

# **Recommendation for the Diavik Diamond Mine Program Description**

Prepared for

**Environmental Monitoring Advisory Board**

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Prepared by



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## Executive Summary

The Environmental Monitoring Advisory Board (EMAB or the Board) for the Diavik Diamond Mine Inc. (DDMI) Project requested that Management and Solutions in Environmental Science Inc. (MSES) recommend improvements to the monitoring, mitigation, and management actions associated with the Wildlife Monitoring Program for the Diavik Diamond Mine. These recommendations may be considered during the development of a Program Description by DDMI in 2020. EMAB has recommended that Diavik collaborate with EMAB, the Government of the Northwest Territories (GNWT), and the Traditional Knowledge (TK) panel when developing the Program Description.

The annual data collection is mandated to follow a Wildlife Monitoring Program (WMP), developed in 2002, which determined the testable questions and the objectives that need to be addressed through the life of the project. The WMP is a requirement of the Diavik Environmental Agreement, which is an agreement between DDMI, local Indigenous groups and the federal and territorial governments that formalizes Diavik's environmental protection commitments. The annual review of the Wildlife Monitoring Reports (WMR) assists the Board in partially fulfilling its mandate as outlined in the Diavik Environmental Agreement. Since 2004, MSES reviewed the WMRs and Wildlife Comprehensive Analysis Reports (WCARs) to evaluate how the WMP was and is adhered to. In the course of 2010, MSES participated in several communications with DDMI and other parties where a number of recommendations were discussed in workshops and other venues to adapt the data collection in light of the information available at the time (Handley 2010). These recommendations, in part, altered the objectives of the 2002 WMP which are now reflected in the WMRs since 2011. Below, we have summarized our key recommendations for the Program Description.

### **Vegetation and Wildlife Habitat (Landscape Changes)**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### **Barren-Ground Caribou**

#### ***Habitat Loss***

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

#### ***Movement***

- **ZOI Monitoring should continue as a component of the WMP. We recommend utilizing multiple lines of evidence (i.e., aerial survey, satellite collar data) to confirm the presence/absence and potential size of a ZOI.**
- **We recommend that the ZOI Technical Task Group (TTG) reconvene to discuss and determine the approach to future ZOI monitoring, including the need for additional aerial surveys.**
- **Should the TTG determine the need for additional aerial surveys, we recommend revising sampling methods to address some of the data analysis issues found using the old design (e.g. geometric phenomena (Golder 2020, pg.33)).**

### ***Behaviour***

- **We continue to emphasize the importance of these data in understanding the influence of the Mine on caribou and recommend that DDMI continue their efforts to collect caribou behaviour data.**
- **The methods for data collection currently being applied to this component are appropriate.**
- **Regarding caribou activities other than foraging, we recommend DDMI evaluate whether the data can be pooled and analyzed while considering covariates such as year, gender, and distance to the Mine.**
- **The combination of walking with running and trotting in the 2011 behavioural analysis may be diluting the effect of trotting and running (higher energy activities). We recommend DDMI compare caribou running bouts as a function of distance. Please also consider grouping or separating running and trotting activities for the analysis.**

### ***Distribution***

- **Further data collection and analysis is required to understand clearly why the impact prediction in the EER was incorrect regarding the southern (fall) migration.**
- **The methods applied to this component may not be appropriate. If the monitoring results do not follow the prediction for the southern migration (as for 7/8 of the most recent years of monitoring; between 2011 and 2018) but one can still conclude the population is connected, then it seems that an incorrect test is being applied in the WMRs.**
- **Migration predictions were based on a least-cost path (friction) analysis. As such, DDMI should consider whether changes in the southern migration have a consequence for caribou energetics. DDMI should consider an approach that evaluates the energetic cost of migration (e.g. “cost-of-movement index”).**

### ***Incidents and Mortality***

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### ***Advisory***

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### ***Caribou Herding***

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

## **Grizzly Bears**

### ***Habitat Loss***

- The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.

#### ***Presence and Distribution***

- The methods applied for this part of monitoring are adequate. We continue to support DDMI's involvement in the GNWT hair snagging program but recognize that annual surveys may not be necessary given the stable regional grizzly bear populations and no apparent negative demographic effects associated with the presence of the Mines.

#### ***Incidents and Mortalities***

- The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.

### **Wolverine**

#### ***Presence and Distribution***

- The methods applied for the snow track component of the monitoring program are adequate. We recommend the continuation of the snow tracking program to monitor impacts of the mine on wolverine detectability, occupancy, colonization and extinction.
- The methods applied for the hair snagging component of the monitoring program are adequate. We recommend that the schedule for future hair snagging be determined in collaboration with GNWT-ENR. Given the findings of the MSOM which shows distance to the Mines effects wolverine occupancy, ongoing monitoring of population size and stability would be prudent to ensure negative impacts of the Mines on wolverines do not lead to population extinction.

#### ***Incidents and Mortalities***

- The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.

### **Raptors**

#### ***Nest Site Occupancy***

- The methods applied to determine if pit walls or other infrastructure are utilized as nesting sites for raptors are adequate. We support DDMI's continued Pit Wall/Mine Infrastructure monitoring for nesting raptors. Keep this component of the monitoring program.
- The methods applied to determine nest success in areas of development and document effectiveness of deterrent efforts are adequate. We support DDMI's continued contribution to regional nest monitoring. Keep this component of the monitoring program.

#### ***Incidents and Mortalities***

- The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.

### **Waste Management**

- The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.

### **Adaptive Management**

- Please continue to discuss how the information gained from the various wildlife datasets could be used in terms of mitigation and adaptive management for the Diavik Mine in particular and for other future projects in the region in general.

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## 1.0 Introduction

The Environmental Monitoring Advisory Board (EMAB or the Board) for the Diavik Diamond Mine Inc. (DDMI) Project requested that Management and Solutions in Environmental Science Inc. (MSES) recommend improvements to the monitoring, mitigation, and management actions associated with the Wildlife Monitoring Program for the Diavik Diamond Mine. These recommendations may be considered during the development of a Program Description by DDMI in 2020. EMAB has recommended that Diavik collaborate with EMAB, the Government of the Northwest Territories (GNWT), and the Traditional Knowledge (TK) panel when developing the Program Description.

The annual data collection is mandated to follow a Wildlife Monitoring Program (WMP), developed in 2002, which determined the testable questions and the objectives that need to be addressed through the life of the project. The WMP is a requirement of the Diavik Environmental Agreement, which is an agreement (2000) between DDMI, local Indigenous groups and the federal and territorial governments that formalizes Diavik's environmental protection commitments. The annual review of the Wildlife Monitoring Reports (WMR) assists the Board in partially fulfilling its mandate as outlined in the Diavik Environmental Agreement. Since 2004, MSES reviewed the WMRs and Wildlife Comprehensive Analysis Reports (WCARs) to evaluate how the WMP was and is adhered to. In the course of 2010, MSES participated in several communications with DDMI and other parties where a number of recommendations were discussed in workshops and other venues to adapt the data collection in light of the information available at the time (Handley 2010). These recommendations, in part, altered the objectives of the 2002 WMP which are now reflected in the WMRs since 2011.

Based on its annual reviews of past WMRs and detailed data analyses (WCARs), MSES submitted numerous recommendations for EMAB and DDMI to consider. The present report takes past recommendations and discussions, as well as the altered WMP objectives, into account.

In our review below, for the ease of identifying our recommendations and requests, we highlight the **text in bold**.

## 2.0 Objectives of the Wildlife Monitoring Program

The objectives of the WMP v.2 were developed in 2002 and DDMI has anchored its monitoring reports on these objectives. For more clarity, below we re-state the objectives set forth in the WMP v. 2 of 2002:

*“The objectives of the wildlife monitoring program are to:*

- a. Verify the accuracy of the predicted effects determined in the Environmental Effects Report (Wildlife 1998) and the Comprehensive Study Report (June 1999); and*
- b. Ensure that management and mitigation measures for wildlife and wildlife habitat are effective in preventing significant adverse impacts to wildlife.”*

A number of specific questions that have been tested in the course of the years of monitoring have been found to be either largely answered or ineffective for the testing of mitigation effectiveness, prompting discussions about adapting the objectives of data collection in light of current information (Handley 2010).



Specific to grizzly bear, the monitoring objective was revised once again at a March 2013 Wildlife Monitoring Workshop hosted by the GNWT (GNWT 2013). The new grizzly bear and wolverine objectives are to provide estimates of grizzly bear and wolverine abundance and distribution in the Diavik Wildlife Study Area over time. The new barren ground caribou monitoring program objectives are to determine whether the zone of influence changes in relation to changes in Mine activity and whether caribou behaviour changes with distance from the mines. The new objectives of the falcon monitoring program are to contribute data to the Canadian Peregrine Falcon Survey (CPFS), identify any pit wall or infrastructure nesting sites, determine nest success and deterrent effectiveness, and determine cause of any Mine-related raptor mortalities.

## 3.0 Wildlife Monitoring Program Components

### 3.1 Vegetation and Wildlife Habitat (Landscape Changes)

**Prediction:** Determine if direct vegetation/habitat loss due to the Mine footprint exceeds the prediction of 12.67 km<sup>2</sup>.

**Data Collected:** Ecological Land Classification (ELC) unit loss (area km<sup>2</sup>).

**Collection Method:** Landcover image analysis.

**Status:** Conditions remain at or below predicted levels. Last tested in 2019.

**Recommendation:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 3.2 Barren-Ground Caribou

#### 3.2.1 Habitat Loss

**Prediction:** At full development, direct summer habitat loss from the project is predicted to equal 2.965 Habitat Units (HU).

**Data Collected:** ELC unit loss (area km<sup>2</sup>) X habitat suitability value.

**Collection Method:** Landcover image analysis.

**Status:** Conditions remain at or below predicted levels. Last tested in 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

#### 3.2.2 Movement

**Prediction:** To determine whether the zone of influence changes in relation to Mine activity (Handley 2010).

**Data Collected:** Caribou presence from aerial surveys and locations of satellite-collared caribou.

**Collection Method:** Aerial surveys of caribou and radio-collar monitoring/data collection.

**Status:** A ZOI of 14km was detected using aerial survey data and a weaker 11 km ZOI was detected using the satellite-collar location data (Boulanger et al. 2012). Caribou aerial surveys have not been completed since 2012 because a request to omit the ZOI requirement for caribou monitoring in 2013 was approved by ENR. Aerial survey data was re-analyzed in 2019 with a conclusion of no ZOI.

**Recommendations:**

- **ZOI Monitoring should continue as a component of the WMP. We recommend utilizing multiple lines of evidence (i.e., aerial survey, satellite collar data) to confirm the presence/absence and potential size of a ZOI.**
- **We recommend that the ZOI Technical Task Group (TTG) reconvene to discuss and determine the approach to future ZOI monitoring, including the need for additional aerial surveys.**
- **Should the TTG determine the need for additional aerial surveys, we recommend revising sampling methods to address some of the data analysis issues found using the old design (e.g. geometric phenomena (Golder 2020, pg.33)).**

### 3.2.3 Behaviour

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

**Data Collected:** Focal and group scan behaviour data.

**Collection Method:** Ground-based behavioural observations.

**Status:** Caribou groups with calves spend less time feeding and resting within 5 km of the mine than farther away. Last tested in 2011. DDMI continues to conduct group scan behavioural surveys in cooperation with the Ekati mine.

**Recommendations:**

- **We continue to emphasize the importance of these data in understanding the influence of the Mine on caribou and recommend that DDMI continue their efforts to collect caribou behaviour data.**
- **The methods for data collection currently being applied to this component are appropriate.**
- **Regarding caribou activities other than foraging, we recommend DDMI evaluate whether the data can be pooled and analyzed while considering covariates such as year, gender, and distance to the Mine.**
- **The combination of walking with running and trotting in the 2011 behavioural analysis may be diluting the effect of trotting and running (higher energy activities). We recommend DDMI compare caribou running bouts as a function of distance. Please also consider grouping or separating running and trotting activities for the analysis.**

### 3.2.4 Distribution

**Prediction:** 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.

**Data Collected:** Locations of satellite-collared caribou.

**Collection Method:** Radio-collar monitoring of cows and bulls (proportion travelling east vs. west of the mine).

**Status:** The northern migration is following predictions; however, the southern migration deviates from predictions in the last several years of monitoring. DDMI concludes that over all years there has not been a significant deviation from the predictions. Last tested in 2018. DDMI has requested to remove this monitoring component from the WMP.

**Recommendations:**

- **Further data collection and analysis is required to understand clearly why the impact prediction in the EER was incorrect regarding the southern (fall) migration.**
- **The methods applied to this component may not be appropriate. If the monitoring results do not follow the prediction for the southern migration (as for 7/8 of the most recent years of monitoring; between 2011 and 2018) but one can still conclude the population is connected, then it seems that an incorrect test is being applied in the WMRs.**
- **Migration predictions were based on a least-cost path (friction) analysis. As such, DDMI should consider whether changes in the southern migration have a consequence for caribou energetics. DDMI should consider an approach that evaluates the energetic cost of migration (e.g. “cost-of-movement index”).**

### 3.2.5 Incidents and Mortality

**Prediction:** Mine-related mortality is expected to be low.

**Data Collected:** Number of incidents and mortalities reports.

**Collection Method:** Incident and mortality reports.

**Status:** No Mine-related mortalities were reported in 2019, and one natural mortality was reported on East Island. Conditions remain at or below predicted levels. Last tested 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 3.2.6 Advisory

**Objective:** The objective of the Caribou Advisory Monitoring program is to make certain that workers are aware of the approximate numbers of caribou on and near East Island, which is related to the potential for interactions between caribou and mining activities.

**Data Collected:** Number of animals on the island and specific location.

**Collection Method:** Incidental observations from pilots and workers, the use of satellite collar locations provided by ENR, and ground surveys.

**Status:** No deterrent actions or elevation from “No Advisory” was required in 2019. Last completed in 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 3.2.7 Caribou Herding

**Objective:** When caribou are present on East Island their movements are monitored so that Mine personnel are aware of their presence and location and so that caribou can be herded away from potentially hazardous areas.

**Data Collected:** Location of caribou on East Island.

**Collection Method:** slow advancement of personnel behind caribou to encourage movement in a safe direction.

**Status:** There were no reported incidents involving caribou in 2019 and there was no need for herding of caribou away from hazardous areas. Last completed in 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

## 3.3 Grizzly Bears

### 3.3.1 Habitat Loss

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

**Data Collected:** ELC unit loss (area km<sup>2</sup>) for all terrestrial habitats.

**Collection Method:** Landcover image analysis.

**Status:** Conditions remain at or below predicted levels. Last tested 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 3.3.2 Presence and Distribution

#### 3.3.2.1 Historical

**Prediction 1:** Mine development is not predicted to influence the presence of grizzly bears in the area.

**Prediction 2:** Determine if Mine-related activities influence the relative abundance and distribution of grizzly bears in the study area over time (Handley 2010).

**Status:** Prediction was supported by the monitoring data. Approximately 10 years of monitoring showed no significant statistical relationships.

### 3.3.2.2 Current

**Current Prediction:** Provide estimates of grizzly bear abundance and distribution in the study area over time (GNWT 2013).

**Data Collected:** Sex and number of individuals in the study area (DNA samples).

**Collection Method:** Grizzly bear hair snagging.

**Status:** There is a stable or increasing abundance of grizzly bears. Last completed in 2017. Results of the 2012 and 2013 hair snagging program can be found in ERM Rescan (2014) and results of 2012, 2013, and 2017 can be found in ERM (2018) (Appendix J of 2018 WMR).

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. We continue to support DDMI's involvement in the GNWT hair snagging program but recognize that annual surveys may not be necessary given the stable regional grizzly bear populations and no apparent negative demographic effects associated with the presence of the Mines.**

### 3.3.3 Incidents and Mortalities

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

**Data Collected:** Number of incidents and mortalities reports.

**Collection Method:** Incident and mortality reports.

**Status:** There were zero bear mortalities in 2019, but there were 45 days that deterrent actions were used, which is an increase from 36 in 2018. Conditions remain at or below predicted levels. Last tested 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

## 3.4 Wolverine

### 3.4.1 Presence and Distribution

**Prediction:** Provide estimates of wolverine abundance and distribution the study area over time (GNWT 2013).

**Data Collected:**

- Wolverine site occupancy.
- Sex and number of individuals in the study area (DNA samples).

**Collection Method:**

- Snow track surveys.
- Wolverine hair snagging.

**Status:**

- Wind had the biggest effect on wolverine snow track detectability. There is a weak positive effect of habitat on wolverine track occurrence. Distance has a weak positive effect on the probability on wolverine occupancy, which suggests that transects closer to the Mines are less likely to be occupied. Larger sample sizes are required to allow for the simultaneous analysis of distance and habitat effects on wolverine occupancy. Last tested in 2019.
- Stable wolverine population growth rate through time across study areas, except for Daring Lake, which showed a slight decline. Apparent survival was similar across study areas (Efford and Boulanger 2018). Last completed in 2014.

**Recommendations:**

- **The methods applied for the snow track component of the monitoring program are adequate. We recommend the continuation of the snow tracking program to monitor impacts of the mine on wolverine detectability, occupancy, colonization and extinction.**
- **The methods applied for the hair snagging component of the monitoring program are adequate. We recommend that the schedule for future hair snagging be determined in collaboration with GNWT-ENR. Given the findings of the MSOM which shows distance to the Mines effects wolverine occupancy, ongoing monitoring of population size and stability would be prudent to ensure negative impacts of the Mines on wolverines do not contribute to population extinction.**

### 3.4.1 Incidents and Mortalities

**Prediction:** Mine-related mortalities, if they occur, are not expected to alter wolverine population parameters in the Lac de Gras area.

**Data Collected:** Number of incidents and mortalities reports.

**Collection Method:** Incident and mortality reports.

**Status:** Conditions remain at or below predicted levels. The 2019 WMR reported zero mortalities, two relocations, and seven deterrent actions for wolverine on-site. Last tested 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

## 3.5 Raptors

### 3.5.1 Historical

**Prediction 1:** Disturbance from the Mine and the associate zone of influence is not predicted to result in measurable impacts to the distribution of raptors in the study area.

**Prediction 2:** The Mine is not predicted to cause a measurable change in raptor presence in the study area.

**Status:** Analysis of Diavik and Ekati peregrine falcon and gyrfalcon nest data from 1998 to 2010 determined that sensory disturbance was not influencing nest occupancy and success.

**Prediction 3:** 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.

**Status:** Canadian Prairie Falcon Survey is no longer completed and was removed from the WMP in 2010. CPFS was discontinued in the NWT in 2015.

### 3.5.2 Nest Site Occupancy

**Current Prediction 1:** Determine if pit walls or other infrastructure are utilized as nesting sites for raptors.

**Data Collected:** Nest location, species identification, activity status (presence of eggs or chicks).

**Collection Method:** Pit wall/infrastructure inspections are completed twice weekly.

**Status:** Two active peregrine falcon nests were observed, one was located at the Site Services Building and one at the Process Plant. No observations of fledglings were recorded. Last tested 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. We support DDMI's continued Pit Wall/Mine Infrastructure monitoring for nesting raptors. Keep this component of the monitoring program.**

**Current Prediction 2:** Determine nest success in areas of development and document effectiveness of deterrent efforts that may be employed for nest relocations.

**Data Collected:** Nest use and success (presence of hatchlings).

**Collection Method:** Helicopter surveys of known nest sites in early and late summer.

**Status:** Nest monitoring data contributed to ENR every 5 years. It was last completed in 2015 and next due in 2020.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. We support DDMI's continued contribution to regional nest monitoring. Keep this component of the monitoring program.**

### 3.5.3 Incidents and Mortalities

**Current Prediction 3:** Document and determine the cause of direct Mine-related mortalities of raptors.

**Data Collected:** Mine-related incidents.

**Collection Method:** Incident reports submitted by mine staff.

**Status:** No raptor incidents or mortalities were reported at the Mine in 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 3.6 Waste Management

**Objective:** Create a system for proper disposal of waste, minimize adverse impacts on physical and biological environment, and comply with Federal and NWT legislation.

**Data Collected:** Type and number of misdirected waste items and wildlife species and sign.

**Collection Method:** Inspections of Waste Transfer Area (WTA) and the Landfill conducted twice weekly.

**Status:** In general, the number of wildlife observations in the WTA and the Landfill were lower in 2019 than in 2018, and roughly the same in the A21 Area and the Underground. The overall outcome of waste management appears to be positive. Last evaluated in 2019.

**Recommendations:**

- **The methods applied for this part of monitoring are adequate. Keep this component of the monitoring program.**

### 4.0 Adaptive Management

**Please continue to discuss how the information gained from the various wildlife datasets could be used in terms of mitigation and adaptive management for the Diavik Mine in particular and for other future projects in the region in general.**

### 5.0 Closure

The recommendations reported herein presents the conclusions arrived at by MSES based on our knowledge from our review of the 2019 WMR and understanding of how the program has evolved over time. Some of our recommendations may be best addressed during detailed data analyses using multiple years of new data. Our views are submitted to EMAB for its consideration of potential recommendations and actions.

### 6.0 References

Boulanger J., Poole K.G., Gunn A., and J. Wierzchowski, 2012. Estimating the zone of influence of industrial developments on wildlife: a migratory caribou *Rangifer tarandus groenlandicus* and diamond mine case study. *Wildlife Biology*. 18(2): 164-179.

Diavik Environmental Agreement. 2000. [http://www.emab.ca/sites/default/files/diavik\\_enviro\\_agree.pdf](http://www.emab.ca/sites/default/files/diavik_enviro_agree.pdf)

Efford, M. and J. Boulanger. 2018. Analyses of wolverine DNA mark-recapture sampling in the Northwest Territories 2004-2015. Draft February 28, 2018.



- ERM Rescan. 2014. Ekati and Diavik Diamond Mines: 2014 Final Lac de Gras Regional Grizzly Bear DNA Report. Prepared for Dominion Diamond Ekati Corporation and Diavik Diamond Mine (2012) Inc. by ERM Rescan Consultants Canada Ltd. Yellowknife, NWT.
- ERM. 2018. Ekati Diamond Mine and Diavik Diamond Mine: Grizzly Bear Population Assessment in the Lac de Gras Region, Northwest Territories – Final Report. Prepared for Dominion Diamond Ekati ULC and Diavik Diamond Mine (2012) Inc. by ERM Consultants Canada Ltd. Vancouver, British Columbia
- GNWT (Government of the Northwest Territories). 2013. Final Minutes from March 6<sup>th</sup> 2013 Grizzly Bear Workshop. Department of Environment and Natural Resources. Yellowknife, NT.
- Golder. 2020. Diavik Diamond Mines (2012) Inc. 2019 Wildlife Monitoring Report. Prepared for Diavik Diamond Mines Inc. Yellowknife, NT. Reference No.: 19115664-1897-R-Rev0-10000.
- Handley, J. 2010. Diamond Mine Wildlife Monitoring Workshop Report. Prepared by Joe Handley. Yellowknife, NT.