Rio Tinto

Diavik Diamond Mine

Health, Safety and Environment Department

2012 Wildlife Monitoring Program Report

28 March 2013

Executive Summary

As a requirement of the Environmental Agreement, Diavik Diamond Mines 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 2012 Wildlife Monitoring Program for the Diavik Diamond Mine located at Lac de Gras, Northwest Territories. The data was collected according to procedures outlined in the Standard Operating Procedures. Where helpful, comparisons to the information gathered during the previous monitoring (2000 to 2011) and the pre-construction baseline (June 1995 to August 1997) have been included.

General observations in each program are as follows:

Vegetation/Habitat Loss

- Total terrestrial landscape loss to date from mining activities was 10.10 km^2, below that predicted during the Environmental Assessment (EA).
- At the end of 2012, actual habitat loss for Riparian Shrub (0.03 km^2), and Esker Complex (0.17 km^2) exceeded the predictions during the EA.

Barren-ground Caribou

- There was increase in mine footprint in 2012; therefore, the total number of habitat units (HU's) lost has increased to 2.61 HU's, which is less than what was predicted during the Environment Assessment.
- One natural caribou mortality was reported in 2012, likely a grizzly bear predation. No caribou injuries were reported.
- During 2012, the caribou traffic advisory remained at "No Concern" for 365 days, as caribou numbers on East Island did not exceed 100 at any given time.
- There were no actions taken to herd caribou in 2012.
- DDMI and Ekati jointly completed weekly aerial surveys from 8 July till 13 October 2012.
- A total of 86 ground-based caribou behavioural observations were completed in 2012. EKATI did not complete any behaviour scans in 2012; therefore could not be

pooled. Distances of observations ranged from less than 2 km to greater than 30 km from mine infrastructure.

- Caribou collar data from the GNWT showed that caribou moved west of Diavik during the northern migration and travelled limited movement south during the southern migration.
- No caribou were observed during the Processed Kimberlite Containment (PKC) area and rock pile surveys or during the road surveys in 2012.

Grizzly Bear

- To date, the total direct grizzly bear habitat loss is 7.5 km^2, which is below the amount predicted during the Environmental Assessment.
- A total of 97 incidental sightings were recorded at the mine site during 2012 from 27 April until 3 October 2012.
- No grizzly bear injuries or mortalities occurred during 2012; however a sow and two cubs were relocated away from East Island.
- Grizzly Bear hair snagging studies were undertaken jointly by DDMI and Ekati in 2012.

Wolverine

- Wolverines were present on East Island in 2012.
- Two deceased wolverines were found inside the burnable bin at West Island.
- The wolverine hair snagging program was not completed in 2012 and is scheduled to resume in the late winter of 2014.
- The snow track survey was conducted in 2012 and one community assistant participated in the monitoring program.

Waste Management

- Regular inspections were conducted at the Waste Transfer Area (WTA) and Inert Landfill in 2012.
- At the WTA, food and food packaging were found during 2% and 5% of all inspections in 2012.
- At the Inert Landfill, food was found during 3% of all inspections and food packaging was found during 21% of all inspections in 2012.

Falcons

- Pit Wall/Mine Infrastructure surveys were conducted 15 May 2012 until 30 September 2012. One peregrine falcon nest was observed by the Process Plant. Two to three fledglings were observed.
- One falcon mortality occurred at the Diavik Mine site in 2012. On the 26 August 2012, peregrine falcon wing remains were found on the A418 dike.

Waterfowl

- There was no direct habitat loss in 2012 for shallow or deep water habitats. The total area of water habitat loss to date is 2.5 $km^{2.}$ This value is below the predicted value set from baseline.
- Waterfowl were present at East Island Shallow Bays.
- Waterfowl are utilizing mine-altered wetlands, particularly the North Inlet.

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Introduction

1. Introduction

Diavik Diamond Mines Inc. (DDMI) 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 Project Description and Environmental Assessment (DDMI, March 1998a, 1998b). Information was used by DDMI throughout the project 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. Documents that were utilized 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, Wildlife, Diavik Diamonds Project, September 1998; and
- Wildlife Baseline Report, Diavik Diamonds Project, Penner and Associates, July 1998.

A Wildlife Monitoring Program (DDMI, 2002) was designed specifically to monitor and manage wildlife issues of concern identified by communities and regulatory agencies. The program has evolved since then, with 2010 being the eleventh year of monitoring. John Virgl of Golder Associates was contracted to assist in the development of the WMP and has provided expertise in data collection methods for the majority of programs so that there is similarity with other wildlife effects monitoring programs in the NWT.

The current objectives of the monitoring program are to:

> *Collect information that will assist DDMI to determine if there are effects on wildlife and if these effects were accurately predicted in the Environmental Assessment (EA);*
>
> *Determine the effectiveness of mitigation practices intended to limit project-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 Environmental Assessment.

The wildlife study area (Figure 1-1) encompasses approximately 1,200 square kilometers (km^2). Its boundaries are roughly: west to the southwest arm of Lac de Gras, east to Thonokeid Lake, north to the BHP Billliton wildlife survey area and south to the north shore of MacKay Lake. An extension to the northwest was made to include the Lac du Sauvage narrows, an important migration corridor (Penner, 1998). The local study area during baseline studies (Penner, 1998) covered an area of approximately 805 km^2.

Figure 1-1 Diavik's Wildlife Study Area, 2012

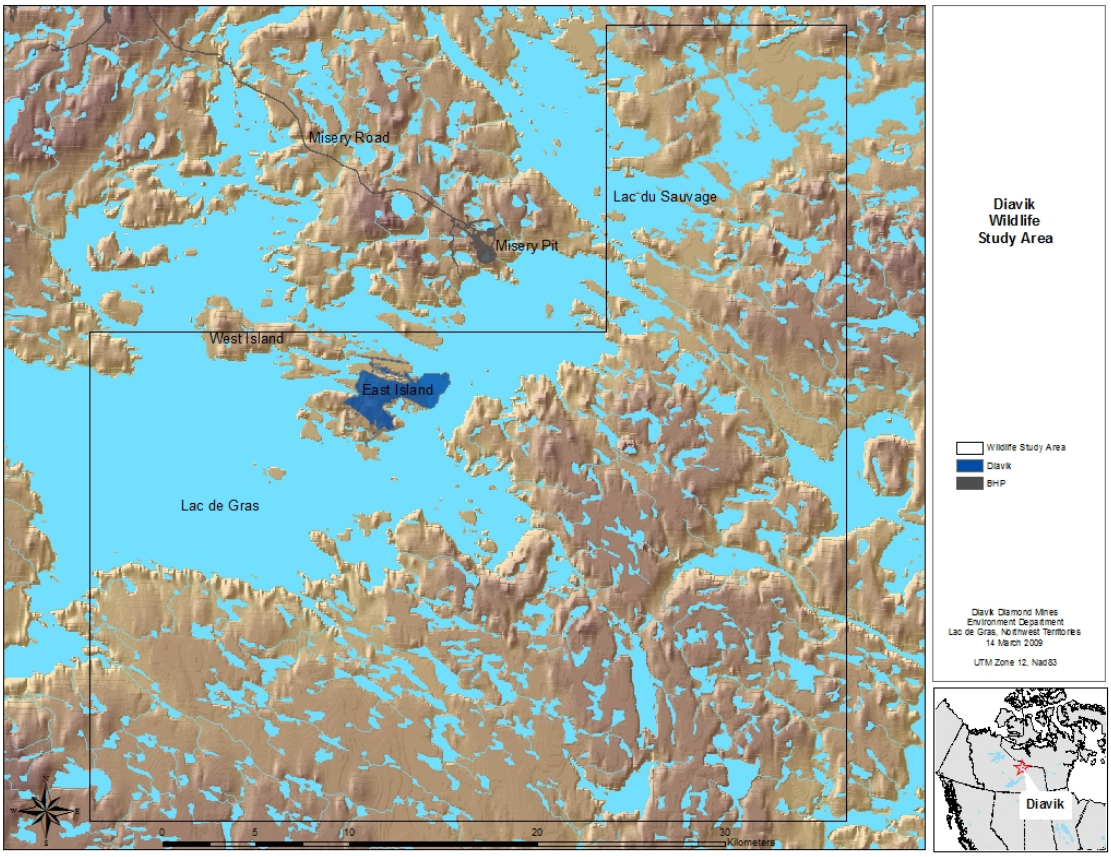
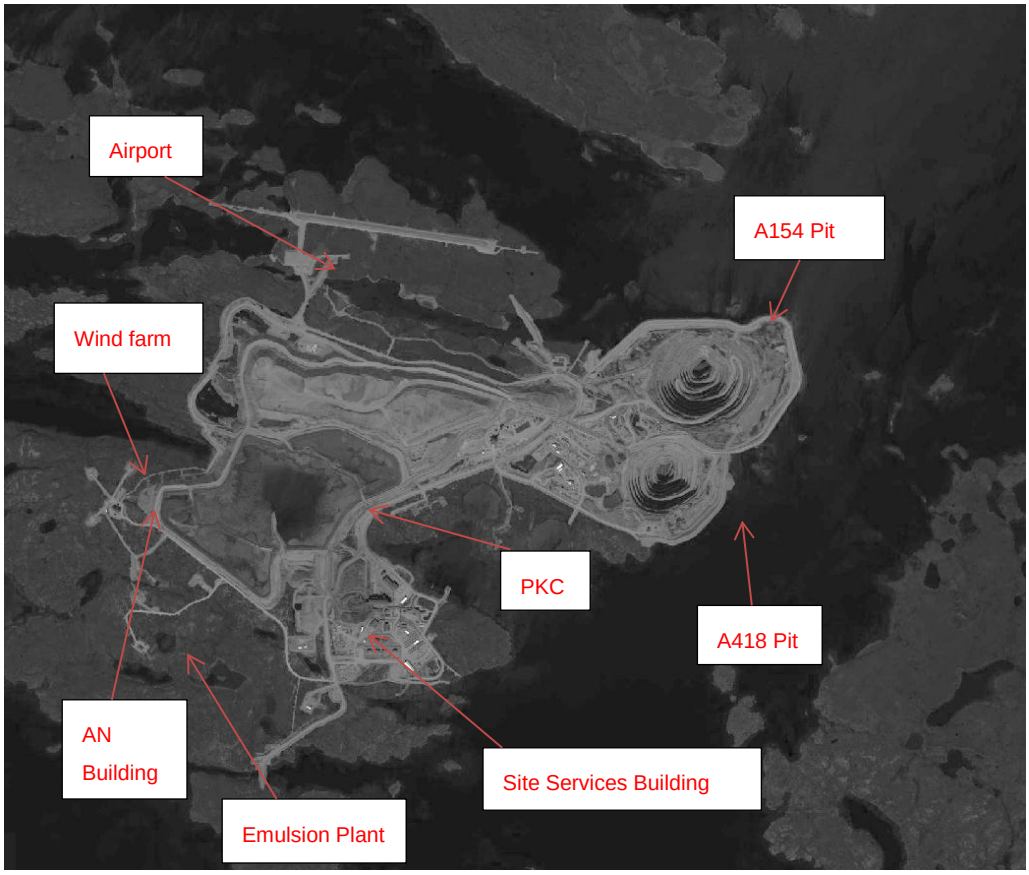


Figure 1-2 Satellite Image of East Island , 2012



The mine footprint is restricted to East Island and consists of haul roads, an airstrip, country rock piles, A154 pit, A418 pit and all mine infrastructure (Figure 1-2).

There was only a minor change in the Project footprint in 2012, mostly associated with creating access for a new wind farm. All haul roads required for mining activities to date are complete. Development of the underground mine at the A154/418 decline continued during 2012, with 310,023 tonnes of waste and 1,040,045 tonnes of ore completed by year end.

The number of people present at Diavik site in 2012 was similar to 2011, averaging 629 people, with a maximum of 660 people. The average population of the main camp accommodation was 457 people while the average for south camp accommodation was 172 people.

This report is divided into nine sections that make up the core monitoring program.

- Section 1: Introduction
- Section 2: Vegetation Loss
- Section 3: Barren-ground Caribou
- Section 4: Grizzly Bear
- Section 5: Wolverine
- Section 6: Waste Management
- Section 7: Falcons
- Section 8: Waterfowl
- Section 9: References

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 DDMI WMP is an evolving program that will reflect recommendations during previous years, as well as advances in project development. Changes will be captured in annual revisions of the Wildlife Monitoring and Management Plan for the Diavik Diamond Mine.

Community visits are scheduled on an annually basis, giving the community members the opportunity to see operations of the mine site. During these visits if any proposed changes are being executed discussion and feedback are obtained from the communities.

From 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. For the intermediate years (including 2012), 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.

Landscape Changes

2. Vegetation Loss

East Island vegetation cover is predominantly characterized by heath tundra, heath tundra with boulders and/or bedrock and tussock/hummock habitat types. The main effect on vegetation during operations is the reduction in the geographic extent of all vegetation/land cover types due to disturbance caused by the mine and the mine infrastructure. The recovery of vegetation is slow in arctic environments (Burt, 1997). Also, altered landscapes may attract certain wildlife species such as caribou that could make use of the airstrip and hauls roads for insect relief (Mueller and Gunn, 1996). In addition to terrestrial landscape loss, areas of Lac de Gras are affected by the Project.

The intent for this program is to determine if vegetation loss is within the extent predicted in the Environmental Effects Report (DDMI, 1998b). The objective is:

> *To determine if direct vegetation/habitat loss due to the mine footprint exceeds the prediction of 12.67 km2.*

2.1 Methods

A satellite image of the mine site area was obtained and used to update the area of the current mine footprint. This dataset was then laid over the Ecological Landscape Classification (ELC) developed by Environment and Natural Resources (ENR) (Matthews *et. al* 2001). Each ELC type disturbed by the Project was selected and area calculations were made to determine the area (km^2) of each habitat type replaced by the mine footprint (Figure 2-1).

2.2 Results

As of December 2012, a total area of 10.10 km^2 been altered due to the Project, going back to construction in 2000. This represents a total loss of 79.7% of the predicted Project landscape disturbance (from DDMI, 1998a, Table 2-1). Heath tundra and deep water alone represent half of the loss. ELC types at or slightly exceeding the predicted loss include riparian shrub, esker complex and bedrock complex.

Figure 2-1 Project Footprint Expansion by Year, 2002-2012

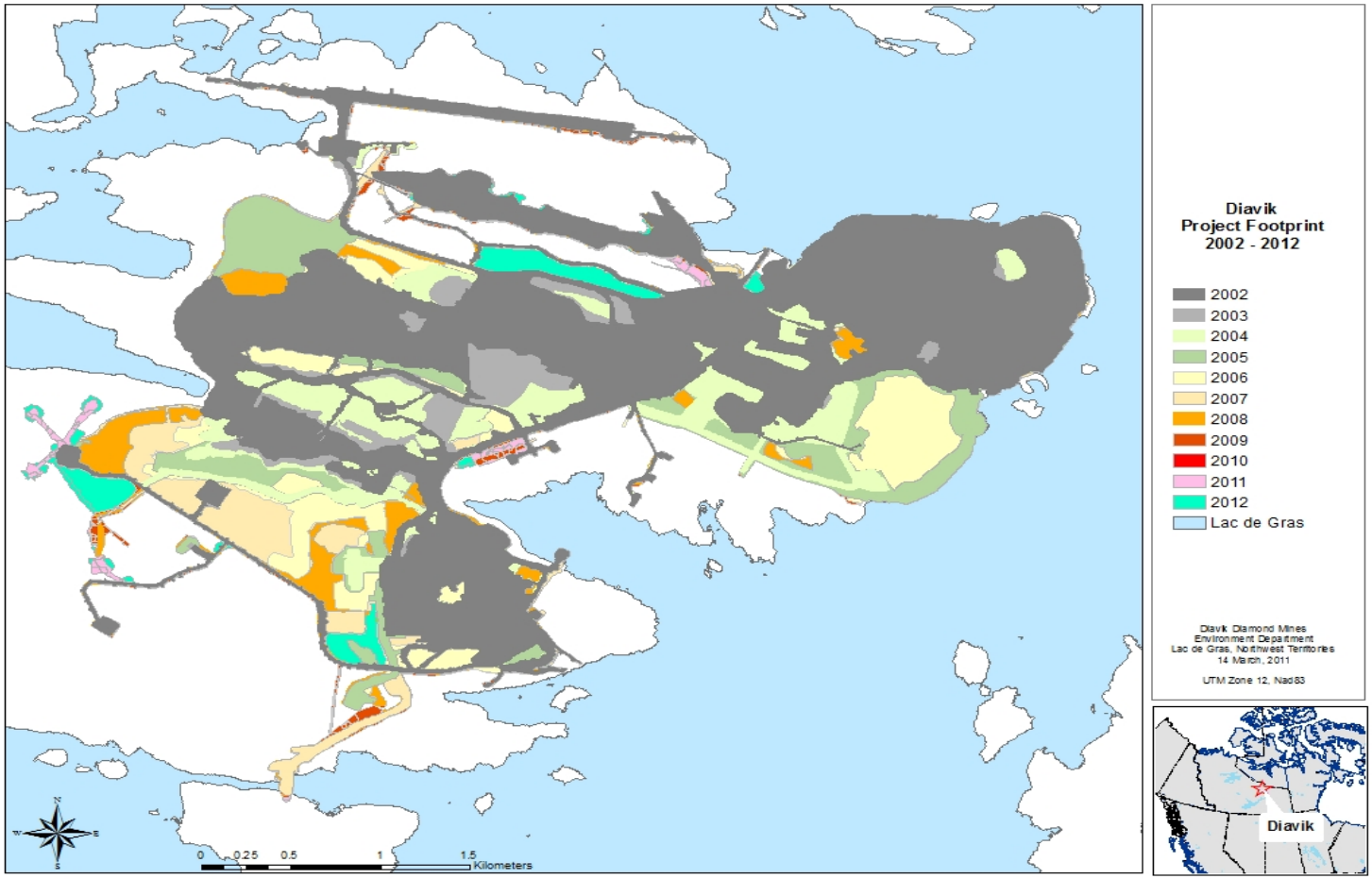


Table 2-1 Predicted Mine Disturbance versus Cumulative Actual Mine Disturbance for All Years (2000-2012)

Habitat Classification	Total Area (km²) per Year												
	up to 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Predicted***
Heath Tundra	1.45	1.89	2.02	2.38	2.62	2.76	2.93	2.97	3.03	3	3.01	3.2	3.68
Heath Bedrock (30-68%)	0.08	0.34	0.36	0.4	0.45	0.49	0.53	0.58	0.59	0.58	0.59	0.64	0.78
Health Boulder (30-68%)	0.26	0.64	0.73	0.96	1.07	1.24	1.43	1.49	1.52	1.5	1.53	1.62	1.89
Tussock/Hummock	0.45	0.63	0.79	1.01	1.19	1.27	1.35	1.42	1.44	1.43	1.44	1.46	1.64
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	0.26
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
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	0.1	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	0.05
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
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	0.48
Deep Water	0.15	1.8	1.81	1.82	1.93	2.17	2.19	2.19	2.19	2.12	2.12	2.13	3.46
Disturbed**	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**
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	0.16
Total *	**3.12**	**5.88**	**6.32**	**7.3**	**8.15**	**8.86**	**9.4**	**9.66**	**9.78**	**9.65**	**9.71**	**10.1**	**12.67**

Note: Values in red represent actual habitat loss equal to or exceeding that predicted
* Any discrepancies in totals across the rows results from the rounding of numbers in annual columns for presentation purposes
**Disturbed includes areas that were already disturbed by exploration activities when the ELC classification was made.
***From DDMI 1998a.

In 2012, the main construction projects that occurred was expansion of wind farm roads located east of AN building and work by airport road. Heath Tundra habitat has experienced the greatest loss to date (3.20 km^2). A progression of habitat loss from the mine footprint can be seen in Figure 2-1. Values provided for ELC unit loss are estimates based on the predicted Project footprint (DDMI, 1998), the actual Project footprint and the ELC classification (Matthews et *al*., 2001). DDMI will continue to monitor habitat loss as the mine expands and will identify any exceedances that may occur during this time.

Barren-Ground Caribou

3. Barren-Ground Caribou

The Bathurst caribou utilize a migration corridor that passes through the Lac de Gras area on their way to and from their calving grounds at Bathurst Inlet (Gunn *et. al.,* 2002). A portion of the herd frequently forages and moves through the Lac de Gras area during the summer and fall periods, sometimes following shorelines and onto the West and East Islands.

NWT's barren-ground caribou herd declines are consistent with worldwide caribou trends. Between 2006 and 2010, a number of management and monitoring actions were implemented throughout the NWT to promote recovery of declining herds (ENR 2010, website). With management actions enforced and improved calf recruitment, results from the GNWT 2010 survey suggest the Bathurst herd is stabilizing. A regional survey was completed in 2012. Results indicate that the heard is now stabilized at about 35,000, a slight increase from 32,000 in 2009 (GNWT, 2012, website). The overall size of this heard remains very low and with the number of breeding females has not increased and calf recruitment over the past couple years has been poor (GNWT, 2012, website).

The barren-ground caribou has been ranked as a 'Sensitive' species by the General Status Ranks of Wild Species in the Northwest Territories (GNWT, 2010), and are an important food source for hunters of both western Nunavut and the communities of the Northwest Territories. The barren-ground caribou was selected as one of the key indicator species for impact assessment because of its cultural and economic value to northern residents, ecological importance, management status, and biological vulnerability (DDMI, 1998b).

3.1 Habitat Loss

Physical alteration of the landscape can have an influence on caribou as the vegetation can no longer be exploitable as a source of life basics (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 monitoring program is to determine if direct summer habitat loss (in habitat units [HUs]) is greater than predicted. The following section summarizes methods used and results obtained. The impact prediction in the Environmental Effects Report (DDMI, 1998b) is:

At full development, direct summer habitat loss from the project is predicted to equal 2.965 habitat units (HU's).

3.1.1 Methods

The approach is similar to methods used in the Vegetation section of this report. The area (km^2) of vegetation type lost was multiplied by its habitat suitability value (Table 3-1; DDMI, 1998b) to determine habitat units lost (HUs).

3.1.2 Results

Direct summer habitat loss to date from the mine totalled 2.61 HU (Table 3-1). Heath tundra, which has the highest habitat suitability rating, represents 3.20 km^2 of lost vegetation since construction began (Table 2-1). Caribou summer habitat loss was greatest in 2001, when the majority of haul roads and laydown areas for mine infrastructure were constructed. Overall, total direct losses for all summer habitat suitability classes for caribou are currently below that predicted in the Environmental Assessment.

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). 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".

Information collected on the activity of caribou, as part of the Wildlife Monitoring Program, is used to determine whether a change in behaviour is detected in relation to distance from mining activities. Scan sampling is conducted on East Island where the foraging behaviour of animals may be influenced by mining activities. Observations are also made on the mainland ("control site"), to determine whether or not "changes in behaviour were a response to human activity" (Gunn, 1983).

The current objective for this program is to determine if the Zone of Influence (ZOI) from 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

Table 3-1 Predicted Area of Summer Caribou Habitat – Disturbed vs. Actual Area of Summer Caribou Habitat on East Island

Vegetation Cover Type	Habitat Suitability Value	Habitat Lost in 2012 (km^2)	Habitat Suitability Class	Predicted Habitat Units Lost	Actual Habitat Units Lost (HU)													Total Habitat Units Lost to Date*
					2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	
Heath Tundra	0.37	0.19	High	2.13	0.3	0.42	0.19	0.09	0.23	0.14	0.12	0.14	0.09	0.03	0.00	0.02	0.11	1.88
Heath Boulder	0.4	0.09																
Riparian Shrub	0.46	0.01																
Bedrock Complex	0.27	0.01	Moderate	0.63	0.07	0.12	0.07	0.05	0.08	0.08	0.02	0.03	0.03	0.01	0.00	0.00	0.01	0.57
Tussock/Hummock	0.3	0.02																
Sedge Wetland	0.28	0.01																
Esker	0.3	0																
Birch Seep & Shrub	0.11	0.01	Low	0.2	0.02	0.05	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0	0.00	0.00	0.01	0.16
Boulder Complex	0.21	0																
Heath Bedrock	0.23	0.05																

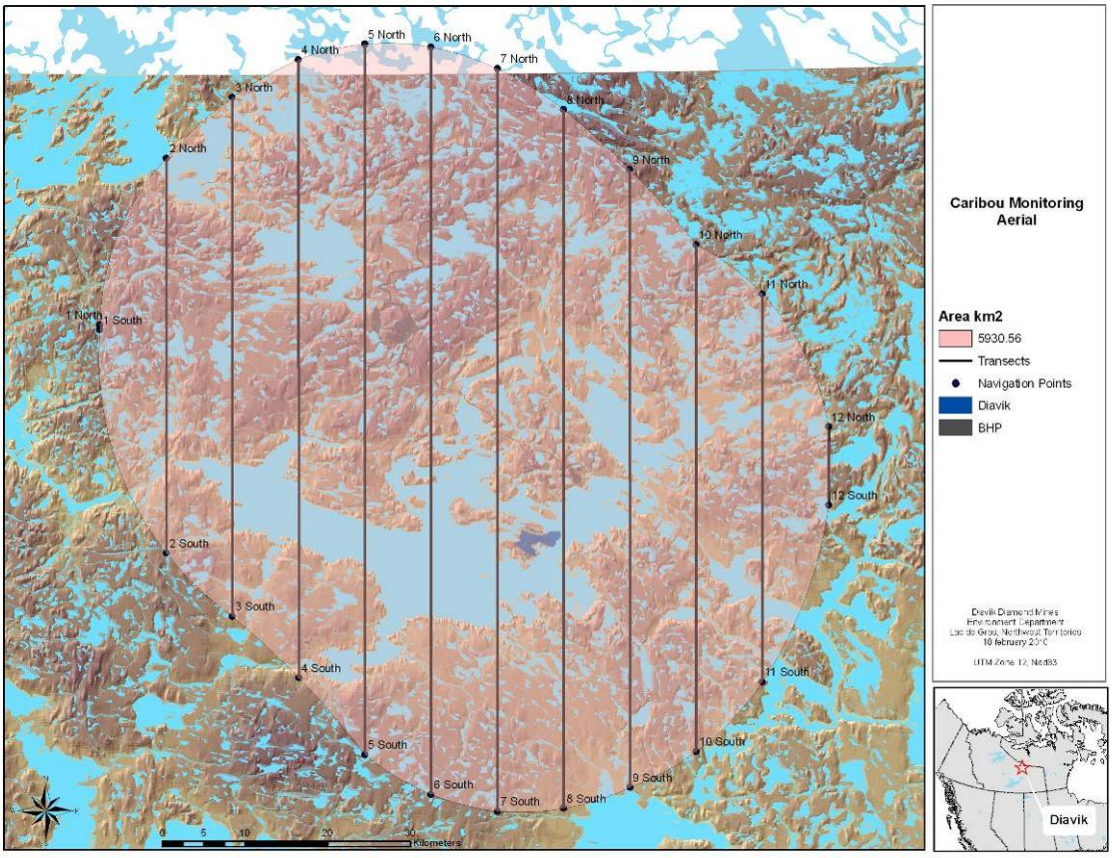
*Totals may vary slightly due to rounding of values for reporting purposes

From 2002 through 2009, DDMI has 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 spatial area (Figure 3-1). In 2012, aerial surveys were conducted again in collaboration with Ekati Diamond Mine. Caribou aerial surveys will be conducted for three continuous years, followed by two years off in an effort to capture changes to the zone of influence as mining activity levels decrease over time.

3.2.1 Methods

Surveys were completed from mid-July through to October to collect information on caribou numbers, habitat type associated with the caribou groups, and distance from the Diavik mine site. This survey period focuses on the southern (post-calving) migration period. The northern migration was not included due to the caribou's tendency to move rapidly through the mine study areas on their way to the calving grounds.

Figure 3-1 Aerial survey transects , 2012



3.2.2 Results

The aerial surveys commenced on 8 July 2012. Caribou were first observed on 18 August 2012. Caribou were last observed on 13 October 2012, the final survey for the year. Overall, Caribou were observed on 9 surveys completed in 2012 (Appendix I). The total number of caribou documented on transect was a total of 1919 animals over the 13 surveys carried out for the year. There were many additional observations of smaller caribou herd sizes noted off

transect; however, on 12 October 2012 there were two additional notes made of a herd size of approximate 1500 - 2000 caribou observed off the transect line. The maximum number of caribou observed in a single survey was 500 caribou on 13 October 2012. When comparing data to 2009, when the aerial survey was last completed, a total of 8,849 caribou were observed over the 12 transects for this year.

The aerial survey area covers approximately 6,300 km^2. Twelve transects were spaced 8 km apart, and the observation width along transects was 1,200 m (600 m per side), which generated 15% coverage (887 km^2) of the study area (Figure 3-1). This area covers a distance of approximately 30 kilometres in each direction from mine infrastructure associated with the Diavik Diamond Mine and the Ekati mine. A helicopter was used to conduct the survey and all were completed at 110 m to 130 m above ground level at a speed of 145 km to 160 km per hour. The survey takes approximately six to seven and half hours to complete.

In 2012, surveys began on 8 July and were flown once per week until 13 October, as weather permitted (n = 13 surveys). Two surveys were cancelled due to weather on 5 and 12 August 2012. On 13 October, the decision was made with collaboration from ENR to abort further aerial surveys for the year due to the incident of the aircraft flying the transects on the survey and a group of five caribou were spooked by the aircraft noise and huddled together on the ice and fell through (the helicopter immediately left the area, and returned later to find the caribou had made it to shore).

Impact predictions relating to the ZOI were tested through a comprehensive analysis of regional caribou data (Golder, 2011). Analysis was undertaken in 2011, this report only provides updated data. Results from the 2012 aerial survey in relation to these Zones of Influence are outlined below (Figure 3-2).

A ZOI was detected with data from 1998 to 2009 for all caribou groups in the area of the mine, with the threshold distance varying from year to year (Golder, 2011). For example, a ZOI near 40 km was noted for three monitoring years (2001, 2005 and 2009) and a ZOI of 15 km was noted in 2006. However, large lakes such as Lac de Gras appear to have a stronger influence on the distribution of caribou when compared to the level of activity at the mine, in some years (e.g. 2005 and 2009). The calculated zones of influence varied from year to year, but not in a progressively increasing manner (Golder, 2011). There was no relationship between the extent of the ZOI and the level of activity at the Diavik mine site.

Figure 3-2 Distribution of caribou within the survey area in relation to estimated ZOIs - based on aerial survey data, 2012 southern migration

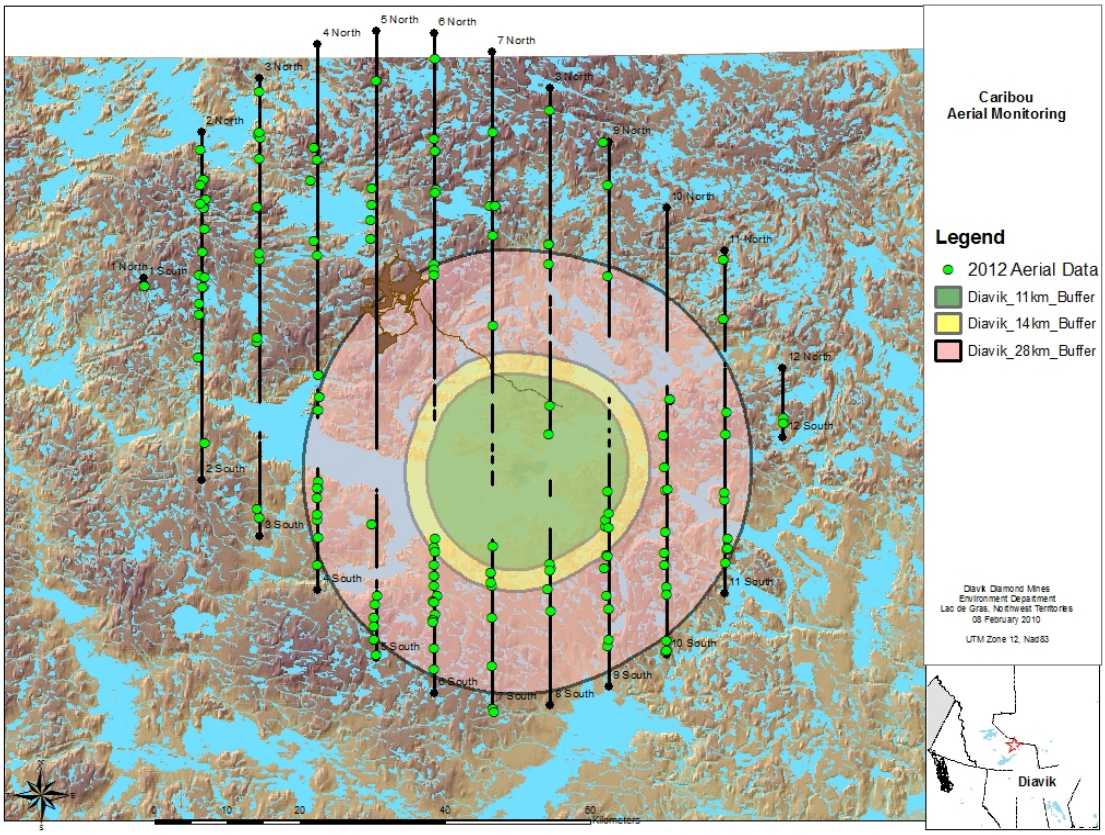
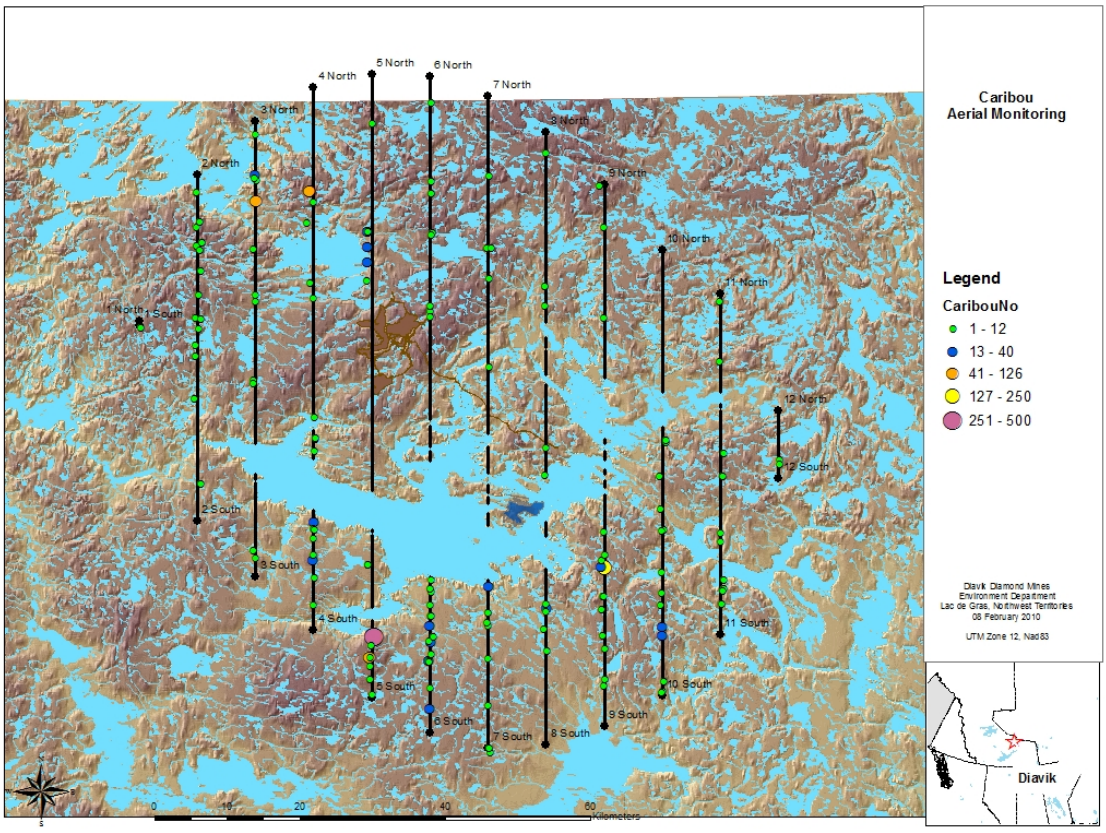


Figure 3-3 Number of Caribou observed during Aerial Surveys, 2012



3.3 Changes to Behaviour

In an attempt to obtain more localized effects data on caribou behaviour, ground-based behavioural observations, or scan sampling, is conducted. These types of observations can provide useful data on potential changes in caribou behaviour as they move closer to or further from the mine. The EKATI mine regularly has caribou close to mine infrastructure, while the location of the Diavik mine on East Island is better suited to collecting observations further from the mines.

3.3.1 Methods

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 spring, 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 potential stressors include distance from mine, season, and group composition. In order to control for the effects of habitat and insect harassment, all observations were performed

within one habitat type (tundra with < 30% bedrock or boulders) and the level of insect harassment was recorded.

The group was scanned every 8 minutes for a minimum of 4 observations and a maximum of 8. For each scan, the number of animals exhibiting each type of behaviour was recorded. For all caribou groups, instantaneous observations were used to assess the response of caribou to different potential stressors as a function of distance. 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 1-2 minutes), and would begin scanning observations again. For the scan observations, weather conditions such as wind speed and direction, temperature, and type of precipitation were documented.

3.3.2 Results

A total of 86 behavioural observations of caribou were obtained during 2012 (Appendix I). The observations (n = 86) can be categorized into the following distance categories listed in Table 3-2. Ekati did not complete any behavioural scans in 2012.

Table 3-2 Caribou behavioural observations by distance from mine infrastructure, 2012

Distance from Mine Infrastructure	Number of Scans Conducted by Diavik Personnel
≤ 2 km	0
2-8 km	2
8 – 15 km	17
15 – 20 km	11
20 – 30 km	11
> 30 km	45

A statistical analysis was conducted to assist in interpreting behavioural response mechanisms within the ZOI (Golder, 2011). Further analysis will be undertaken when sufficient data is available or when three years of aerial surveys have been completed.

3.4 Changes to Distribution

Due to construction and operations of mining areas, infrastructure, roads and an airstrip, a 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 following section describes the methods used and results obtained from aerial surveys and information provided by caribou collar locations supplied by Environment and Natural Resources (ENR). The impact prediction found 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.*

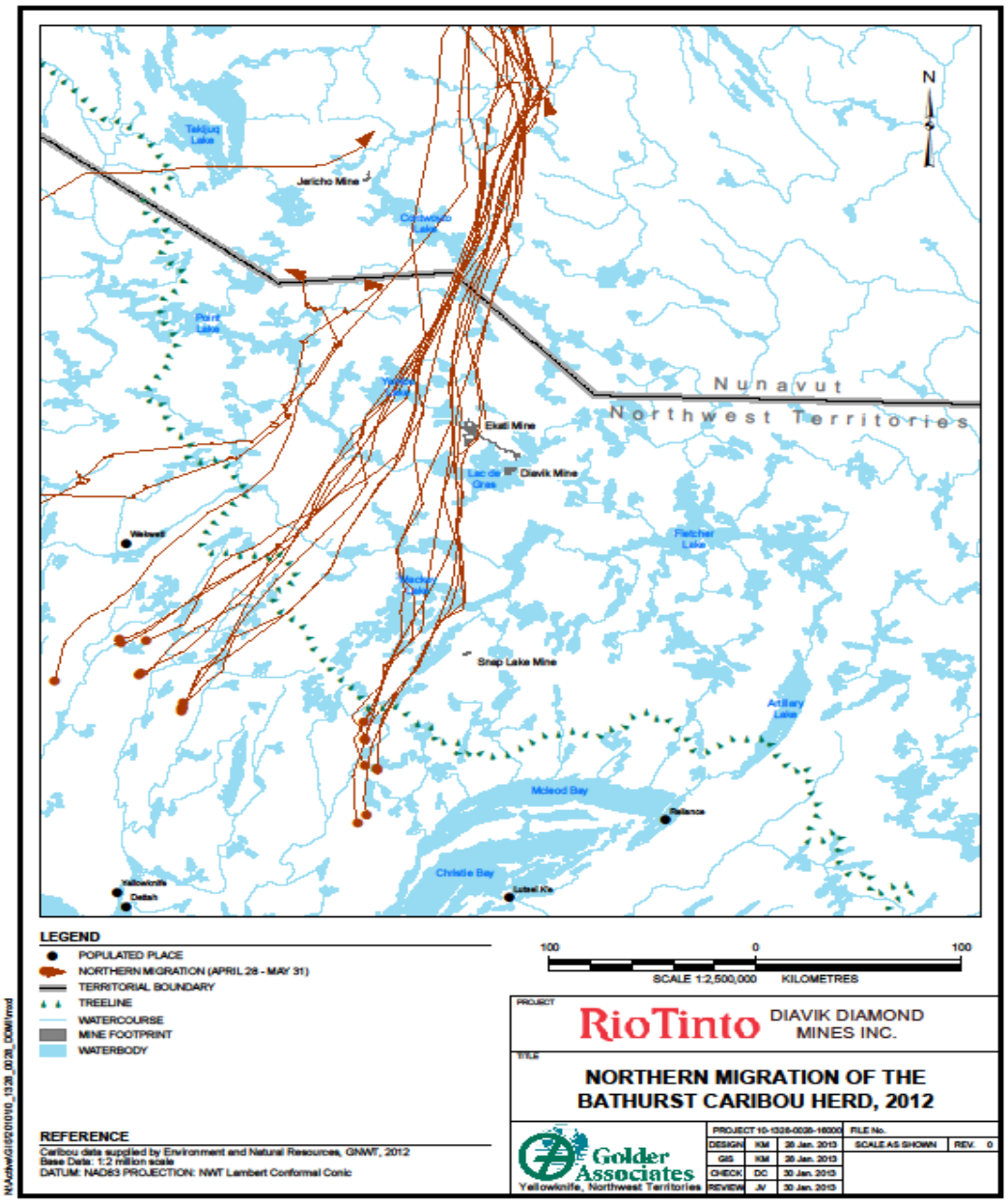
3.4.1 Methods

ENR provided daily data on the geographic location of collared cows and this information was used to show general locations of the Bathurst caribou herd during migration periods. Movements of collared Bathurst caribou during the 2012 northern and southern migrations are included in this report.

3.4.2 Results

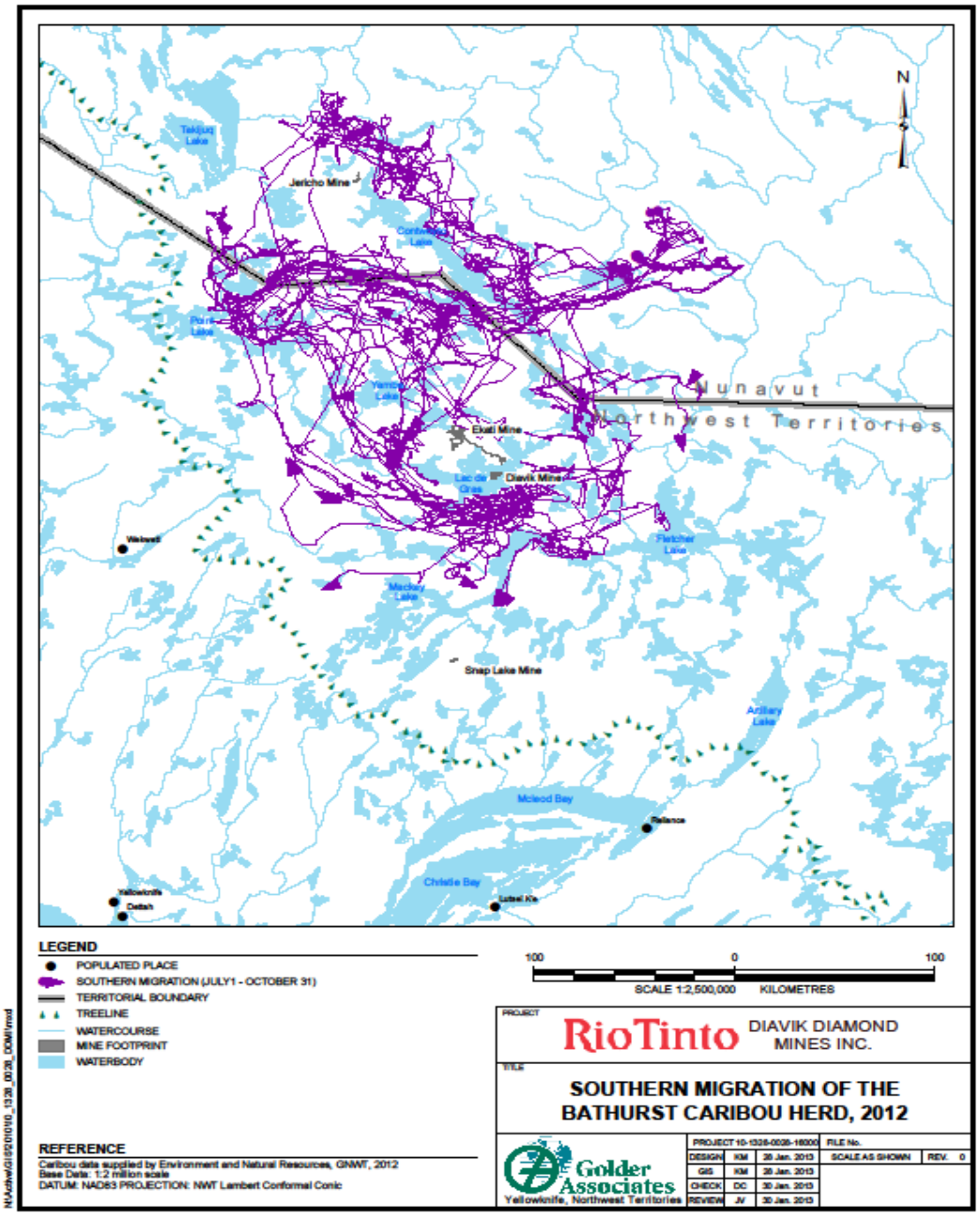
The northern migration is defined by the period when Bathurst caribou cows leave the winter range in the forest, and migrate north to the calving grounds, typically in May (Gunn et al. 2001). During the northern migration, data from satellite-collared caribou show that the majority of collared females in the Bathurst herd travelled west of the mine during the 2012 northern migration (Figure 3-4). This result appears to be in alignment with the impact prediction.

Figure 3-4 Northern Migration of Bathurst Caribou Herd, 2012



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. 2001). For 2012, collared data indicated less movement to the south of Diavik (Figure 3-5) when compared to 2011 data. The comprehensive analysis (Golder 2011) shows that from 2002 to 2010, the majority of collared caribou traveled adjacent to or through the southeast corner of the study area. Overall, data collected in 2012 for the southern migration illustrates roughly equal numbers of collared animals travelling east and west of the mine site.

Figure 3-5 Southern Migration of Bathurst Caribou, 2012



3.5 Mortality

Mineral development in the Bathurst caribou herd range has caused concerns about increased mortality, which include ground-vehicle collisions, collisions with aircraft, and accidental losses associated with caribou moving in hazardous areas around mining activities (DDMI, 1998b). Mitigation practices and policies have been developed and implemented to reduce the potential for mortalities such as, wildlife have the “right of way” on all haul roads,

suspension of blasts when caribou are within the “safe zone” of the blast, and the caribou traffic advisory. The objective for this program is to determine if the number of caribou deaths or injuries associated with DDMI mining 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 Environmental Effects Report (DDMI, 1998b) is:

Project-related mortality is expected to be low.

3.5.1 Methods

Project-related caribou mortalities are monitored in a number of ways. All personnel undergo an environmental orientation where it is stipulated that all wildlife incidents be reported. Numerous environmental data collection programs occur on East Island such as water quality sampling and dust and vegetation monitoring programs; any caribou mortalities located during these sampling events are investigated by Environment personnel.

3.5.2 Results

No project-related caribou mortalities or injuries occurred on East Island in 2012. A summary of natural and mine-related caribou mortalities from baseline through 2012 is provided in Table 3-3.

One natural caribou mortality occurred at East Island in 2012. On 28 May 2012, a caribou kill site was discovered by airstrip near a pond at 3000 ft marker. A grizzly bear sow and two cubs were present at the kill site during the time of discovery.

Table 3-3 Caribou Mortalities on East Island, 2000 to 2012

	Baseline*	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Natural Caribou Mortalities on East Island	8	7	1	1	0	2	0	0	1	0	0	0	1	1
Project-related Mortalities	0	0	0	0	0	1	0	0	0	0	0	0	0	0

*Includes data from 1995-1997

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 are to 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; these included reports from pilots and workers, Environment department road surveys on East Island and utilizing the satellite collar locations provided by Environment and Natural Resources (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 and documenting approximate caribou numbers.

3.6.2 Results

During 2012, the caribou traffic advisory remained at "No Concern" for 365 days, as caribou numbers on the island did not exceed 100 at any given time. All incidental observations of caribou are reported in Appendix V.

3.7 Monitoring Caribou at Diavik Mine

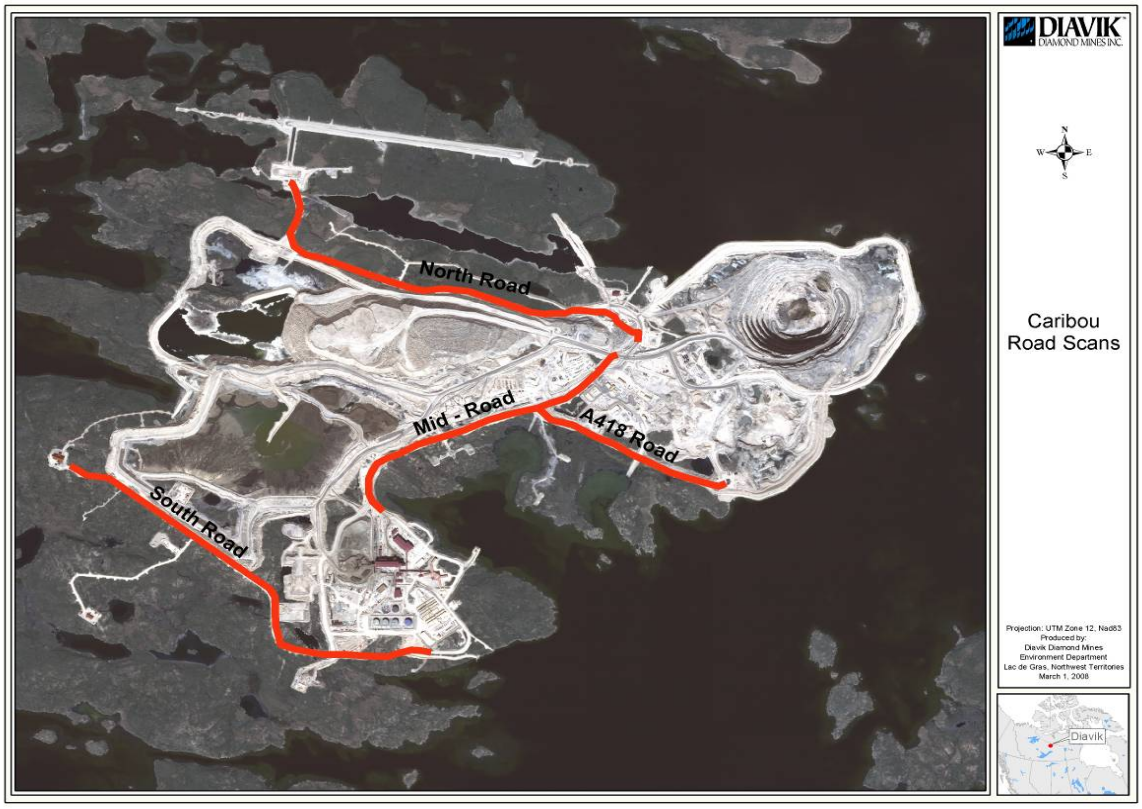
Dust deposition can influence vegetation vigour, snowmelt rates, and changes in vegetation community structure. As a result, caribou may be attracted to these areas (Gunn, 1998). Dust from Diavik's mining activities is monitored and information on this year's program can be found in the Dust Deposition Monitoring Program 2012 Annual Report (DDMI, 2012).

3.7.1 Methods

Road observations were conducted twice a week from mid-June to the end of October to determine if caribou were utilizing 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, 50-200 m of road and greater than 200 m from the road), dominant behaviour of group, group size and group composition (Appendix II). East Island was divided up into four haul road sections (Figure 3-6) 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.

Figure 3-6 Caribou road Observation Locations, 2012



3.7.2 Results

Caribou road surveys and PKC and rock pile monitoring were conducted on 59 occasions between 15 June and 26 October 2012. Results are attached to this report as Appendix II. No caribou were observed during the PKC and rock pile surveys or during the road surveys in 2012.

3.8 Caribou Herding

While on the island, caribou movements were monitored so that mine site personnel were 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, DDMI implements its standard operating procedure (SOP) for caribou herding.

3.8.1 Methods

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

3.8.2 Results

No herding was conducted in 2012.

3.9 Recommendations

Conduct caribou aerial surveys at a frequency cycle of three years on, two years off in an effort to capture changes to the zone of influence as mine activity levels decrease over time. Caribou aerial surveys will continue in 2013 in collaboration with Ekati Diamond Mine.

Evaluate survey technique to see if cameras or other types of technology can be implemented in aircraft to conduct future studies.

DDMI to look at revamping Caribou Mine site surveys (i.e-Caribou road, rock, PKC surveys). Formalize survey method to ensure accuracy in data collection, review current survey technique and explore other survey options for collecting data that enables the surveyor to visually observe area with no obstructions. Further investigate alternate methods to driving a specific set of roads. Determine adequate survey frequency for monitoring caribou at DDMI mine site.

Grizzly Bear

4. Grizzly Bear

The barren-ground grizzly bear ranges throughout most of the Northwest Territories. It is considered a 'Species of Special Concern', as assessed by the Committee on the Status of Endangered Species (COSEWIC, 2002) and as 'Sensitive' by the General Status Ranks of Wild Species in the Northwest Territories (GNWT, 2010).

Grizzly bears have low population densities, low reproductive rates and are sensitive to human activity (DDMI, 1998b). The barren-ground grizzly bears of the NWT are unique, as they have not been subjected to the 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, level of grizzly bear activity and if project-related mortalities have occurred.

4.1 Habitat loss

Grizzly bears use a wide variety of vegetation and habitats types. Studies of grizzly bears in the Northwest Territories have led to an understanding of their seasonal habitat preferences (McLoughlin et al. 2002a). Loss of habitat may result in negative effects on grizzly bears; for that reason habitat loss is calculated to determine if it is different from the prediction (DDMI 1998b), which is:

> *At full development, direct terrestrial habitat loss from the project is predicted to be 8.67 km2.*

4.1.1 Methods

Methods used to determine grizzly bear habitat loss are similar to that described in the Vegetation section. Habitat for grizzly bears was assumed to include all terrestrial habitats (i.e. all landscape types in Table 2-1 except for deep water, shallow water and disturbed).

4.1.2 Results

Cumulative direct grizzly bear habitat loss resulting from the Diavik mine was 7.55 km^2. Total disturbance is thus below that predicted.

4.2 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 of grizzly bears (Gau and Case, 1999). The revised impact prediction determined 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.

Surveys for grizzly bear sign were previously used to monitor the presence of grizzly bears; however, this methodology was discontinued in 2009 due to safety concerns associated with the field work component of the program. In 2010, a pilot study using a hair-snagging technique was initiated to assess its effectiveness in determining grizzly bear presence in the Diavik wildlife study area.

4.2.1 Methods

In 2012, Ekati and Diavik jointly completed the Grizzly Program 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. 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 on session 3, fish oil on session 2, and sweeter scented oils on session 1) 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 moved between each sampling period; therefore, a novel scent combination was used each session to prevent habituation. There were six sampling sessions between June 23 and September 4, 2012. Each session lasted 9-13 days. 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 in Nelson, BC for DNA fingerprinting.

4.2.2 Results

4.2.2.1 Grizzly Bear Hair Snagging Program

There were six sampling sessions between June 23 and September 4, 2012. The numbers of posts with grizzly bear hair varied through the six sessions from 23 (20%) to 50 (44%) (Table 4-1). Considering all sessions, there were 22 posts without hair captures, 25 posts that had one visit, 25 posts that were visited twice, 33 that were visited 3 to 4 times, and 8 that were visited 5 to 6 times. A total of 1,902 hair samples were collected and submitted to Wildlife Genetics International for DNA fingerprinting. It is hoped that the preliminary results of the grizzly bear program can be reported in April 2012. A memorandum regarding the 2012 grizzly bear program and a map of post deployments is provided in Appendix VIII.

Table 4-1 Ekati- Diavik Grizzly Bear Program Hair Collection Summary, 2012

Session	Date (2012)	Bait	Number of Posts with a Capture	Number of Hair Samples
1	June 23 to July 13	Blood	31	220
2	July 6 to July 24	Fish Oil	23	149
3	July 16 to August 6	Blood	50	289
4	July 27 to August 15	Fish Oil + Anise Oil	40	358
5	August 6 to August 25	Blood	50	515
6	August 18 to September 4	Sweet Oils	32	371

4.2.2.2 Incidental Observations

Grizzly bear incidental observations on East Island in 2012 totalled 97 sightings over 77 days (Table 4-2). It is important to note however that the actual number of bears on site is unknown, as the same bear(s) were be observed on multiple occasions (Appendix V). To date, 2012 currently has the highest number of bear observations on East Island.

Table 4-2 Average Camp Population and Number of Incidental Grizzly Bear Observations by Year, 2002-2012

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

A grizzly bear with two cubs frequented East Island for much of the summer, from approximately 27 April to 22 June 2012. They were first sighted by the Shallow Bays. DDMI Environment later confirmed that a grizzly bear den was present in this area. It is suspected that the sow and two cubs wintered on East Island during the winter of 2011/2012.

The last recorded grizzly bear observation occurred on 3 October 2012 when a sow and three cubs was observed on the East Island.

4.3 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 sessions continue to help raise employee awareness and response, and contributed to the timely reporting of bears approaching site. This, in turn, 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 Environmental Effects Report (DDMI, 1998b) is:

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

4.3.1 Methods

Project-related incidents and mortalities are reported to Environment staff for documentation.

4.3.2 Results

No grizzly bear injuries, mortalities occurred during 2012 (Table 4-3), however a relocation effort occurred on 22 June 2012, to move the sow and two cubs away from East Island.

Table 4-3 Grizzly Bear Statistics for All Monitoring Years

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

In 2012, a total of 97 observations occurred on East Island and an additional three sightings were noted off East Island (Table 4-2). On 25 April 2012 a single bear was observed by Dust Gauge 5, (north of Diavik), on 1 June 2012, sow and two cubs were observed at M-lakes on Mainland and lastly on 31 Aug 2012 the sow and two cubs were observed at West Island. These observations occurred over 77 days between 25 April and 3 October 2012. Deterrent actions were used primarily consisting of pen launched bear bangers and vehicles to protect people and property by moving the bears off to a safe distance (Appendix V). During twenty eight of the deterrent events, a helicopter was utilized to assist with moving bears away from infrastructure, or to a safer water crossing. The helicopter is used to relocate bears that are frequenting the island for extended periods of time or is utilized where other deterrent actions are not effective. The pen launchers are a successful deterrent when used on bears that are not exposed to the launchers in the past; this can also be an effective deterrent measure when used strategically on bears exposed to the noise maker in the past.

On 22 June 2012, a sow and two cubs were relocated away from mine property. ENR Officers undertook the relocation process. The sow and two cubs were tranquilized and captured on the East Island, then moved with the helicopter 62 km east of Diavik. They were observed on the East Island again on 10 August 2012, and were observed frequently until the

beginning of September. Construction began at the Diavik Diamond Mine site in the year 2000. The calculated mine mortality rate over the past ten years is 0.10, which falls below the range predicted during the environmental assessment.

4.4 Recommendations

For DDMI and Ekati Mine to continue with the grizzly bear hair-snagging program that was implemented in 2012. Explore options for setting up cameras at various post locations to review footage of animals encountering the tripod enclosure. This program will be conducted again in 2013.

Wolverine

5. Wolverine

Wolverines are year round residents in the Lac de Gras area (DDMI, 1998b). COSEWIC assessed the wolverine as a Special concern in 2003 due to the naturally occurring low numbers and the impact of human development on wolverine habitat (COSEWIC, 2003). The wolverine receives no special protection in the NWT but several studies are currently underway to collection information on age classes, sex ratio, home ranges and harvest patterns of wolverine on the tundra (GNWT, 2013).

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 (Penner, 1998). This potential has been demonstrated during baseline, construction, and operations in the Lac de Gras area.

5.1 Presence and Distribution

The objective for this program 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.*

5.1.1 Methods

Wolverine presence around the Diavik Diamond Mine was monitored in three ways: snow track surveys, hair-snagging and incidental observations at site. Representatives of DDMI record all incidental sightings of wolverines on East Island.

A new study design for wolverine snow track counts was introduced in 2008. Wolverine snow track surveys are now conducted by snowmobile along 40 transects. Each transect is 4 kilometres (km) in length, totalling 160 kilometres for the study. Each route is driven once by snowmobile in March or April and all wolverine tracks and other sign (digs and dens) are recorded. The snow track surveys began in 2003, and has been conducted with the assistance of a community member, when available.

The wolverine DNA research program is a regional research program conducted in partnership with the GNWT-ENR and BHP Billiton. The survey is carried out during the month of April by snowmobile. A total of 134 posts (4”x 4” x 5’ in length) 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 a genetics laboratory

for DNA analysis. The DNA research program was conducted in 2005, 2006, 2010 and 2011. This program is also conducted with the assistance of community members.

5.1.2 Snow Track Results

The spring wolverine snow track survey was conducted from 28 March to 3 April 2012. A total of 22 wolverine tracks were encountered on the 40 transects surveyed (Appendix III). This resulted in a track index of 0.14 wolverine tracks per kilometre (Table 5-1).

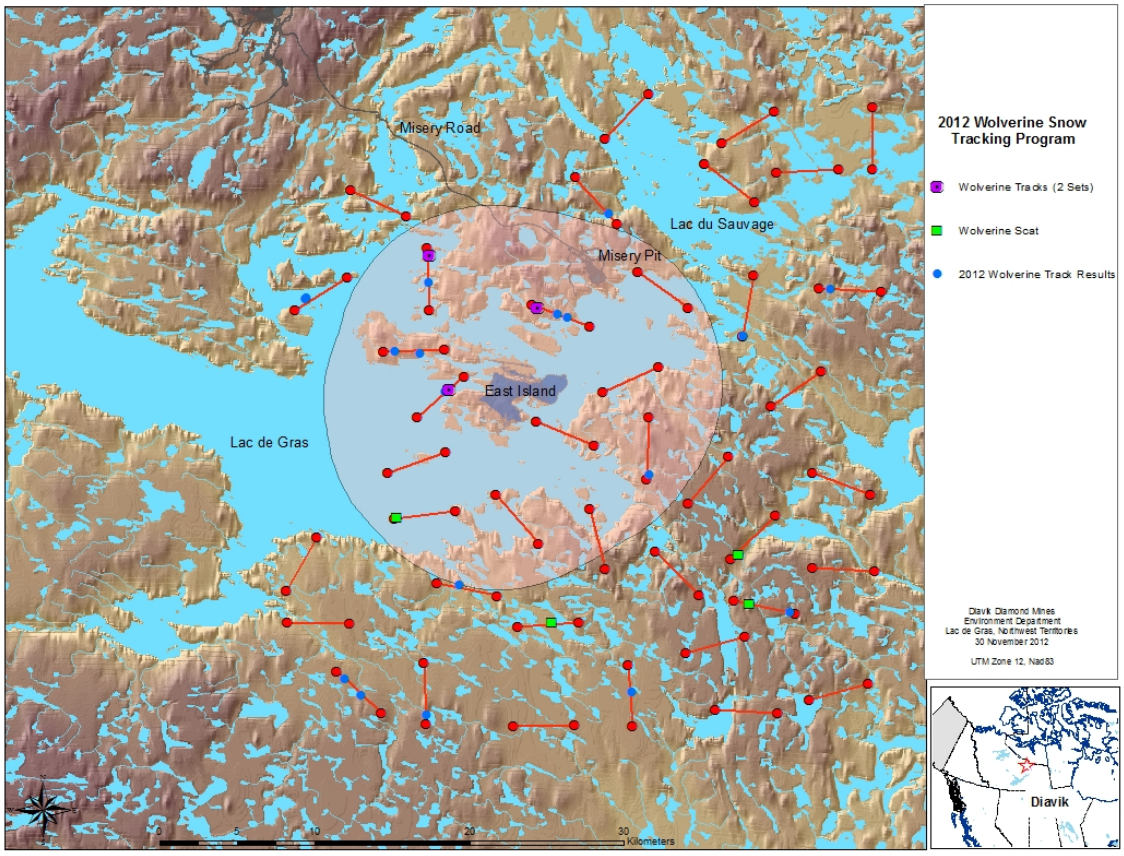
Table 5-1 Wolverine Track Index and Mean days Since Snow Fall, 2003-2012

	Spring 2003	**Spring 2004**	**Winter 2004**	**Spring 2005**	**Winter 2005**	**Spring 2006**	**Spring 2008**	**Spring 2009**	**Spring 2010**	**Spring 2011**	**Spring 2012**
Tracks Encountered	13	16	12	7	16	5	15	12	N/A **	27	22
Distance Surveyed (km)	148	148	148	148	148	148	160*	152	160	160	160
Track Index (Tracks/km)	0.09	0.11	0.08	0.05	0.11	0.03	0.09	0.08	N/A **	0.17	0.14
Mean Days Since Snow	2	4	4	7.5	2	1	2	1	N/A **	1	2

* A new survey technique was introduced in 2008.
** Survey was not completed in 2010 due to community assistant not being available to participate in survey.

One seasonal position, Ericson Sanguez, participated in the wolverine snow track survey in 2012. The predominant sign identified during the 2012 survey was wolverine tracks, with four observations of scat. There were three occasions during the course of the program where two sets of tracks were identified at one given location, suspected to be a male and female or female and young (Figure 5-1).

Figure 5-1 Wolverine Snow Tracking Program, 2012



Wolverine snow track densities for 2012 show an index of 0.25 tracks per kilometre for all transects located within 10 km and an index of 0.09 tracks/km for those transects outside 10 km zone.

5.1.3 Hair Snagging Results

The wolverine hair snagging program was not conducted in 2012, and is next scheduled for 2014.

5.2 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 Diavik 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 mining related mortalities to prevent any changes to wolverine population parameters.

5.2.1 Methods

Project-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. This information is tabulated and provided for annual comparisons.

5.2.2 Results

Since 2000, two wolverines have been relocated and two mortalities have occurred at the Diavik mine site. There were no mortalities on site during 2012 (Table 5-2). However; on 3 August 2012 two deceased wolverines were found inside the burnable bin at West Island off site from DDMI.

A total of 11 sightings occurred on East Island and an additional two observations were noted off East Island in 2012; one deterrent effort was taken utilizing the truck to move the wolverine from UG warehouse area into the North Inlet (Table 5-2). All incidental observations of wolverines on East Island during 2012 were recorded by Diavik staff (Appendix V). Wolverines are scavenger animals and the incidental observations in 2012 were mainly wolverines passing through a particular. It appears that the wolverines are not frequenting East Island for extended periods of time; meaning they are not finding rewards and that DDMI Waste Management practices are being followed.

Table 5-2 Wolverine Statistics for All Monitoring Years

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

*Includes Wolverine occurrences recorded at three different camps (i.e. Diavik, Kennecott, and/or Echo Bay Road camps) Yearly numbers are not available for baseline investigations.

5.3 Recommendations

DDMI is planning to participate in another DNA research program with both Ekati and GNWT in 2014.

Waste Management

6. Waste Management

Diavik Diamond Mines Inc. (DDMI) is committed to taking all the necessary steps so that the collection, storage, transportation and disposal of all wastes generated by the project are being conducted in a safe, efficient and environmentally compliant manner. The DDMI Waste Management Plan, an integral part of Diavik Diamond Mines' Environmental Management System, focuses on minimizing the generation of wastes at points of use, optimizing the usage of materials before disposal and facilitating the collection and processing of wastes with the least adverse effects on the physical and biological conditions at site.

Along with the ideals of the four R's embodied in the Waste Management Plan (Appendix VII), namely reduction, recovery, reuse and recycling, there are several mitigation practices to prevent and reduce adverse impacts on wildlife. These practices include, but are not limited to, incineration of all food wastes, categorical segregation of all non-food waste for storage and subsequent removal from site, and on-site disposal. All of these methods are designed to limit wildlife attraction.

Incineration, segregation and storage of waste takes place at the DDMI Waste Transfer Area (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 meter 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 new water scrubbed incinerators were installed and operational in October 2012 and are located within the incinerator building. The majority of wastes are inventoried and stored at the WTA while awaiting backhaul on the winter ice road.

On-site disposal of non-burnable wastes such as steel, plastics and glass currently occurs at the inert landfill located within the Type 3 waste rock pile. These materials are covered with waste rock on a regular basis to prevent wildlife attraction.

6.1 Methods

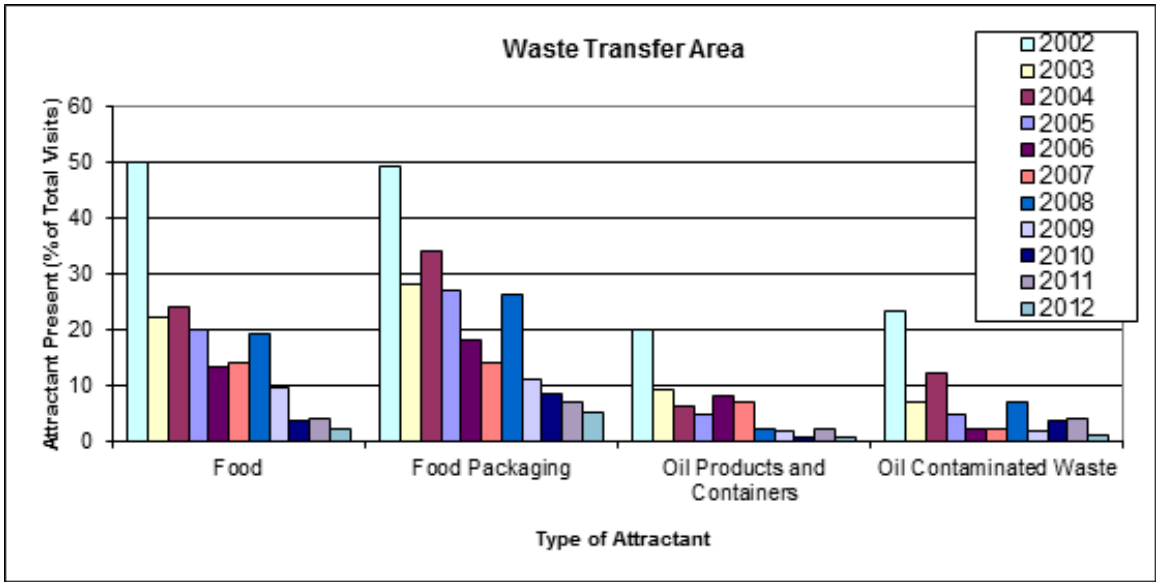
Waste inspections are conducted to check that all waste segregation, storage and disposal procedures set out in the DDMI Waste Management Plan are being followed, thereby preventing the attraction of wildlife and protecting environmental integrity. Environment personnel record all occurrences of improperly disposed waste materials that attract wildlife, as well as all wildlife sign and observations. Any infractions are reported to waste management personnel for immediate rectification.

In 2012, inspections of the Waste Transfer Area (WTA) and Inert Landfill were conducted every two days beginning 1 January and ending 31 December. Inspections consisted of Environment personnel walking the area of the WTA and landfill, where safe to do so, and documenting the type and number of attractants found, as well as wildlife species or fresh sign that were present during the survey.

6.2 Results

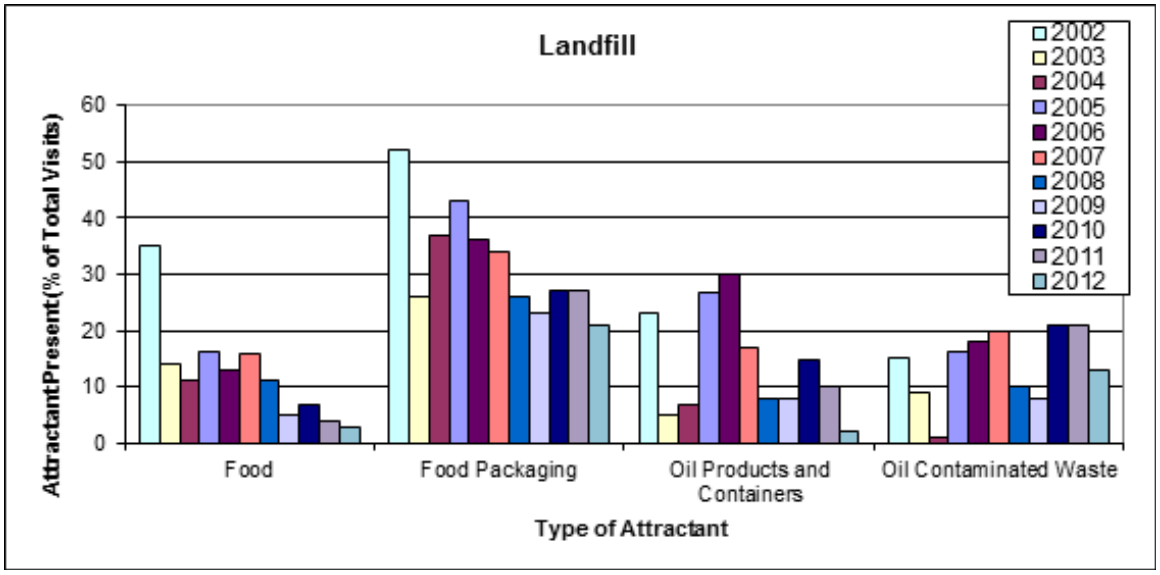
The presence of attractants in the WTA has declined since monitoring began in 2002 (Figure 6-1). During 2012, potential wildlife attractants (i.e. oil contaminated waste and food) were found at the WTA on 9% of the 179 inspections. Food packaging was the most commonly observed attractant, found during 5% of all inspections (Figure 6-1).

Figure 6-1 Percentage of Total Inspections Identifying Attractants at the Waste Transfer Area 2002-2012



At the landfill, attractants were found on 39% of the 176 inspections, and the occurrence of each attractant was found to decrease when compared to the previous year. Food packaging was the most commonly found attractant, having been observed during 21% of all inspections during 2012 (Figure 6-2).

Figure 6-2 Percentage of Total Inspections Identifying Attractants at the Inert Landfill 2002-2012



Wildlife was observed on 47% of all inspections of the WTA, and on 8% of inspections at the landfill. Wildlife sightings remained was similar compared to 2011 inspections at both the Landfill and WTA. Foxes were the most frequently observed wildlife at the WTA with 57 observations in 2012, and ravens were the most frequently observed wildlife at the Landfill with eight observations in 2012 (Table 6-1).

Wildlife sign was found on 36% of visits to the WTA and 16% of visits to the landfill. There was a 1% increase in the amount of wildlife sign observed at the landfill compared to 2011 inspections, and wildlife signs at the WTA decreased 5% when compared to 2011 inspections. The most commonly observed sign, as with previous years, was associated with foxes (Table 6-1).

Table 6-1 Occurrences of Wildlife or Wildlife Sign during Waste Inspections, 2012

	WTA (179 visits)		Landfill (176 visits)	
	Wildlife	**Wildlife Sign**	**Wildlife**	**Wildlife Sign**
Gull	1	0	0	0
Raven	27	6 tracks	8	3 tracks, 1 scat
Fox	57	3 scat, 56 tracks	6	1 chew,1 scat, 23 tracks
Hare	0	0	0	0
Ground Squirrel	0	0	0	0
Wolverine	0	0	0	0
Wolf	0	0	0	0
Grizzly Bear	0	0	0	0

Presence of wildlife at the WTA and landfill are summarized in Figures 6-3 and 6-4, respectively. Wildlife sightings within the landfill have remained similar across all years. Ground squirrel and hare sightings were more common during 2002, and likely decreased due to increased infrastructure (rock pile and crusher) in the area of the landfill. There was an increase in fox observations at the Waste Transfer Area in 2012 compared to 2011. Fox observations at the Landfill were the same for 2012 as 2011 with a total of 6 observations for the year.

Figure 6-3 Presence of Wildlife (Sightings) at the Diavik Landfill 2002-2012

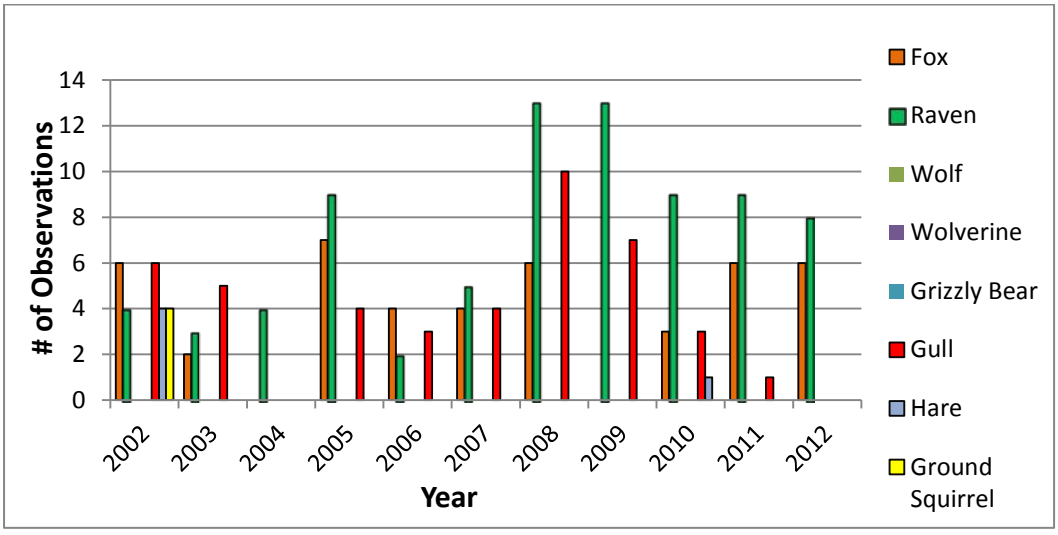
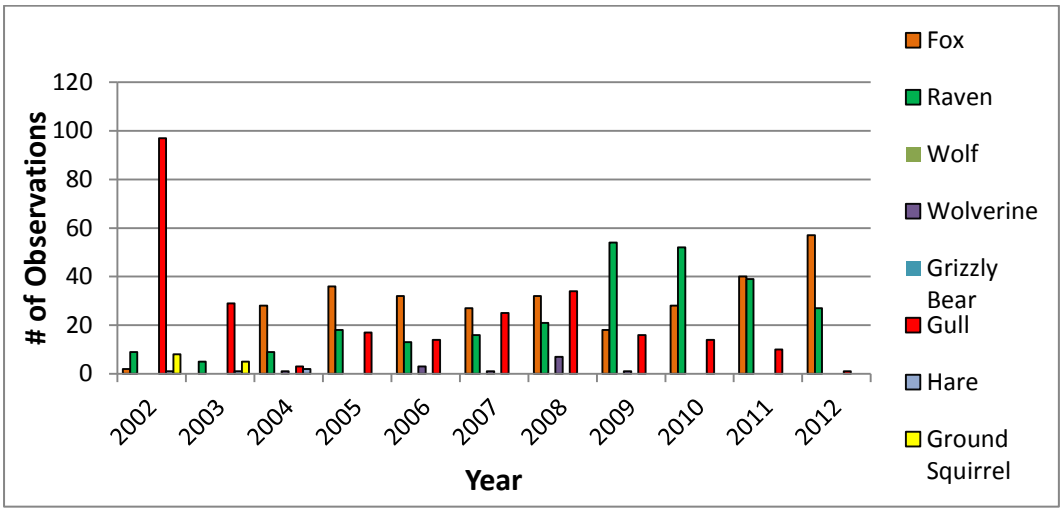


Figure 6-4 Presence of Wildlife (Sightings) at the Diavik WTA 2002-2012



Presence of wildlife sign is summarized in Figure 6-5 and Figure 6-6. Tracks are the predominant sign of wildlife in each of the waste disposal locations on site. From 2002 to 2004, an increase in the number of tracks was observed at both the landfill and at the WTA. Since 2004, the number of tracks has shown has shown minimal variation between the years; with the exception of 2009, which showed a decrease. The cause of the decrease during 2009 is likely related to the 6 week summer shut down that occurred; hence a reduction in personnel on site. To date, the highest number of wildlife sign at the landfill occurred in 2007 with a total of 62 observations. Within the WTA, observations of wildlife sign peaked during 2004 with 70 observations and then again during 2011 with 71 observations.

Figure 6-5 Presence of Wildlife Sign at the Diavik Landfill, 2002-2012

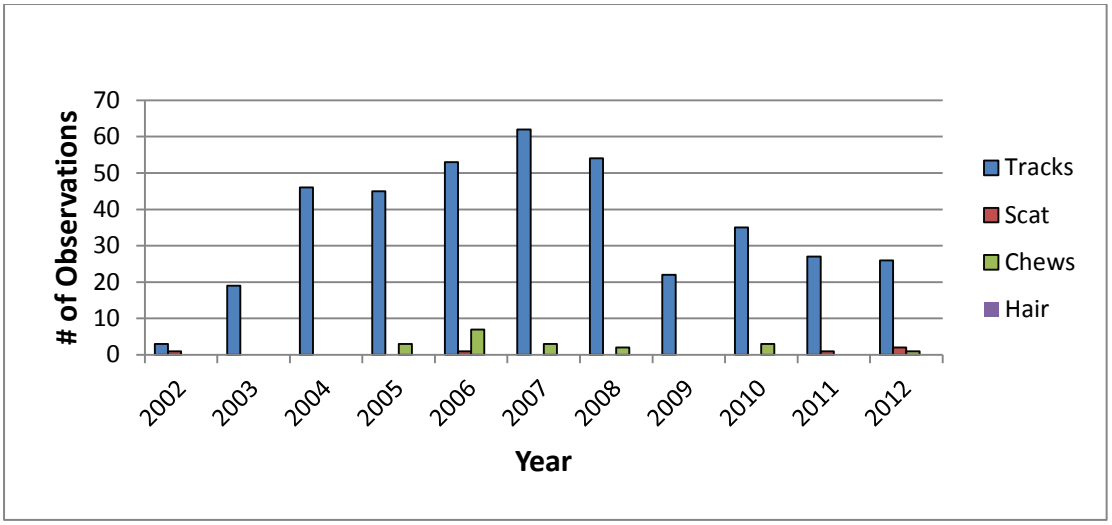
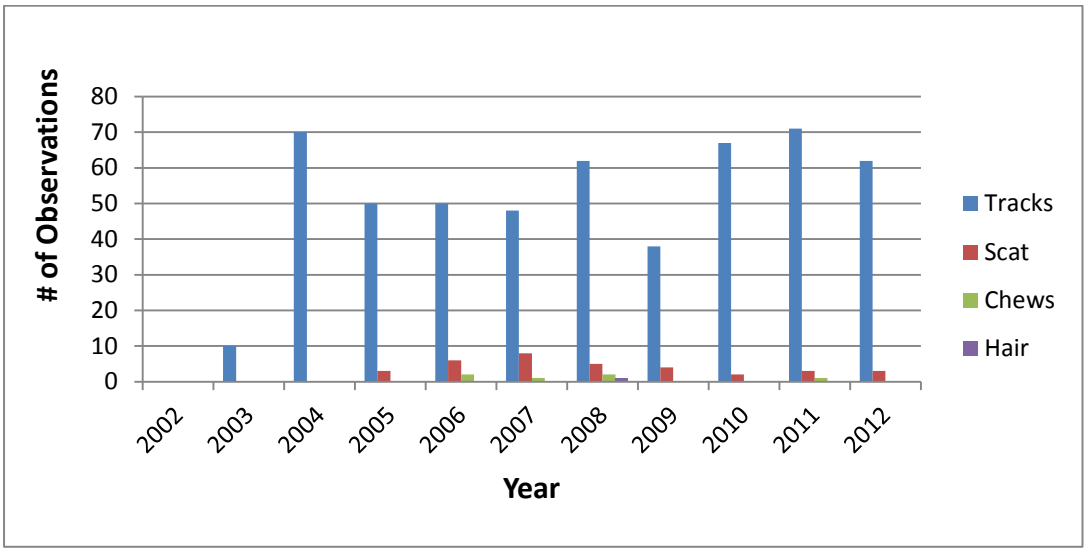


Figure 6-6 Presence of Wildlife Sign at the Diavik WTA, 2002-2012



6.3 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 2012, 1100 aluminium cans and 4750 plastic bottles were recycled. This resulted in a total donation of $3,680.00. To date total proceeds generated by Diavik is $16,741.00.

In addition to these smaller-scale programs, 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:

a. used oil, oil filters and grease;
b. used glycol;
c. aerosol cans;
d. batteries (lead-acid and dry cell);
e. expired/waste fuel (e.g. Jet B);
f. oil-based paint; and,
g. fluorescent tubes.

Diavik wishes to continue to increase recycling opportunities, with a particular focus on the waste streams generated at the mine site.

6.4 Summary

The DDMI Waste Management Plan outlines the practices in place so that materials which may act as wildlife attractants are routed toward the WTA for incineration or storage. To this end, occasional observations of attractants can be expected and should not present a problem if incineration is prompt.

The total number of observations for each type of waste occurring within the WTA has shown an overall decreasing trend since 2002 when data collection began. In 2012, the decreasing trend continues when looking at type of attractants present in both the landfill and WTA.

The landfill established in 2008 is located within the rock pile and a gate was installed in an effort to limit uncontrolled dumping in this area. Overall all attractant observations have decreased in 2012 from 2011.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.

Working in conjunction with waste management staff, DDMI continue to identify problem areas and work with all contractors and DDMI employees to resolve any issues. Numbering and inspection of waste collection bins prior to pick up has continued to be effective at facilitating communication between waste management staff and Environment, and to address issues within various departments. Unfortunately it can be difficult to identify all improper waste in the large waste collection bins prior to collection, which results in some inappropriate wastes ending up in either the landfill or the burn pit. Diavik remains committed to carrying out employee education programs related to waste handling.

Overall, procedures and mitigation strategies currently in place have been relatively successful at limiting wildlife interactions. 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.

6.5 Recommendations

There are no new recommendations for this program.

Falcons

7. Falcons

The peregrine falcon was selected as a key species because of their special management status, biological vulnerability to disturbance and that they are known to nest regularly in the Lac de Gras area (DDMI, 1998b). The peregrine falcon (*Falco peregrinus tundrius*) is listed under Schedule 3 of the Species at Risk Act as a "Species of Special Concern", as designated by the Committee of the Status of Endangered Wildlife in Canada (COSEWIC, 2007). A Species of Special Concern is defined as a wildlife species that may become a threatened or endangered species because of a combination of biological characteristics and identified threats. The General Status Ranks of Wild Species in the Northwest Territories ranks the peregrine falcon as 'Sensitive' (GNWT, 2010).

Habitat loss, sensory disturbance, and impacts to prey populations may influence raptors nesting in the Lac de Gras 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 specifically for DDMI's Wildlife Monitoring Program.

7.1 Methods

Project-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. This information is tabulated and provided for annual comparisons. The objective for this program is to determine the number of raptors killed or injured due to DDMI mining-related activities.

Pit Wall/ Mine Infrastructure inspections at DDMI were conducted bi-weekly from mid May until September. The purpose of the inspections was to determine if bird nests are present in

pit walls or mine infrastructure. If a nest is found, identify the species, check for the presence of eggs and chicks, and determine if deterrent actions are necessary. The Pit Wall/ Mine Infrastructure inspections were divided up into seven locations of the mine site: A154 Pit area, A418 Pit area, South Tank Farm, Process Plant, Powerhouse, Site Services Building and Backfill Plant. The survey was conducted by driving through area and stopping at a clear vantage point in order to thoroughly scan the area for any potential nesting locations. If any nesting activity was present or any birds of prey sighted, GPS coordinate of location are documented and notes are collected on sighting.

7.2 Results

One falcon mortality occurred at the Diavik Mine site in 2012. On the 26 August 2012, there was peregrine falcon wing remains found on the A418 dike; the cause of mortality is unknown.

Pit Wall/ Mine Infrastructure surveys were conducted 15 May 2012 until 30 September 2012. From 16 July 2012, only known nest sites were monitored until the end of September. One peregrine falcon nest was confirmed by the Process Plant behind the site Services building (Figure 7-1). This nest occupied two adult peregrines for a number of the surveys conducted. In mid-July, two to three fledglings were present in the nest. Towards the end of August there was no activity in the nest during the surveys.

For the A154 and A418 area no confirmed nest locations were observed for 2012. There were observations of gryfalcon, rough-legged hawk and peregrine falcons in these locations throughout the surveys; no confirmed nesting activities were identified (results have been attached to (Appendix IV).

Figure 7-1- Three Fledglings observed in nest by Process Plant on 5 August 2012

7.3 Recommendations

No recommendations to this program.

Waterfowl

8. Waterfowl

Diavik is within the Central Flyway waterfowl migratory route. Migratory birds often stop or "stage" to feed in the Lac de Gras area before moving on to their nesting grounds further north. Diavik's surveys include both natural (shallow bays) and man-made (mine-altered) wetlands in an effort to provide a clear picture of potential impacts of mining activities on waterfowl.

8.1 Habitat Loss

In the East Island area, shallow bays, melt-water ponds and shoreline leads have been identified as important areas for migrant waterfowl as they provide habitat requisites such as open water. The shallow bays consist of a combination of mudflats and sedge bands, which are proximate to open water and upland vegetation, providing ideal habitat for shorebirds. The shallow bays near the Diavik site are unique to the region surrounding the mine, and may therefore attract waterfowl during the spring migration when open water in other areas may be limited. Mining activities may artificially produce early open water due to dust deposition and the associated increased rate of snowmelt. This, in turn, may also attract migrating waterfowl. DDMI monitors the shallow bays of East Island to determine if there is a change in the number and species of waterfowl present.

Artificially created water habitat is also monitored to ascertain the level of use by waterfowl in those created habitats. Habitat loss (shallow and deep water) due to mining activities is also monitored to determine if more or less habitat is lost than predicted. As a result of mining activities, the Environmental Effects Report (DDMI, 1998b) stated that:

> *At full development, direct aquatic habitat loss from the project is predicted to be 3.94 km2.*

8.1.1 Methods

Habitat loss is defined as the loss of habitat utilized by waterfowl in the East Island area. Habitat loss for waterfowl was calculated using the habitat loss data presented in Table 2-1. Habitat for waterfowl included deep water and shallow water.

8.1.2 Results

The amount of shallow and deep water disturbed has remained the same since 2008. It was predicted that a total of 3.94 km^2 of shallow and deep water would be lost as a result of mine operations over the course of the mine life (DDMI, 1998b). To date, a total of 2.49 km^2 of waterfowl habitat has been lost to mine development (Table 2-1), below the predicted total habitat loss.

8.2 Presence

The objective for this component is to determine if disturbance from the mine is impacting the presence of waterfowl species. Disturbance may result from habitat loss, altered drainage patterns, dust fall, noise from mining activities and human presence (DDMI, 1998b). The following section summarizes the methods used and results obtained from yearly surveys of East Island shallow bays and mine altered water bodies. This monitoring program is used to determine if conditions are different than the predicted impact:

> *The mine is not predicted to cause a measurable change in waterfowl presence in the study area.*

8.2.1 Methods

East Island shallow bays (Figure 8-1) and mine-altered water bodies (Figure 8-2) were surveyed for waterfowl presence daily for 5 weeks during peak migration, 23 May to 25 June 2012. Shallow bay surveys continued to be conducted by Environment personnel walking the perimeter of the bays. Given the unique nature of the shallow bays in the region around the mine, no control site has been identified or monitored since initiation of this monitoring program.

All birds observed were identified in accordance with specific characteristics outlined in Petersons Field Guide to Western Birds (3rd Edition, 1990), and counted and recorded Species observations, from both the shallow bays and mine-altered water bodies, were categorized into groups based upon easily identifiable characteristics and similarities (i.e. shorebird, geese, dabbling duck and diving duck). Birds that were unidentifiable during surveys were categorized as unknown species within each group. The waterfowl presence section of this report summarizes staging waterfowl groups; specifically, shorebird, geese, dabbling and diving ducks from both the shallow bays and mine-altered water bodies.

8.2.2 Results

8.2.2.1 Shorebirds

In 2012, 9 species of shorebird were recorded during waterfowl monitoring surveys (Table 8-1). Five species observed during baseline surveys identified were also identified in 2012, these species were the Semipalmated Plover, Semipalmated Sandpiper, Least Sandpiper, Pectoral Sandpiper and the Red-necked Phalarope. Seven species were observed during baseline but were not identified in 2012; these species were the America Golden Plover, White Rumped Sandpiper, Baird's Sandpiper, Stilted Sandpiper, Dulin, Sanderling and the Common Snipe. The Semipalmated Plover, Semipalmated Sandpiper and the Least Sandpiper were observed for all monitored seasons from baseline till 2012.

Figure 8-1 Shallow Bay Monitoring Locations on East Island

Figure 8-2 Mine Altered Waters on East Island

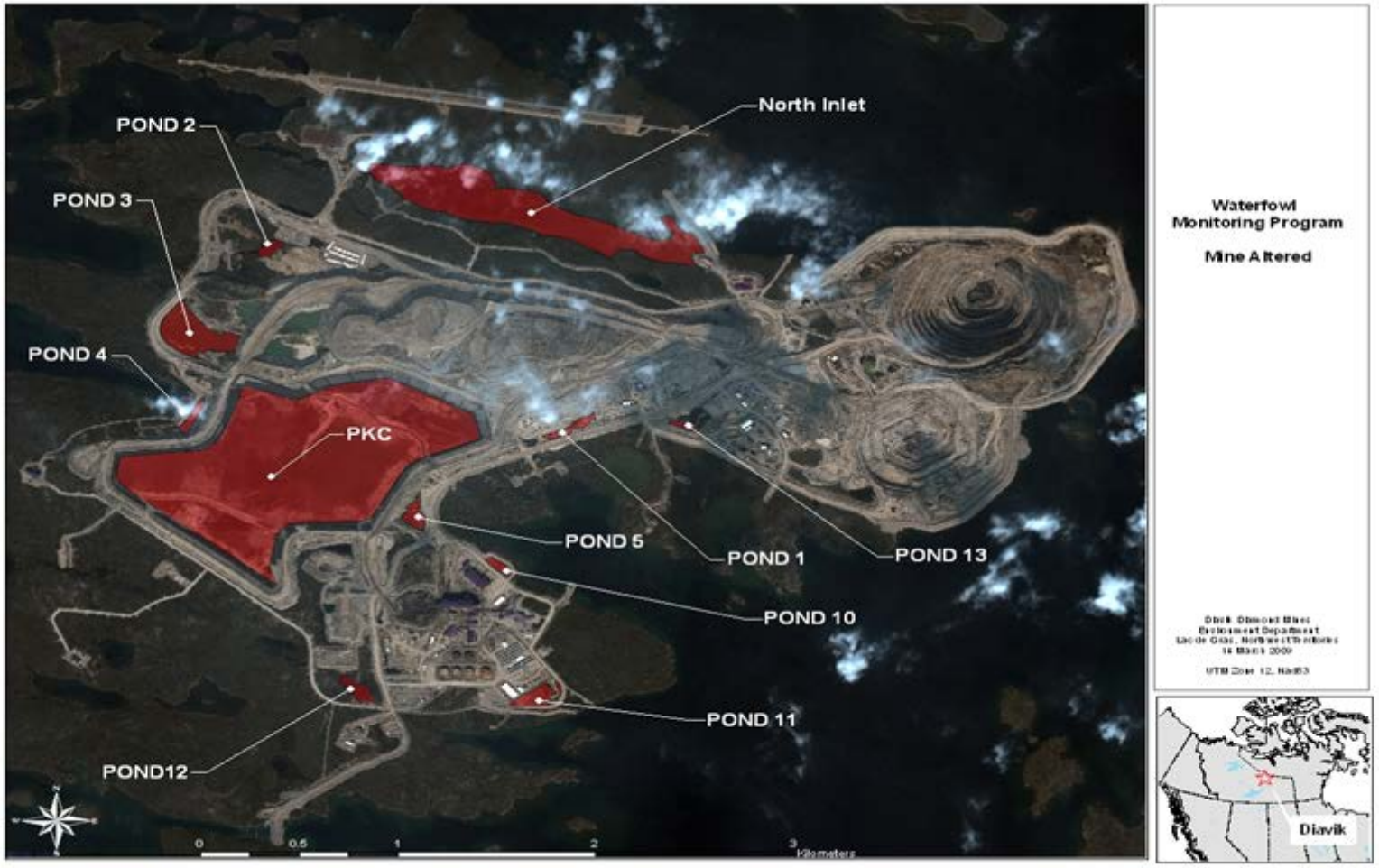


Table 8-1 Shorebird Species Present (✓) or Absent (X) on East Island for All Monitoring Years

Species	Baseline (1995-1997)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Semipalmated Plover	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Black-bellied Plover	×	×	×	×	×	✓	✓	×	×	×	×	✓	×	×
American Golden Plover	✓	✓	✓	✓	×	×	✓	×	×	✓	×	✓	×	×
Semipalmated Sandpiper	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Least Sandpiper	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
White-rumped Sandpiper	✓	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	×	×	×
Baird's Sandpiper	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	×
Pectoral Sandpiper	✓	✓	×	✓	×	×	×	×	×	✓	✓	×	×	✓
Stilted Sandpiper	✓	✓	✓	✓	×	×	✓	×	×	✓	✓	✓	×	×
Dunlin	✓	✓	×	✓	×	✓	×	✓	×	✓	✓	×	✓	×
Sandhill Crane	×	×	×	×	×	✓	✓	✓	×	×	✓	✓	×	×
Sanderling	✓	✓	✓	×	×	×	×	×	×	×	×	×	×	×
Red-necked Phalarope	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	×	✓	✓	✓
Common Snipe	✓	✓	×	×	×	×	×	×	×	×	×	×	×	×
Ruddy Turnstone	×	✓	×	✓	×	×	✓	✓	×	×	×	×	✓	×
Long billed Dowitcher	×	×	✓	×	×	×	×	✓	×	×	✓	×	×	✓
Spotted Sandpiper	×	×	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓
Lesser Yellowlegs	×	×	×	×	×	×	×	×	×	✓	×	✓	×	✓
Kill Deer Plover	×	×	×	×	×	×	×	×	×	×	×	×	×	✓

A total of 128 shorebird observations were made in 2012, 15 of which were recorded as unidentified shorebird species (Table 8-2). The Semipalmated Sandpiper was the most common species of shorebird observed in 2012 comprising of 36% of total shorebird observations. The Killdeer, Long Billed Dowitcher, Pectoral Sandpiper and Spotted Sandpiper was the least observed species for 2012 with one observation.

Table 8-2 Waterfowl Survey Shorebird Observations, 2012

Species	Observations
Killdeer Plover	1
Long Billed Dowitcher	1
Least Sandpiper	22
Pectoral Sandpiper	1
Red Necked Phalarope	4
Semipalmated Plover	37
Semipalmated Sandpiper	46
Spotted Sandpiper	1
Shorebird species	15
Total	**128**

8.2.2.2 Geese

The Canada Goose, Greater White-fronted Goose, and Tundra Swan were all identified and confirmed present on site for the 2012 monitoring season (Table 8-3).

Table 8-3 Geese Species Present (√) or Absent (X) on East Island for All Monitoring Years

Species	Baseline (1995-1997)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Canada Goose	✓	✓	✓	✓	✓	✓	✓	✓	×	✓	✓	✓	✓	✓
Greater White-fronted Goose	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Snow goose	✓	×	✓	✓	×	✓	✓	×	×	×	✓	✓	✓	✓
Tundra Swan	✓	✓	×	×	×	×	✓	×	×	✓	×	✓	✓	✓

The total number of geese observations made during 2012 was 96, 1 of which was recorded as unidentified goose species (Table 8-4). The Greater White-fronted Goose comprised 97% of observations made of goose species. The Canada Goose compromised of 1% of goose species observations for 2012. The Tundra Swan had one observation for 2012 (Table 8-4).

Table 8-4: Waterfowl Survey Goose Observations, 2012

Species	Observations
Canada Goose	1
Greater White-fronted Goose	93
Tundra Swan	1
Goose species	1
Total	**96**

8.2.2.3 Dabbling Ducks

Four species of dabbling ducks were confirmed present during the 2012 waterfowl monitoring surveys. Northern Pintail have been observed consistently since baseline, while the American Green-winged Teal, which were absent from 2002 to 2004, were recorded again for the eighth straight year (Table 8-5). The Northern Shoveler duck species was observed in 2012 for the first time over all monitoring years from baseline.

Table 8-5 Dabbling Duck Species Present (√) or Absent (X) on East Island for All Monitoring Years

Species	Baseline (1995-1997)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Northern Pintail	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mallard	✓	×	×	✓	×	×	×	×	✓	✓	✓	×	×	✓
American Wigeon	✓	×	✓	×	×	×	×	✓	×	✓	✓	×	✓	×
American Green-winged Teal	✓	✓	✓	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Northern Shoveler	×	×	×	×	×	×	×	×	×	×	×	×	×	✓

During the 2012 monitoring period a total of 175 dabbling duck observations were recorded, 16 of which were categorized as unknown duck species (Table 8-6). The Northern Pintail continues to be the most abundant dabbling duck observed accounting for 56% of all observations. The American Green Winged Teal was the least common dabbling duck identified with only nine observations during 2012.

Table 8-6 Waterfowl Survey Dabbling Duck Observations 2012

Species	Observations
Northern Pintail	98
Northern Shoveler	42
American Green-winged Teal	9
Mallard	10
Duck species	16
Total	**175**

8.2.2.4 Diving Ducks

Nine bird species categorized as diving ducks were observed during the 2012 shallow bay and mine-altered water body monitoring programs. To date, the Long Tailed Duck is the only species to be observed during baseline and all subsequent monitoring years (Table 8-7). Of interest is the appearance in recent years of scaup, mergansers, and Pacific loons.

Table 8-7 Diving Duck Species Present (√) or Absent (X) on East Island for All Monitoring Years

Species	Baseline (1995-1997)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Long Tailed Duck	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Greater Scaup	✓	✓	✓	×	✓	×	✓	✓	✓	✓	✓	✓	✓	✓
Black Scoter	✓	×	×	×	×	×	✓	×	×	✓	✓	✓	×	✓
Surf Scoter	×	×	×	×	×	✓	×	×	×	×	×	✓	×	×
Red-breasted Merganser	✓	✓	✓	×	✓	×	✓	✓	✓	✓	✓	✓	×	×
Common Loon	✓	×	×	✓	✓	×	✓	✓	×	✓	✓	✓	✓	✓
Horned Grebe	×	×	×	×	×	×	×	×	×	×	×	×	×	✓
Red-throated Loon	✓	✓	✓	×	×	×	✓	✓	✓	✓	✓	✓	✓	✓
Red Necked Grebe	×	×	×	×	×	×	×	×	×	×	×	×	×	✓
Pacific Loon	×	×	×	×	×	×	×	✓	✓	✓	×	✓	×	×
Yellow Billed Loon	×	×	×	×	×	×	×	✓	×	×	×	×	×	×
Lesser Scaup	×	×	×	×	×	×	×	✓	×	✓	✓	✓	✓	✓
Common Merganser	×	×	×	×	×	×	×	✓	✓	✓	✓	✓	✓	✓
Hooded Merganser	×	×	×	×	×	×	×	×	✓	×	×	×	×	×

In total, 78 observations were made from the diving duck category in 2012 (Table 8-8). The Long Tailed Duck was the most common diving duck observed for 2011, with 48%. Both the Horned Grebe and the Red Necked Grebe were observed in 2012 for the first time over the various monitoring years from baseline.

Table 8-8 Waterfowl Survey Diving Duck Observations 2012

Species	Observations
Black Scoter	5
Common Loon	3
Common Merganser	1
Greater Scaup	3
Horned Grebe	1
Lesser Scaup	22
Long Tailed Duck	38
Red Throated Loon	2
Red Necked Grebe	1
Loon spp.	2
Total	**78**

8.3 Habitat Utilization

The water management system for the Diavik mine includes several engineered lined ponds to collect site run off water. There are 12 mine-altered water bodies to date, each of which has the potential to provide suitable habitat for migratory birds. Specific water bodies included in surveys are the North Inlet, Processed Kimberlite Containment (PKC) area and collection ponds 1, 2, 3 (formerly the Clarification Pond), 4, 5, 7, 10, 11, 12 and 13 (Figure 8-2). 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 reclaimed by the waste rock pile.

As part of the water management system, the water within the North Inlet was lowered, which resulted in exposed “new” shoreline habitat that may potentially be used by waterfowl and shorebirds. The PKC area was constructed in 2002, and waters that could potentially be used by waterfowl are stored in this area for use within the diamond process plant. Use of these areas will be monitored by DDMI to determine the extent to which early open water or vegetation growth may attract waterfowl. These data can then be compared to that of East Island’s shallow bays, which have not been substantially altered by mine activities.

The objective is to determine if waterfowl are using mine-altered waters, thereby determining if:

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

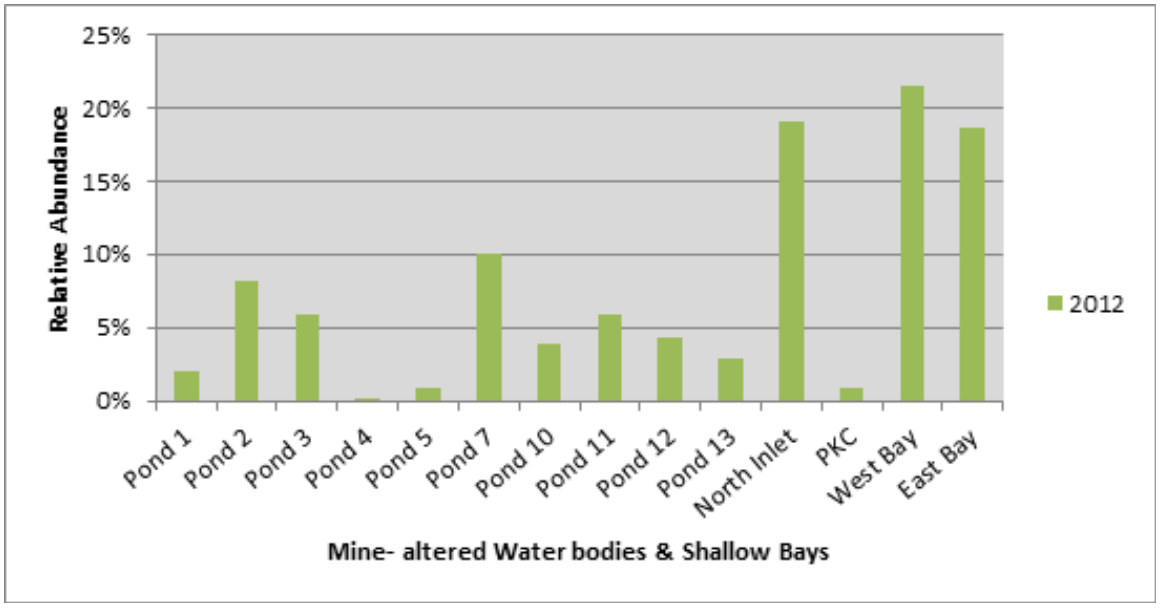
8.3.1 Methods

Mine-altered water bodies and East Island shallow bays were surveyed daily from 23 May to 25 June 2012. In accordance with the 2012 DDMI waterfowl 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.

8.3.2 Results

Monitoring surveys conducted on the shallow bays and mine-altered water bodies of the Diavik mine site resulted in a total of 684 bird observations. The West and East shallow bays each accounted for 21% (147) and 19% (128) of all observations, respectively. Mine-altered water bodies combined accounted for the remaining 60% (409) of observations (Figure 8-3).

Figure 8-3 Relative abundance of observations by habitat area

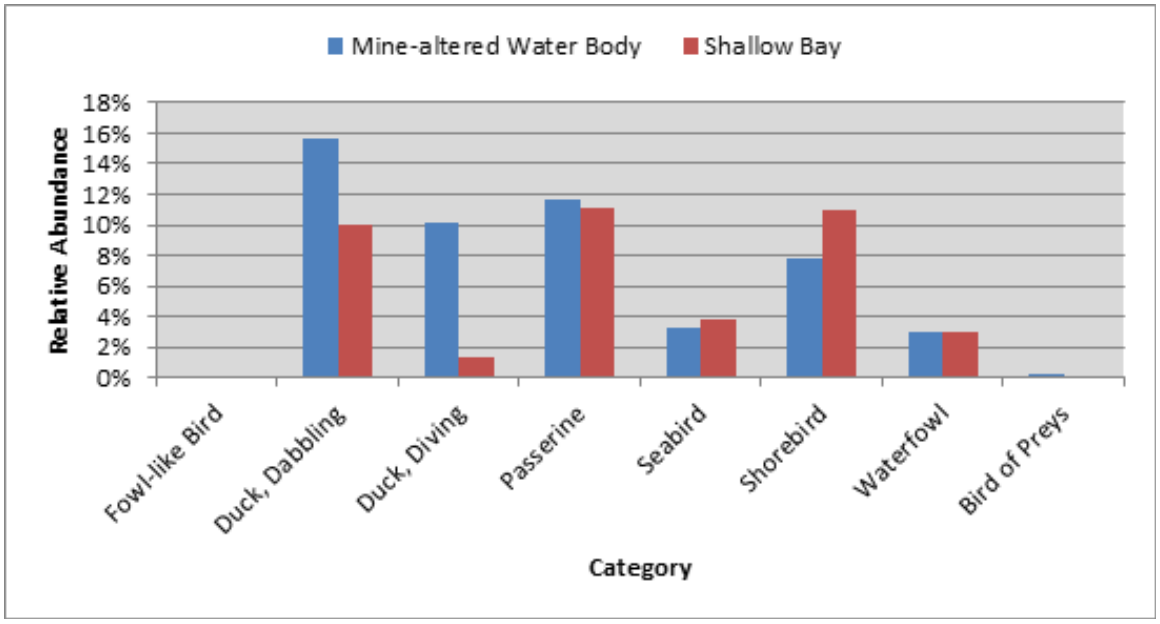


In 2012, as with previous years, the majority of observations in mine-altered water bodies occurred at the North Inlet (Figure 8-3). Overall distribution has remained fairly constant, in that the majority of observations continue to occur in the larger water bodies.

Overall, there was a total tend of 145 more bird observations in 2012 than in 2011 (when there were 539 Observations). When comparing relative abundance of waterfowl monitoring categories between shallow bays and mine-altered water bodies a noticeable habitat preference seems to be apparent for shorebirds and diving ducks (Figure 8-4). Diving ducks tend to prefer the mine-altered water bodies such as the North Inlet; the mine-altered water bodies which have deeper water and a shoreline of rock outcrops suitable for nesting ducks.

The data for 2012 also show a preference for dabbling duck to mine-altered ponds and shorebirds to the shallow bays.

Figure 8-4 Relative abundance of Waterfowl on Shallow Bays vs. Mine-altered water bodies, 2012



8.4 Recommendations

DDMI will be reviewing and evaluating the current waterfowl program to see if any improvements can be implemented for collecting the data.

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Appendix I
Caribou Behavioural Observations

Appendix II
Caribou Road, Rock Pile, PKC Observations

Appendix III
2012 Wolverine Track Survey Results

Appendix IV
Pit Wall/Mine Infrastructure Summary

Appendix V
Incidental Observations - Caribou, Wolverine and Grizzly Bear

Appendix VI
Wildlife Management Plan

Appendix VII
Waste Management Plan

Appendix VIII
Grizzly Bear Program Memorandum