all wolverine tracks and other sign (digs and dens) are recorded.

The detection of snow tracks can be influenced by wind or snowfall. The effect of snowfall was estimated by determining the number of days from the survey date since the most recent snowfall. A wind threshold index was estimated by determining the number of days from the survey date since the mean hourly wind speed had reached 7.7 m/s. The threshold wind speed of 7.7 m/s is sufficient to move dry snow along the ground (Li and Pomeroy 1997). Track counts were adjusted for weather by using the minimum number of days prior to reaching the most recent snowfall or threshold wind speed. For each transect, a track density index (TDI) was calculated

as the number of wolverine tracks per transect length per number of days since recent snowfall or threshold wind speed.

5.2.1.2 Wolverine Hair-Snagging

The wolverine hair-snagging is a regional research program conducted in partnership with the ENR and Dominion Diamond Ekati Corporation. This program is also conducted with the assistance of community members. The survey is carried out in March and April by snowmobile. A total of 134 posts constructed of 4"x 4" lumber in 5 foot lengths are erected across the Diavik study area in a 3 km by 3 km grid. Each post is spiral-wrapped in barbed wire, intended to snag hair from wolverine, and baited with a small portion of local meat and two types of commercially prepared lures. Hair samples are submitted to Wildlife Genetics International for DNA analysis. The hair-snagging program was conducted in 2005, 2006, 2010 and 2011. Diavik is conducting the program in 2014.

5.2.2 Results

5.2.2.1 Wolverine Snow Track Surveys

During 2013, a total of 26 observations of wolverine tracks were encountered from 2 April to 6 April (Figure 7; Appendix J). This resulted in a track index of 0.17 tracks per kilometre and a mean (±2 SE) track density index (TDI) of 0.076 ±0.043 wolverine tracks per kilometre per days since last weather threshold (Table 9; Appendix C). Other wolverine sign observed during the snow track survey included observation of an Arctic hare kill site near wolverine tracks.

Table 9: Wolverine Track Index and Mean days Since Snow Fall, 2003-2013

Year	Survey Period	Number of Tracks	Distance Surveyed (km)	Mean Days Since Snowfall[a]	Mean Days Since Threshold Wind Speed[a]	Track Index (Tracks/km)	Mean Track Density Index (± 2SE)[b]
2003	April 10 – 12	13	148	2.2	2.1	0.09	0.046 ± 0.044
2004	April 16 – 24	22	148	4.0	4.6	0.15	0.061 ± 0.040
2004	December 2 - 8	10	148	3.9	2.5	0.07	0.048 ± 0.042
2005	March 30 – 31	7	148	7.5	3.9	0.05	0.026 ± 0.022
2005	December 7 – 12	18	148	2.4	3.5	0.12	0.106 ± 0.044
2006	March 30 – 1	5	148	1.0	2.5	0.03	0.029 ± 0.010
2008[c]	April 30 – May 2	15	160	17.1	4.1	0.09	0.022 ± 0.011
2009	April 2 – 4	11	156	31.0	9.0	0.07	0.007 ± 0.005
2010[d]	-	-	-	-	-	-	-
2011	March 30 – April 3	23	156	0.9	6.7	0.15	0.167 ± 0.072
2012	March 28 – April 3	22	160	2.8	4.4	0.14	0.096 ± 0.065
2013	April 2 – 6	26	156	3.1	2.9	0.17	0.076 ± 0.043

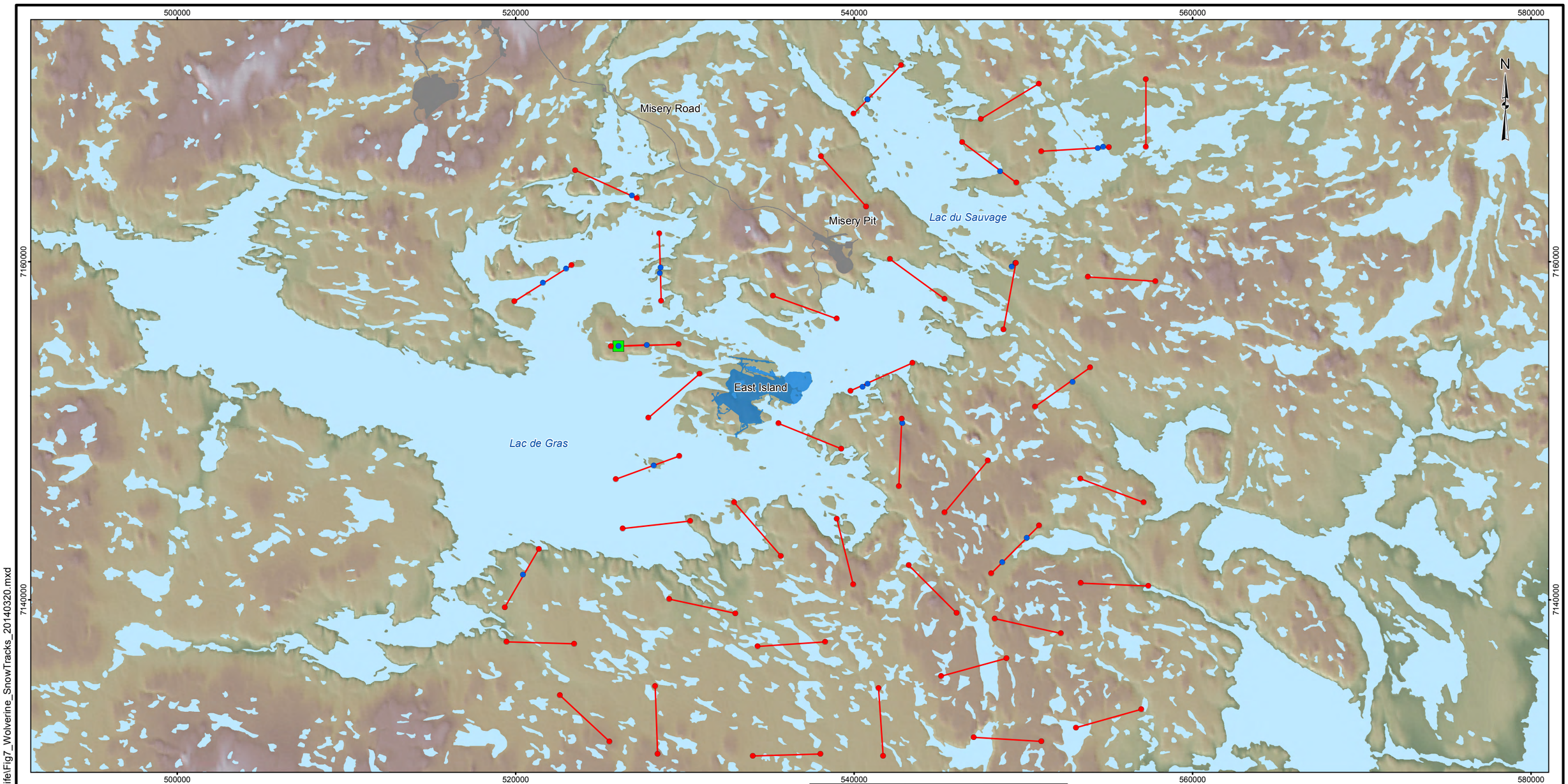
Note: km = kilometers; tracks/km = tracks per kilometre; SE = standard error.

[a] Presented as a summary of the data used to calculate track densities. Wind threshold speed = 7.7 metres per second.

[b] For each transect, a track density index (TDI) was calculated as the number of wolverine tracks per transect length per number of days since recent snowfall or threshold wind speed. TDI is reported as Mean Track Density Index ±2 standard error (Appendix C).

[c] The new survey technique was introduced in 2008.

[d] Survey was not completed in 2010 due to community assistant not being available to participate in survey.

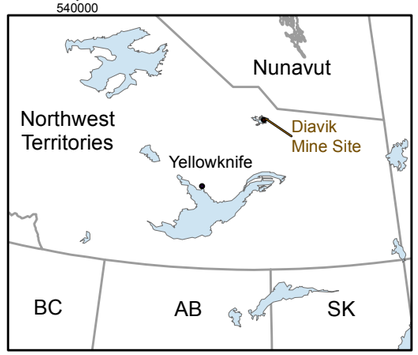


LEGEND

- ARCTIC HARE KILL SITE
- WOLVERINE TRACK
- TRANSECT
- DIAVIK FOOTPRINT
- MINE SITE
- WATERBODY

REFERENCE

DEM AND HILLSHADE OBTAINED FROM GEOGRATIS, © DEPARTMENT OFNATURAL RESOURCES CANADA. ALL RIGHTS RESERVED. HYDROLOGY OBTAINED FROM CLIENT.
DATUM: NAD83 PROJECTION: UTM ZONE 12



5 0 5
SCALE 1:225,000 KILOMETRES

PROJECT
RioTinto DIAVIK DIAMOND MINES INC.

TITLE
WOLVERINE SNOW TRACK SURVEY, 2013

Golder Associates

PROJECT	13-1328-0001		FILE No.	
DESIGN	MG	06 Mar. 2014	SCALE AS SHOWN	REV. 0
GIS	RC	19 Mar. 2014		
CHECK	DP	20 Mar. 2014		
REVIEW	JV	20 Mar. 2014		

FIGURE: 7

I:\2011\11-1328\11-1328-0038\Mapping\MXD\Wildlife\Fig7_Wolverine_SnowTracks_20140320.mxd

5.2.2.2 Wolverine Hair-Snagging

The wolverine hair snagging program was not undertaken in 2013. The next scheduled survey is in 2014.

5.3 Mortality

Mortalities can occur if wolverines become habituated to mining activities resulting from efforts to locate food or shelter (DDMI 1998b). Diligent waste management, strictly enforced speed limits, and immediate reporting of wildlife sightings on East Island have limited the mortality of wolverine during the operational period of the Mine. The prediction made during the environmental assessment was:

> *Mining related mortalities, if they occur, are not expected to alter wolverine population parameters in the Lac de Gras area.*

To date, efforts have been focused on limiting Mine related mortalities to prevent any changes to wolverine population parameters.

5.3.1 Methods

Mine-related incidents that may occur are reported to Environment personnel through incident reports submitted by Mine staff. The Environment department follows up on any incident and completes the necessary documentation. ENR is consulted for mitigation or disposal procedures. This information is tabulated and provided for annual comparisons.

5.3.2 Results

Since 2000, two wolverines have been relocated and four mortalities have occurred at the Mine site. There were no mortalities on site during 2013. A total of 3 sightings of wolverine occurred on East Island (Table 10) and deterrent efforts were not required in 2013 (Table 11).

Table 10: Wolverine Incidental Observations on East Island, 2013

Date	Animals	Location	Advisory Issued	Attractant Present	Action Taken (Deterrents Used)	Comments
27 January 2013	1	A21 Access Road	no	none	none	not confirmed by Environment
2 March 2013	1	Haul Road near Backfill Plant	no	none	none	
28 December 2013	1	Near A154 Dike	no	none	none	

Table 11: Wolverine Observations, Deterrents, Relocations and Mortalities, Baseline to 2013

	Baseline[a]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Days with Wolverine Visitations on East Island	27/year Total = 82	25	36	4	38	14	43	31	19	46	21	28	4	11	3
Days Deterrent Actions were Utilized	Unknown	9	10	0	1	1	5	2	1	17	1	0	0	1	0
Relocations	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0
Mortalities	1	0	1	0	0	0	0	0	0	1	0	0	0	2[b]	0

[a] Includes wolverine occurrences recorded at three different camps (i.e. Diavik, Kennecott, and/or Echo Bay Road camps) annual numbers are not available for baseline investigations.

[b] Two wolverine mortalities occurred in 2012. The mortalities and incident reports were not included in the 2012 WMP.

5.4 Recommendations

In years when snow track surveys are completed for wolverine, Diavik will consider increasing the frequency that transects are surveyed, up to three times, between February and April. The purpose of repeating the surveys would be to improve program quality and account for the imperfect detection of wolverine snow tracks.

6.0 FALCONS

6.1 Objectives and Scope

Falcons were selected as a key species for monitoring because they are known to nest regularly in the Lac de Gras area (DDMI 1998b). The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Federal Species at Risk Act (SARA) considers the peregrine falcon (*Falco peregrinus tundrius*) as *Special Concern*; however, they currently have no status under NWT species at risk legislation (NWT SAR 2014). Peregrine falcon is scheduled for assessment by the NWT Species at Risk Committee in December 2017 (NWT SAR 2014).

Habitat loss, sensory disturbance, and impacts to prey populations may influence raptors nesting in the Lac de Gras area. Mining activities may cause raptors to avoid the Mine area and surrounding habitats; Mine-related changes in habitat quality can influence the presence and distribution of raptors. The objective of falcon monitoring in the WMP and the impact predictions (DDMI 1998a) were:

> *Disturbance from the Mine and the associated zone of influence is not predicted to result in measureable impacts to the distribution of raptors in the study area.*
>
> *The Mine is not predicted to cause a measureable change in raptor presence in the study area.*

The revised impact predictions determined in Handley (2010) are:

> *To determine nest site occupancy and productivity of historic peregrine falcon nest sites in the study area to contribute to the Canadian Peregrine Falcon Survey (CPFS) which monitors recovery of species and long term population trends.*
>
> *To determine if pit walls or other infrastructure are utilized as nesting sites for raptors. Determine nest success in areas of development and document effectiveness of deterrent efforts that may be employed for nest relocations.*
>
> *To document and determine the cause of direct Mine-related mortalities of raptors*

Other raptors present in the study area include gyrfalcons, rough-legged hawks, snowy owls, and short-eared owls. However, these species are not common, and their presence from year to year is unpredictable. Peregrine falcons are thereby used to monitor impacts to raptors.

6.2 Nest Site Occupancy

6.2.1 Methods

Mine-related incidents that occur are reported to Environment staff through incident reports submitted by Mine staff. The Environment department follows up on any incident and completes the necessary documentation. This information is tabulated and provided for annual comparisons.

Falcons have been known to nest on Mine infrastructure and within the vertical rock faces of open pits at both Diavik and Ekati. Pit Wall/Mine Infrastructure inspections at Diavik are conducted twice weekly during the nesting season. Pit walls and other Mine infrastructure are inspected for nests or falcon nesting behaviour; if nests are found the species occupying the nest is determined along with the presence of eggs and/or chicks. Deterrent actions are considered in consultation with ENR if the nest is in an area hazardous to the birds.

Pit Wall/Mine Infrastructure inspections are divided into eight locations of the Mine site: A154 Pit area (Lookout #1 and #2), A418 Pit area (Lookout #1 and #2), South Tank Farm, Process Plant, Powerhouse (1 and 2), Site Services Building, Boiler House and Backfill Plant. The survey is conducted by stopping at a clear vantage point and thoroughly scanning the area for any potential nesting locations.

6.2.2 Results

A total of 38 Pit Wall/Mine Infrastructure inspections were completed from May 13 until 23 September to determine use by raptors (Appendix K). During the inspections, nesting sites were confirmed at the A418 Lookout #1 and #2, the site services building and the boiler house (Table 12). Once a nest was confirmed to no longer be active, no further inspections were undertaken.

Table 12: Nests Observed on Mine Infrastructure and Open Pits in 2013

Area	Species	Dates	Active Nest	Observations
A418 Lookout #1	rough-legged hawk	July 5	Yes	one chick observed on July 5; no activity after July 5
A418 Lookout #2	rough-legged hawk	May 31 to August 16	Yes	two adults observed on 31 May; one fledgling observed on July 19; fledgling observed flying on 16 August
Site Services Building	peregrine falcon	June 7 to August 23	Yes	nest observed on 7 June; two fledglings observed on 22 July; three fledglings observed flying on August 12 and 23
Boiler House	common raven	June 21 to July 5	Yes	nest observed on 21 June with two chicks; four fledglings observed on 27 June and 1 July; nest was no longer occupied on 5 July

6.3 Mortality

6.3.1 Methods

Mine-related incidents that may occur are reported to Environment personnel through incident reports submitted by Mine staff. The Environment department follows up on any incident and completes the necessary documentation. ENR is consulted for mitigation or disposal procedures. This information is tabulated and provided for annual comparisons.

6.3.2 Results

One common raven mortality and two peregrine falcon mortalities occurred at the Mine site in 2013.

On 21 January, 2013, a common raven carcass was found near the South Approach of the Winter Road. Environment personnel recovered the carcass intact and there were no signs of trauma or cause of death. Low temperatures could have contributed to the raven mortality. The carcass was incinerated.

On 20 July 2013, a peregrine falcon carcass was found by the A154 dike. A detailed incident report was completed by the Environment department. The peregrine carcass appeared to have three wounds and the investigation details indicated that the peregrine may have hit a power line. The incident was reported and the carcass was sent to ENR in Yellowknife.

On 17 November 2013, a peregrine falcon carcass was found on the 9210 Bench below the ore storage area in the A154 pit. A detailed incident report was completed. When the carcass was found it had been extensively scavenged; there was little more than feathers observed. Due to the state of the carcass, Environment staff were not able to determine the cause of death.There was no nearby infrastructure that would indicate that the mortality resulted from the Mine. The size of the feathers indicated that the peregrine may have been a juvenile. ENR was contacted and the remains were disposed.

6.4 Recommendations

Diavik will continue Pit Wall/Mine Infrastructure monitoring for nesting raptors. Diavik will provide data on nest surveys of the study area to ENR. The next survey is scheduled to occur in 2015.

7.0 WATER BIRDS

7.1 Habitat Utilization

The water management system for the Mine includes several engineered lined ponds to collect site run off water. There are 12 Mine-altered water bodies, each of which has the potential to provide suitable habitat for migratory birds. Specific water bodies included in surveys are the North Inlet, PKC area and Collection Ponds 1, 2, 3 (formerly the Clarification Pond), 4, 5, 7, 10, 11, 12 and 13 (Figure 8). Former Collection Pond 14 was drained of water and ceased operation in the spring of 2008; this pond was only required during construction of the A418 dike and pit. The area previously designated as the Sedimentation Pond was removed from the monitoring program in 2006 as it was filled by the waste rock pile. Pond 6 was designed as part of the A21 project and has not been constructed.

The North Inlet provides suitable habitat for water birds (including ducks, geese, gulls, loons and shorebirds). The PKC area was constructed in 2002, and waters that could potentially be used by water birds are stored in this area for use within the diamond process plant. Use of these areas is monitored by Diavik to determine the extent to which early open water or vegetation growth may attract water birds.

The objective of this component of the WMP is to determine if:

Early open water or early vegetation growth might attract waterfowl during spring migration.

7.2 Methods

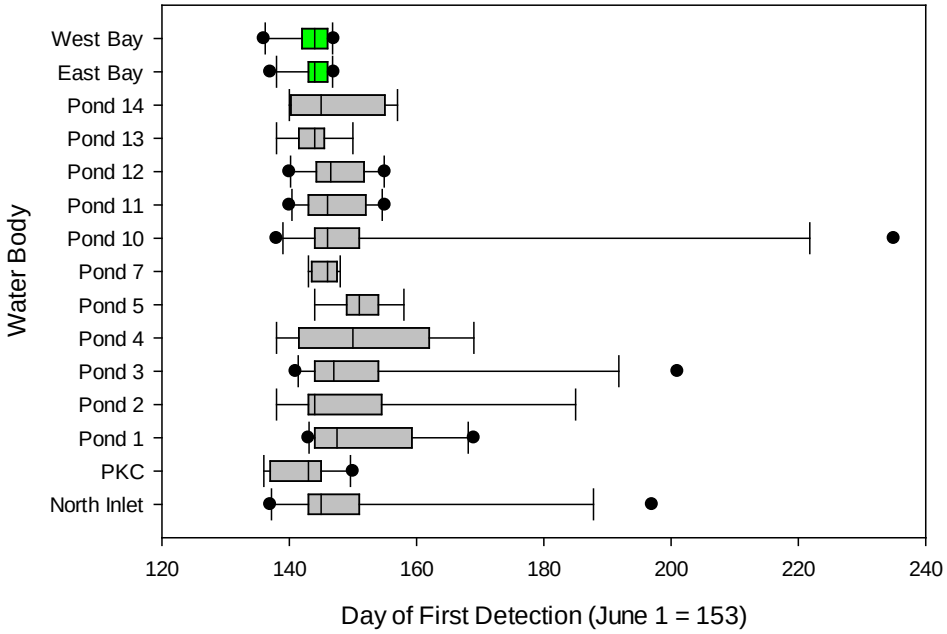
Mine-altered water bodies and East Island shallow bays have been surveyed daily for the presence of water birds from 2003 to 2013 between May 10 and 25. In accordance with the Diavik water bird survey methods, Environment staff walked the perimeters of the shallow bays and scanned Mine-altered water bodies and shoreline perimeters with binoculars to identify and record all bird observations. Species observed generally belonged to the guilds of dabbling or diving ducks, geese, gulls, loons and shorebirds. From 2009 to 2013, observers also recorded the percent open water visible at each water body.

To examine whether water birds were observed earlier at Mine-altered water bodies than East and West bays, the distribution of dates when birds were first detected during surveys were compared. The date of the first detection was transformed into a day-of-year format (the number of days since 31 December of the prior year). A two-sample and one-tail Komologrov-Smirnov (K-S) test was used to determine whether birds were observed earlier across time at Mine-altered water bodies than at East and West bays. The same test was repeated for each guild to account for differences in the within season arrival of different species. Finally, whether shorebirds occurred earlier at the North Inlet than at East and West bays was also evaluated. Annual variability of dates when open water was observed (percent open water > 1%) during 2009 to 2013 was described using box-plots for each water body.

7.3 Results

The dates of first detection of water birds during surveys of Mine-altered water bodies and East and West bays have varied between 2003 to 2013 (Figure 8). Water birds have been detected as early as May 16th (day-of-year = 135) at the both PKC water body and West Bay in 2003. The latest date of first detection for Mine-altered water bodies was 23 August (day-of-year = 235) at Pond 10 in 2003 and May 27th (day-of-year = 147) at both East and West bays in 2005.

Figure 8: Day of First Detection of Water Birds at Mine-altered Water Bodies and East and West Bays, 2003 to 2013.



Shown are Median (Line within Box), the 25th and 75th Percentiles (Box Ends), the 10th and 90th Percentiles (Whiskers) and extreme values (Black Circles).

In review, early open water at Mine-altered water bodies was predicted to result in earlier use by waterfowl than at East and West bays. Results of detection dates pooled by water body type indicated that water birds are not detected earlier at Mine-altered water bodies than at East and West bays (K-S one-tail test, D = 0.01, P = 1.0; Figure 9). Among the Mine-altered water bodies, birds are generally detected earlier at the PKC Pond (Figure 8). However, the distribution of detection dates at the PKC Pond was not earlier than the for the East and West bays (K-S one-tail test, D = 0.32, P = 0.23).

For each guild, the survey results indicated that dates of first detection at Mine-altered water bodies were not earlier than at East and West bays (Table 13). Test results also indicated that shorebirds are not occurring at the North Inlet before the East and West bays (K-S one-tail test, D = 0.04, P = 0.98). Observation of open water has varied at Mine-altered water bodies and East and West bays from 2009 to 2013 (Figure 10). In these four years, Pond 2 and the North Inlet tended to have open water present earlier than other water bodies although all water bodies have begun to open as early as 23 May (day of year = 143).

Figure 9: Relative Cumulative Frequency of Water Birds First Detection at Mine-altered Water Bodies Versus East and West Bays, 2003 to 2013.

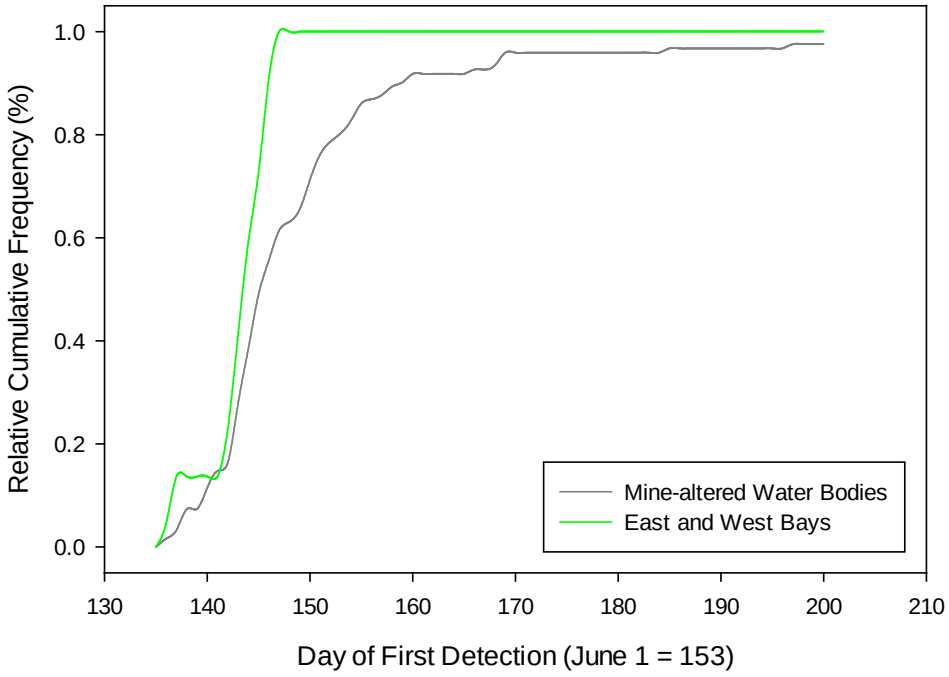
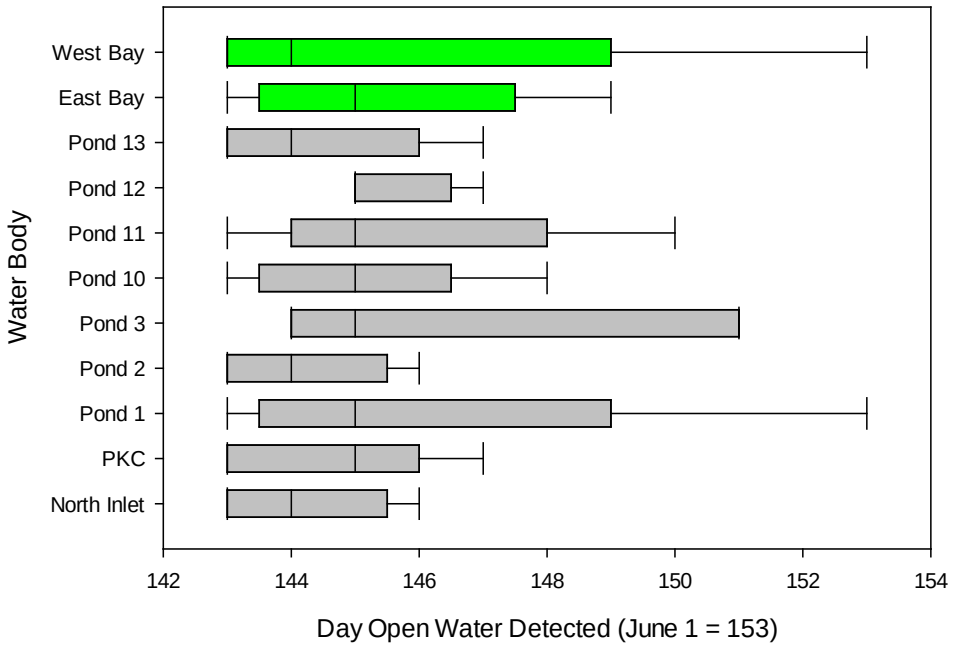


Table 13: Tests for Earlier Use of Mine-altered Water Bodies Versus East and West Bays, by Guild, 2003 to 2013.

Guild	Statistical Results (Kolmogorov-Smirnov one-tail test)	Detected Earlier at Mine-altered Water Bodies
Dabbling Ducks	D = 0.0, P = 1.00	No
Diving Ducks	D = 0.20, P = 0.25	No
Geese	D = 0.01, P = 1.00	No
Gulls	D = 0.0, P = 1.00	No
Loons	D = 0.28, P = 0.20	No
Shorebirds	D = 0.02, P = 0.98	No

Figure 10: Date of First Open Water at Mine-altered Water Bodies Versus East and West Bays, 2009 to 2013



Shown are Median (Line within Box), the 25th and 75th Percentiles (Box Ends) and the 10th and 90th Percentiles (Whiskers)

The results of surveys indicate that Mine-altered water bodies are used by water birds, including ducks, geese, gulls, loons and shorebirds, during spring. However, the distribution of dates when water birds are first detected do not support the predictions that waterfowl or shorebirds are using Mine-altered water bodies earlier than the East and West bays.

7.4 Recommendations

Diavik has consulted with with Environment Canada about whether monitoring of bird species abundance and diversity at East and West bays should be continued given the results to date (Appendix L). Environment Canada has agreed to these changes (Appendix M), and other stakeholders will be consulted. Diavik will continue to monitor health risks to water birds at Mine-altered water bodies. Diavik will investigate contributing to

regional monitoring databases through either participation in Program for Regional and International Shorebird Monitoring (PRISM) or the North American Breeding Bird Survey (BBS).

8.0 WIND FARM

8.1 Background

Since 28 September 2012, Diavik has been operating a 4 turbine 9.2 megawatts (MW) wind farm. The wind farm is located on East Island at Lac de Gras, and is the first industrial wind farm in northern Canada, as well as the world's most northern large-scale wind-diesel hybrid facility. It is estimated that the wind farm will reduce Diavik's diesel consumption by 10% as well as its greenhouse-gas emissions by 12,000 tonnes of carbon dioxide annually.

No formal environmental assessment or approval process was followed, or required, for the wind farm. However, consultation with Environment Canada (EC) was undertaken by Diavik during the planning of the wind farm project with respect to birds in the area. Similarly, no post construction follow up with respect to bird fatalities is required. However, Diavik voluntarily implemented a post-construction monitoring program in 2013 to assess the potential direct impacts the wind farm may have on birds.

An Avian Post-Construction Follow-Up Plan (PCFP) was developed (Dillon 2013) and representatives from EC in Yellowknife were consulted during the development of the PCFP based on their expert advice and knowledge of avian species known to be present near the Mine.

The wind farm Avian Post-Construction Follow-Up Plan (Dillon 2013) is consistent with guidelines developed by the Ontario Ministry of Natural Resources (MNR). This approach was discussed and agreed upon through discussion between EC and Diavik.

Existing natural habitat on East Island is dominated by natural tundra and open water associated with Lac de Gras. Collectively, it was agreed that based on the geographic location of the wind farm, the existing natural habitat, the size of the wind farm, the spacing of the turbines (i.e., ≥700 metres apart) and the low number of bird sightings over multiple years at Diavik that the risk of avian-turbine strikes was considered low.

8.2 Objectives and Scope

The objective of the PCFP was to monitor bird mortalities at the wind farm to evaluate the direct effects of the wind farm on birds and determine if additional monitoring is required.

8.3 Methods

Surveys for bird carcasses below the turbines were undertaken to estimate bird strikes. It was recommended that a minimum number of surveyors complete all monitoring for logistical simplicity and the small number of turbines being searched and the need to accommodate searcher efficiency of bird carcasses for each searcher, seasonally around the four turbines. Monitoring was completed by Diavik personnel twice per week, within a 50 metre radius of each turbine using the Baerwald Spiral method.

To correct for bird carcasses lost to scavengers or undetected by searches, marked bird carcasses were placed below the turbines (see Dillon 2013 for the detailed methods). Scavenger removal and searcher efficiency was estimated by placing marked bird carcasses in the study area over four visits. For each visit the marked carcasses were identified as intact, decomposed or scavenged.

The proportion of carcasses remaining after each search interval was pooled to calculate the overall scavenger correction (S_c) factor. The scavenger correction factor is the proportion of carcasses remaining after each search interval. The proportion of carcasses is pooled to calculate the overall scavenger correction factor as follows:

$$S_c = \frac{nvisit1 + nvisit2 + nvisit3 + nvisit4}{nvisit0 + nvisit1 + nvisit2 + nvisit3}$$

Where:

S_c = the proportion of carcasses not removed by scavengers over the search period
nvisit0 = the total number of carcasses placed
nvisit1 to nvisit4 = the number of carcasses remaining on visits 1 through 4

The minimum estimated bird mortality (C) is calculated as follows:

$$C = c/(S_{eo} \times S_c \times P_s)$$

Where:

C = the corrected number of bird fatalities
c = the number of bird carcasses found
S_{eo} = the weighted proportion of carcasses expected to be found by searchers (overall searcher efficiency)
S_c = the proportion of carcasses not removed by scavengers over the search period
P_s = the proportion of the area searched.

Results were expressed in corrected bird fatalities per turbine per year as well as corrected bird fatalities per megawatt per year to allow comparison among years.

8.4 Results

In 2013, a total of 23 inspections were completed at the wind farm during post-construction mortality monitoring between 11 June and 23 August (Appendix N). No bird carcasses were observed (c).

During the 2013 scavenger trials the scavenger correction factor (S_c) was 0.78. The total number of marked carcasses placed was 15 carcasses (nvisit0). During the scavenger trials, the first visit (nvisit1) yielded 13 remaining carcasses, and the second through fourth visits yielded 6 remaining carcasses (nvisit2 to nvisit 4).

Searcher efficiency is calculated for each searcher as the ability of searchers to locate carcasses may vary. During 2013, individual searcher efficiency could not be calculated as placement and retrieval information was not collected for each individual searcher and the number of searchers varied. However, the overall searcher efficiency was calculated to be S_{eo} = 0.80 using the equation below:

$$S_{eo} = \frac{\text{total number of test carcasses found}}{\text{total number of test carcasses placed} - \text{total number of carcasses removed}}$$

The area searched below the turbines was visually estimated (P_s). The corrected mortality estimate remains 0 as no bird carcasses were found during the wind farm mortality monitoring (Table 14).

Table 14: Corrected Number of Bird Fatalities

Year	Actual Bird Fatalities	Number of Turbines	Wind Power Generated (kWh)	Megawatts (MWh)	Corrected bird fatalities/turbine/year	Corrected bird fatalities/megawatt/year
2012[(a)]	n/a	4	5,572,388	5,572	n/a	n/a
2013	0	4	64,612,821	25,260	0	0

Note: kWh = kilowatt hour; MWh = megawatt hour; N/A = not applicable

(a) The wind farm has been in operation since 28 September 2012; therefore 2013 represents the first full year of operation.

8.5 Recommendations

Diavik voluntarily implemented the first year of post-construction monitoring of the wind turbine as planned and no bird mortalities were observed. Considering the low probability of impacts to birds, and the absence of bird mortalities in 2013, Diavik will discontinue monitoring the wind farm using the 2013 methods. Instead, the wind farm will be monitored for bird mortalities as part of the overall site compliance monitoring program.

9.0 WASTE MANAGEMENT

Diavik is committed to taking the necessary steps to collect, store, transport, and dispose of all waste generated by the Mine. These procedures are being conducted in a safe, efficient and environmentally compliant manner. The Diavik Waste Management Plan is an integral part of Diavik's Environmental Management System, and focuses on practical and positive management of waste.

The objectives of the Waste Management Plan include:

- creating a system for proper disposal of waste;
- minimizing potentially adverse impacts on the physical and biological environment; and
- complying with Federal and Northwest Territories legislation.

Mitigation practices include food waste incineration, categorical segregation of non-food waste for storage and subsequent removal from site, on-site disposal and monitoring.

In addition to these mitigation practices, Diavik has implemented recycling and renewable energy initiatives.

9.1 Waste Inspections

The Diavik Waste Management Plan outlines practices for waste disposal and mitigation practices (Appendix O). The Mobile Maintenance and Support Services department maintains the various waste collection transfer and disposal points, inventories of bulk wastes, waste management datasheets, and status of protective equipment and spill kits. This assists in evaluating the capacity of waste management facilities, planning for logistics associated with back hauling and requirements for any modifications to the system. In addition to this, the Environment department conducts waste inspections at the Waste Transfer Area (WTA) and Landfill every other day, as well as a site-wide compliance inspection on a weekly basis.

Diavik Waste Management staff identify problem areas and work with contractors and Diavik employees to resolve any issues. Numbering and inspecting waste collection bins prior to pick up is an effective method of facilitating communication between waste management staff and Environment staff, and addressing issues

within various departments. Efforts are made to identify improperly disposed waste in the large waste collection bins prior to collection; however, on occasion improperly disposed waste may end up in either the Landfill or the burn pit.

Incineration, segregation and storage of waste takes place at the WTA, which was established to provide proper handling and storage of waste on site. The facility is located on the south side of East Island. The WTA is a lined facility surrounded by a gated, 3 metre high chain link fence to control wind transportation of any litter and prevent most wildlife intrusion. Contained within the WTA are two incinerators for food waste, a burn pit for non-toxic/non-food contaminated burnable material, a contaminated soils containment area, a treated sewage containment area, as well as sea cans, sheds, and storage areas for drums, crates, bins and totes. Two water scrubbed incinerators were installed and operational in October 2012 and are located within the incinerator building. The majority of waste is inventoried and stored at the WTA while awaiting backhaul on the winter ice road.

The current landfill was established in 2008 and is located within the rock pile. On-site disposal of non-burnable wastes such as steel (ground support for underground mining), vent tubing, plastics, and glass currently occurs at the inert Landfill located within the Type 3 waste rock pile. These materials are covered with waste rock regularly to prevent wildlife attraction. A gate was installed in an effort to limit uncontrolled dumping in this area. The location of the Landfill within the rock pile and traffic in the area will continue to discourage wildlife access to the Landfill, thereby limiting the availability of food and food packaging to animals.

9.1.1 Methods

Inspections of the WTA and the Inert Landfill are conducted every other day to confirm that all waste segregation, storage and disposal procedures set out in the Diavik Waste Management Plan are being followed. Inspections consist of Environment personnel walking the area of the WTA and Landfill, where safe to do so, and documenting the type and number of misdirected waste items, as well as wildlife species or fresh sign that were present during the survey. Environment personnel record all occurrences of improperly disposed waste materials that attract wildlife, as well as all wildlife sign and observations.

Improperly disposed materials identified during inspections are reported to waste management personnel for immediate rectification, which typically includes removing and transferring material for proper disposal. For example, non-burnable material is removed from the incinerator waste stream and transferred to the designated area in the Landfill. Hazardous wastes are stored in the WTA until they can be shipped to licensed facilities off-site.

9.1.2 Results

During 2013, a total of 191 inspections took place at a frequency of twice per week from 1 January until 29 December at the WTA and Landfill area (Appendix P). A total of 20 misdirected waste items were found during WTA inspections and 119 items during Landfill inspections (Table 15). In the WTA, the most common misdirected waste item was oil contaminated waste (four items found), followed by aerosol cans, food, food packaging, and oil products and containers (three items of each found). In the Landfill, the most common misdirected waste item was oil contaminated waste (34 items found); followed by food packaging (29 items found), and aerosol cans (25 items found). Considering the total amount of waste disposed (355 tonnes incinerated and 5,238 tonnes landfilled), the total amount of misdirected waste is considered negligible.

Table 15: Misdirected Waste at the Waste Transfer Area and the Landfill

	Waste Transfer Area			Landfill Area		
Misdirected Waste Type	**Number Found**	**Percent of Inspections**	**Corrective Actions Taken**	**Number Found**	**Percent of Inspections**	**Corrective Actions Taken**
Aerosol Cans	3	1.6%	2	25	13.1%	20
Batteries	1	0.5%	1	1	0.5%	1
Cigarettes	1	0.5%	1	5	2.6%	4
Food	3	1.6%	2	7	3.7%	6
Food Packaging	3	1.6%	2	29	15.2%	19
Oil Contaminated Waste	4	2.1%	4	34	17.8%	24
Oil Products & Containers	3	1.6%	3	5	2.6%	5
Other	2	1.0%	1	13	6.8%	8
Total	20	10.5%	16	119	62.3%	87

Additional improperly disposed of items observed during inspections at the WTA that were reported to waste management personnel for immediate rectification included wood pallets, light bulbs, gloves, and rubber hoses. Items improperly disposed of in the Landfill area included bags of concrete, burnable cardboard, wood pallets, and other wood products.

Corrective actions were taken or required 8.4% of the time at the WTA and 45.5% of the time at the Landfill, as required. Corrective actions at the WTA and Landfill area include notifying a WTA coordinator and transferring items to the appropriate disposal area.

Wildlife was observed on 30.9% of inspections of the WTA and on 4.2% of inspections of the Landfill (Table 16). The most common wildlife species observed during inspections was red fox. Other species observed included common raven, greater white-fronted goose and unknown gulls. Ground squirrel and Arctic hare sightings were more common during 2002, and likely decreased due to increased infrastructure (rock pile and crusher) in the area of the Landfill.

During 191 inspections of the WTA and Landfill, wildlife sign was observed during 30.9% of inspections and during 11.5% of inspections, respectively. At the WTA, wildlife sign observed included 56 red fox tracks and chews, and three common raven tracks. At the Landfill, wildlife sign observed included 21 red fox chews, scat and tracks, and one common raven track.

Table 16: Wildlife and Wildlife Sign in the Waste Transfer Area and Landfill Area by Species

	Waste Transfer Area			Landfill Area		
Species	**Number of Inspections with Wildlife Observation**	**Total Number of Individuals Observed**	**Wildlife Sign**	**Number of Inspections with Wildlife Observation**	**Total Number of Individuals Observed**	**Wildlife Sign**
Common Raven	14	17	3	1	1	1
Greater White-fronted Goose	1	2	0	0	0	0
Red Fox	43	56	56	7	7	21
Unknown Gull	1	4	0	0	0	0
Total	**59**	**79**	**59**	**8**	**8**	**22**

9.2 Recycling Initiatives

During 2008, Diavik implemented an employee-driven recycling program for plastic bottles and aluminium cans generated on site. Proceeds from this program are donated to the Stanton Territorial Breast Cancer Foundation and benefits people from all communities.

Throughout 2013, 11,466 units of aluminum containers ($1,146.60) and 13,534 units of plastic containers ($1,353.40) were recycled and the total monetary value was donated to charity. To date the total proceeds since the inception of Diavik's employee-driven recycling program has generated $19,241.00.

Over 20,000 pounds of copper and 2,000 pounds of aluminum were stripped from scrap cable over 2000 hours by volunteers. The copper and aluminum were shipped to Hay River via backhaul donated by Tlicho Landtran. The secure yard was donated by Scotts Electric. The monetary value of the recycled copper totaled approximately $55,000. The money was donated to the Hay River "Lights On" Program. The program uses the schools to provide a safe place for young kids to go on Saturday nights. They have upwards of forty kids showing up for sports activities, but there is also education offered about the harmful effects of drugs and alcohol. The recycled aluminum has yet to be sold; however, the proceeds from the aluminum will be donated to the Diavik soup kitchen charity.

During 2013, approximately 280,665 litres of waste oil was collected and will be used in the waste oil boiler to be commissioned in the second quarter of 2014.

In addition, a number of waste materials generated on site are also shipped to Alberta using winter road backhauls each year. Diavik is committed to maximizing recycling opportunities for wastes generated from Mine operations that cannot be disposed of on site. Items shipped for recycling include:

- used oil, oil filters and grease;
- used glycol;
- aerosol cans;
- batteries (lead-acid and dry cell);

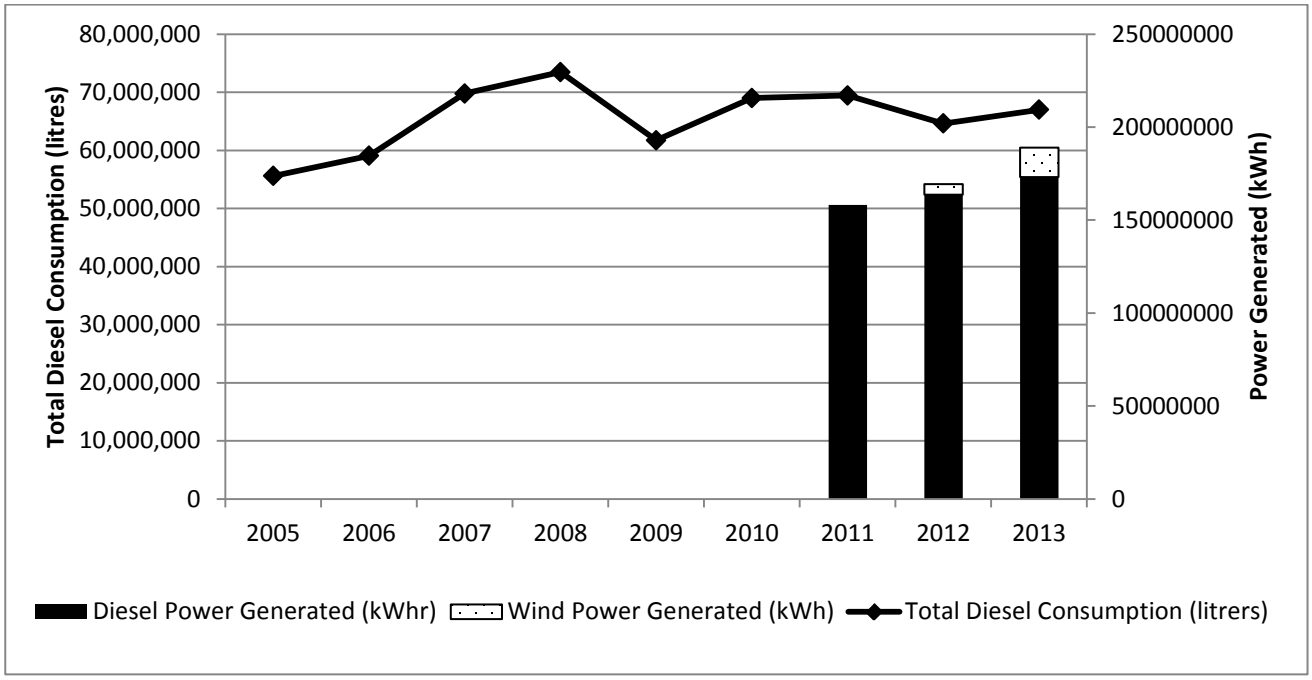
- expired/waste fuel (e.g., Jet B);
- oil-based paint; and,
- fluorescent tubes.

Diavik will continue to increase recycling opportunities, and reduce waste streams generated at the Mine site.

9.3 Renewable Energy

The wind farm became operational on 28 September 2012 and it was predicted that it would reduce Diavik diesel consumption by 10%, as well as greenhouse-gas emissions by 12,000 tonnes of carbon dioxide annually. During the first year of operation, the wind farm generated 15,893 megawatt hours (MWh) of power; which represents 8.4% of the total power generated in 2013 (Figure 11). Between 2005 and 2013, the annual diesel fuel consumption at Diavik has ranged from 55,573,000 litres to 73,449,006 litres; the average annual fuel consumption is 65,512,997 litres.

Figure 11: Diavik Power Generation and Diesel Consumption



9.4 Recommendations

Procedures and mitigation strategies currently in place have been relatively successful at limiting wildlife interactions in the WTA and Landfill. While foxes, ravens and gulls appear to be frequenting the WTA and Landfill areas, these animals are natural scavengers and will continue to be present throughout the Mine life. Diavik recommends that the frequency of inspections at the landfill be reduced to one per week during summer and twice weekly during winter when wildlife are more nutritionally stressed.

Diavik remains committed to carrying out employee education programs related to waste handling.

Report Signature Page

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APPENDIX A

2013 Comprehensive Vegetation and Lichen Monitoring Program Report

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APPENDIX B

NWT Wolf Project, 2013

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APPENDIX C

Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac De Gras Region

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APPENDIX D

Caribou Behavioural Observations Summary, 2013

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Wildlife Mortality Incident Reports

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Caribou Road and PKC Survey Observations, 2013

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APPENDIX G

Grizzly Bear Hair Snagging Study Results, 2013

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APPENDIX H

Grizzly Bear Incidental Observations, 2013

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APPENDIX I

Grizzly Bear Relocation Report

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APPENDIX J

Wolverine Snow Track Survey Results, 2013

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APPENDIX K

Pit Wall / Mine Infrastructure Raptor Survey, 2013

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APPENDIX L

Waterbird and Shorebird Comprehensive Analysis, 1996-2013

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APPENDIX M

Environment Canada Waterbird and Shorebird Monitoring Response Letter, 2013

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APPENDIX N

Wind Farm Bird Strike Monitoring, 2013

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APPENDIX O

Waste Management Plan, 2014

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APPENDIX P

Waste Inspections, 2013

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