WILDLIFE EFFECTS MONITORING PLAN FOR THE EKATI DIAMOND MINE

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December 2016

Table of Contents

Maps

Figures

Tables

Appendices

Abbreviations

Abbreviation	Definition
AEMP	Aquatic Effects Monitoring Program
AQEMMP	Air Quality and Emissions Monitoring and Management Plan
AQMMP	Air Quality Management and Monitoring Program
ARD	acid rock drainage
CMP	Caribou Mitigation Plan
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRMP	Caribou Road Mitigation Plan
CWS	Canadian Wildlife Service
DAR	Developer's Assessment Report
DDMI	Diavik Diamond Mines (2012) Inc.
Diavik Mine	Diavik Diamond Mine
DNA	deoxyribonucleic acid
Dominion Diamond	Dominion Diamond Ekati Corporation
EA	Environmental Assessment
Ekati mine	Ekati Diamond Mine
ELC	Ecological Land Classification
EIR	Environmental Impact Review
EIS	Environmental Impact Statement
ENR	Environment and Natural Resources, Government of the Northwest Territories
GIS	Geographical Information Service
GNWT	Government of the Northwest Territories
IBA	Impact Benefits Agreement
ICRP	Interim Closure and Reclamation Plan
IEMA	Independent Environmental Monitoring Agency
KIA	Kitikmeot Inuit Association
LLCF	Long Lake Containment Facility
LKDFN	Łutselk'e Dene First Nation
NABBS	North American Breeding Bird Survey
NSMA	North Slave Métis Alliance
NWT	Northwest Territories
PM	particulate matter
SARA	*Species at Risk Act*
spp.	multiple species
TK	Traditional Knowledge
VEC	Valued Ecosystem Component
WEMP	Wildlife Effects Monitoring Plan
WLWB	Wek'èezhìı Land and Water Board
WPKMP	Wastewater and Processed Kimberlite Management Plan
WROMP	Waste Rock and Ore Storage Management Plan
WRSA	waste rock storage area

Abbreviation	Definition
YKDFN	Yellowknives Dene First Nation
ZOI	Zone of Influence

Units of Measure

Unit	Definition
%	percent
>	greater than
<	less than
°C	degrees Celsius
cm	centimetre
km	kilometre
km/h	kilometres per hour
km^2	square kilometre
m	metre
mm	millimetre

1 INTRODUCTION

1.1 The Ekati Diamond Mine

The Ekati Diamond Mine (Ekati mine, Ekati or Mine), owned and operated by Dominion Diamond Ekati Corporation (Dominion Diamond), is located in the Slave Geological Province of the Northwest Territories (NWT), approximately 300 kilometres (km) northeast of Yellowknife between Yamba Lake and Lac de Gras. Construction of the Ekati mine began in 1997 and officially went into production in October 1998. Currently, the Ekati mine has one operational open pit (Misery Pit), two underground mines (Koala and Koala North Underground) and three pits under development (Pigeon, Lynx, and Sable). Dominion Diamond is proposing to develop the Jay kimberlite pipe located beneath Lac du Sauvage. The Jay Project will be an extension of the Ekati mine and is expected to extend the life of the Mine by approximately 13 years. In this document, the Ekati mine refers to the main Ekati complex including the Long Lake Containment Facility, accommodation and office buildings, processing plant, Koala and Panda pits and airstrip, as well as all satellite deposits such as the Fox Pit, Misery Pit, Pigeon and Lynx projects, and the Jay Project.

1.2 Background

In 1994, baseline wildlife studies were first undertaken as part of an Environmental Impact Assessment for the proposed diamond Mine (BHP 1995a). Additional baseline data were collected in 1995 and 1996 (BHP 1995b,c,d,e, 1996).

In 1997, a Wildlife Effects Monitoring Plan (WEMP) was established as a result of the Environmental Agreement (Government of Canada, GNWT, BHP 1997) signed on January 6, 1997 by BHP Diamonds Inc., the Government of the Northwest Territories (GNWT), and the Government of Canada (BHP 1998). A modified WEMP was developed in 2000 (BHP 2000a). Through adaptive management and input from Aboriginal communities, the Independent Environmental Monitoring Agency (IEMA) and government these initial plans have evolved into the WEMP presented in this document.

The Environmental Agreement (1997) focused on environmental matters that are supplementary to the statutory terms and conditions addressed under legislation, regulations, leases, and permits. Article VI of the Agreement identified the preparation of both a Construction Phase and an Operating Phase Environmental Management Plan. The Construction Phase Plan was in place until the fall of 1998 and addressed issues and environmental matters that were specific to that phase of development. The Operation Phase Plan began in October 1998 and is currently in place.

Article VII of the Agreement called for the preparation of Environmental Monitoring Programs as part of the Environmental Management Plans. The overall goal of the Environmental Management Plans is to develop, implement, and monitor mitigation strategies so that the Mine does not significantly adversely affect the receiving and surrounding environment. The Agreement states that monitoring programs contained within the management plans shall include activities designed to:

- measure compliance with regulatory requirements;
- determine the environmental effects of the Mine;
- test impact predictions; and,
- measure the performance of operations and effectiveness of impact mitigation.

Section 7.2 of the Environmental Agreement requires that wildlife, including caribou and bears, be among the environmental components monitored. The Environmental Agreement also required the establishment of the IEMA, which operates independently from Ekati and the GNWT and national regulators (e.g., Environment Canada). A main role of the IEMA is to serve as a public watchdog of the regulatory process and the implementation of the Environmental Agreement.

1.3 The Wildlife Effects Monitoring Plan

The WEMP has been conducted since 1997. Ekati employs four Wildlife Technicians, a consultant Wildlife Biologist, and an Environmental Advisor dedicated to implement, manage, and guide the WEMP. This document (the WEMP) is an update to the February 2000 WEMP (BHP 2000a), and is intended to incorporate effects identified through the Jay Project environmental assessment (see Dominion Diamond 2014 and Appendix A) and the associated proposed changes to the WEMP. This document is also intended to engage interested parties and solicit feedback for these changes through the Jay Project Environmental Assessment (EA) review. Subsequent versions may be issued for the Jay Project land use permit process. Two workshops were held, one on June 25, 2015 and one on September 13, 2016 to discuss feedback on changes to the WEMP with interested parties. Additional feedback was submitted in writing following the most recent version being published (May 2016). The recommendations received during engagement and the actions taken or responses from Dominion Diamond have been summarized in Appendix B. Further, the WEMP is a living document that has been reviewed in conjunction with the Environmental Impact Review (EIR) every three years (BHP Billiton 2012), and updated as needed. The scope of the WEMP includes the Ekati mine and all existing and proposed satellite deposits (i.e., Misery, Fox, Sable, Pigeon, Lynx, and Beartooth), and the Jay Project.

The Ekati WEMP is based on the predicted effects to wildlife from the initial Environmental Impact Statement (EIS) (BHP 1995a), the Environmental Assessment Report for the Sable, Pigeon, and Beartooth Kimberlite Pipes (BHP 2000a), and the Developer's Assessment Report (DAR, Dominion Diamond 2014) for the Jay Project. Knowledge of the effects of mining on wildlife from the monitoring undertaken to date at Ekati and other diamond mines in the NWT is considered in the WEMP, as are the requirements of the *Draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program Guidelines* (GNWT-ENR 2013a).

Dominion Diamond and Diavik Diamond Mines (2012) Inc. (DDMI) have worked cooperatively on some of the monitoring including the falcon nest survey, the wolverine DNA study, the grizzly bear DNA study, the caribou behavioural surveys, and community environmental monitoring and engagement.

Because the Ekati mine has been operating for 18 years, multiple environmental monitoring programs and management plans are in place, and have been effectively improved over time through adaptive management. The key Ekati mine monitoring programs and management plans are described below.

Air Quality Management and Monitoring Program

An Air Quality Management and Monitoring Program (AQMMP) is currently implemented at the Ekati mine. It is designed to monitor air quality annually, with a more intensive program every third year. The program includes the following components: annual air emission and greenhouse gas calculations, air sampling (total suspended particulate), continuous air monitoring (oxides of nitrogen, oxides of sulphur, total suspended particulate, and particulate matter [$PM_{2.5}$]), and dustfall monitoring. Every three years,

snow chemistry and lichen tissue monitoring are conducted across a larger spatial scale. Results are publicly reported annually and an interpretive report is prepared every third year.

An Air Quality and Emissions Monitoring and Management Plan (AQEMMP) has been completed for the Jay Project, which includes an adaptive management approach. This plan allows for comment and feedback through the Water Licence process.

Aquatic Effects Monitoring Program

The Water Licence (WLWB 2014) requires an Aquatic Effects Monitoring Program (AEMP) to detect changes in the aquatic receiving environment that could potentially be caused by the Ekati mine. Aquatic effects are currently monitored every year at 14 lakes and 8 streams, including reference locations. The AEMP evaluates the physical, chemical, and biological components of the aquatic ecosystem.

The AEMP will be expanded to incorporate the Jay Project as part of the Water Licence issuance process following completion of the EA review process. An AEMP Design Plan for the construction phase of the Jay Project was developed for submission with the Water Licence application for the Project.

Routine AEMP monitoring can and has resulted in special studies to assess the environmental significance of changes in the receiving environment and their relationship to the Ekati mine. An annual report is provided to the Wek'èezhìı Land and Water Board (WLWB). Additionally, the Water Licence requires that the program is evaluated every three years and that necessary or desired changes are proposed to the WLWB for review and approval.

The Water Licence requires that an Aquatic Response Framework accompany the AEMP. The Response Framework lists early-warning thresholds for adaptive management responses that would prevent negative impacts in the receiving environment.

Caribou Road Mitigation Plan

See Appendix C.

Interim Closure and Reclamation Plan

As a stipulation of the Water Licence, an Interim Closure and Reclamation Plan (ICRP) has been developed with input from regulators and Aboriginal communities. The ICRP incorporates reclamation activities and objectives that describe how reclamation will be completed and documents the performance standards to be met at closure. The Ekati mine ICRP is an all-inclusive plan that addresses all reclamation obligations at the Ekati mine, and which was approved by the WLWB in 2011. Annual reclamation progress and ICRP updates are reported to the WLWB annually.

Under the ICRP, reclamation research studies are completed to address uncertainties in closure planning. The Reclamation Research Plan is a comprehensive, evolving document. The schedule of reclamation research and proposed reclamation activities evolves based on research results and activities at the Ekati mine, with updates reported annually to the WLWB.

The ICRP will be expanded to incorporate the Jay Project during the Water Licence issuance processes. The plan for future reclamation research would be reviewed at that time and updated as necessary to reflect the Jay Project.

Spill Contingency Plan

The Water Licence requires a Spill Contingency Plan, which has been prepared by Dominion Diamond to address any environmental emergency that may occur at the Ekati mine operating sites including satellite facilities, such as Misery Camp and exploration activities. This Plan identifies actions to be taken in the event of a spill at any of the Ekati mine operating sites.

The Spill Contingency Plan will be expanded to incorporate the Jay Project as part of the Water Licence process.

Surveillance Network Program

The Surveillance Network Program is a requirement of the existing Ekati mine Water Licence to collect water quality and other environmental data related to minewater and final effluent water that is released to the receiving environment. Minewater quality is monitored in open pits, underground workings, kimberlite containment areas, lake dewatering and drawdown areas, and in final effluent discharges to assess compliance with the discharge criteria set out in the Water Licence (WLWB 2014). The Surveillance Network Program will be expanded to incorporate the Jay Project as part of the Water Licence process.

Waste Management Plan

The Water Licence requires a Waste Management Plan to describe how Dominion Diamond maintains a safe and healthy workplace at the Ekati mine so that potential adverse effects to the environment and wildlife are minimized through diligent waste management practices. The Plan includes the Incinerator Management Plan, Hazardous Waste Management Plan, Solid Waste Landfill Management Plan and Hydrocarbon Impacted Materials Management Plan, and provides clear direction to Dominion Diamond staff, contractors, communities and public on how waste from the Ekati mine is managed through each of the waste streams to final disposal. The Waste Management Plan covers all activities associated with the Ekati mine including Ekati Main Camp, Misery Camp and exploration activities, and will be expanded to incorporate the Jay Project as part of the Water Licence process.

Waste Rock and Ore Storage Area Seepage Survey Program

As a condition of the Water Licence, annual monitoring and reporting of waste rock storage area (WRSA) seepage quality and ongoing validation of waste rock geochemical characterization are completed. An interpretive report is required every three years as part of the Waste Rock and Ore Storage Management Plan (WROMP). The Waste Rock and WRSA Seepage Monitoring Program will be expanded to incorporate the Jay Project as part of the Water Licence process.

Wastewater and Processed Kimberlite Management Plan

The Wastewater and Processed Kimberlite Management Plan (WPKMP), required by the Water Licence, describes the management of wastewater and fine processed kimberlite. As part of the WPKMP, the fine processed kimberlite is geochemically characterized. The WPKMP describes the use of the Long Lake Containment Facility (LLCF) and Beartooth pit for kimberlite deposition, and the use of the minewater management facilities to maintain compliance with the Water Licence. The relevant aspects of a previously separate Environmental Management Plan, the Geochemical Characterization and Metal Leaching Management Plan, was amalgamated into the WPKMP in 2011. The WPKMP and WROMP includes an Acid/Alkaline Rock Drainage (ARD) monitoring component. The WPKMP will be expanded to incorporate the Jay Project as part of the Water Licence process.

1.4 Objectives

The WEMP describes how Dominion Diamond intends to monitor the effects to wildlife that may occur within and beyond the Mine footprint, and contribute to regional monitoring initiatives. The WEMP also details the mitigation policies, designs, practices and procedures that will be implemented to avoid and reduce direct and indirect Mine-related effects to wildlife and wildlife habitat.

The global objectives of the WEMP were developed considering the requirements of the Environmental Agreement, the remaining key residual environmental risks to wildlife identified in the EIR (BHP Billiton 2012), and the pathways identified in the Jay Project DAR (Dominion Diamond 2014; Appendix A). The global objectives include the following:

- incorporate Traditional Knowledge (TK) and provide opportunities for the involvement and active participation by communities in the implementation of the WEMP;
- documenting Mine-related effects and test impact predictions made in the Environmental Agreement, EIR, and the Jay Project DAR;
- implement operational practices that mitigate disturbance to wildlife and wildlife habitat including migratory birds and their nesting areas, species at risk, and caribou;
- evaluate the accuracy of key predictions made in the Jay Project EA regarding the effects of the Mine directly on wildlife and wildlife habitat and adjust environmental management practices accordingly; and,
- design studies and data collection techniques that are consistent with, and will contribute to, understanding and managing cumulative effects that can be shared across the NWT mining sector.

The specific wildlife monitoring program objectives of the WEMP are summarized below in Table 1.4-1.

Table 1.4-1 Specific Wildlife Monitoring Program Objectives

Monitoring Program		Objectives
Direct Wildlife Habitat Loss		• determine the amount of direct habitat loss due to Ekati mine activities.
Waste Management	Landfill Monitoring	• determine whether the Ekati and Misery landfills contain potential wildlife attractants or evidence of wildlife visitation and habituation.
	Waste Bin Monitoring	• monitor the misdirection of wildlife attractants and hazardous wastes to waste bins to avoid and minimize possible wildlife incidents at these locations.
All Wildlife	Mortalities Incidents Vehicle and Aircraft Interactions	• document and mitigate potential effects of Mine activities on wildlife. • reduce risks to both wildlife and people. • determine if any wildlife are killed or injured as a result of vehicle and aircraft interactions. • determine if migratory birds (and other wildlife) are killed or injured as a result of mine-altered waterbodies. • determine if wildlife use the esker stockpile. • determine the effectiveness of mitigation for minimizing the risks of wildlife injury and mortality from vehicles and aircraft.
Caribou	Incidental Observations Road Surveys	• identify the composition of caribou groups moving through the study area. • document the annual timing of caribou movement through the study area to compare temporal trends in migration patterns. • track any trends in the number of caribou moving through the study area among years. • determine the location, numbers, and proximity of caribou relative to Mine roads.
	Collared Caribou Monitoring	• determine the location of caribou relative to the Mine and provide action levels for mitigation and monitoring of caribou near the Jay and Misery roads (i.e., Caribou Road Mitigation Plan).
	Zone of Influence Monitoring	• determine if caribou distribution changes relative to the Mine.
	Behaviour	• determine if caribou behaviour changes with distance from the Mine.
	Camera Trapping	• determine the level of caribou (and other wildlife) activity and traffic along Misery and Jay roads; • determine caribou (and other wildlife) responses to the road (i.e., crossing and deflecting); • determine caribou (and other wildlife) activity at other Mine infrastructure.
	Long Lake Containment Facility	• determine if any caribou injuries can be attributed to the LLCF; • determine the frequency that caribou use the LLCF; and, • determine the group size, group composition, and dominant group behaviours of caribou observed within the LLCF.
Grizzly Bear	Incidental Observations	• avoid and minimize bear-human interactions; • determine the level of grizzly bear activity within the Ekati study area; and, • document and determine the cause of direct Mine-related mortality of grizzly bears.
	Hair Snagging Study	• provide estimates of grizzly bear abundance and distribution in the study area.

Table 1.4-1 Specific Wildlife Monitoring Program Objectives

Monitoring Program		Objectives
Wolf	Incidental Observations	• minimize wolf-human interactions and identify the presence and composition of incidental wolf den and wolf pack observations in the study area; and, • document and determine the cause of direct Mine-related mortality of wolves.
	Den Occupancy and Productivity	• determine the presence, distribution, and productivity of active wolf dens throughout the study area.
Wolverine	Incidental Observations	• avoid and minimize wolverine-human interactions; • determine the level of wolverine activity within the Ekati study area; and, • document and determine the cause of direct Mine-related mortality of wolverines.
	Hair Snagging Study	• provide estimates of wolverine abundance and distribution in the study area over time.
Raptors	Pit Wall Nest Monitoring and Incidental Observations	• 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; and, • document and determine the cause of direct Mine-related mortalities of raptors.
	Regional Falcon Surveys	• determine site occupancy and productivity of historic peregrine falcon nest sites in the study area to contribute to the Regional Falcon Survey, which monitors long-term population trends.
Fox	Incidental Observations	• avoid and minimize fox-human interactions; • document the level of fox activity in the Ekati study area; and, • document abnormal behaviour in foxes to identify possible cases of rabies.
Upland Breeding Birds	Incidental Observations	• document the presence of breeding birds at the Ekati mine; and, • document sightings of uncommon birds or species of conservation concern in the area.
	North American Breeding Bird Surveys	• contribute data to a continental bird monitoring program, coordinated in Canada by the CWS.
Rare or Uncommon Species	Incidental Observations	• document trends in the detection of rare or uncommon species in the study area.

CWS = Canadian Wildlife Service; LLCF=Long Lake Containment Facility.

All of the objectives for the WEMP are linked to the Adaptive Management Plan. The WEMP has been developed with input from community representatives and government and will remain a living document that Dominion Diamond will adjust based on adaptive management (Section 3.2).

To improve and standardize wildlife monitoring at all diamond mines (Ekati mine, Diavik Diamond Mine [Diavik Mine], and Snap Lake Mine), a series of workshops were organized. The first was in September 2009, and attended by representatives of the three operating diamond mines, governments, monitoring agencies, and communities. The workshop focused on general results from the monitoring programs (Marshall 2009).

A technical workshop in 2010 resulted in specific recommendations for the mining companies to consider incorporating into the objectives, study designs, and methods of their monitoring programs, with an interest in standardizing approaches and regional monitoring objectives across all the mines (Handley 2010). The standardized regional monitoring objectives from this workshop for each Valued Ecosystem Component (VEC) are provided in Section 5.

1.5 Concordance

The WEMP serves to meet Dominion Diamond's obligations to a range of authorities. This includes various Acts and regulations relevant to wildlife in the NWT (Table 1.5-1). The WEMP also serves to meet the requirements of both the GNWT *Draft Wildlife and Wildlife Habitat Protection Plan and Wildlife Effects Monitoring Program Guidelines* (GNWT-ENR 2013a). The sections of the WEMP that pertain to the NWT Acts and regulations, and the guidelines for wildlife and wildlife habitat protection and monitoring have also been identified in Table 1.5-1.

Table 1.5-1 Concordance of Legislation/Regulation Requirements and Wildlife Effects Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WEMP	Responsible Regulatory Agency
Environmental Agreement	• measure compliance with regulatory requirements • determine the environmental effects of the Mine • test impact predictions • measure the performance of operations and effectiveness of impact mitigation	Entire Document	Government of Canada, GNWT
Migratory Birds Convention Act, Migratory Bird Regulations	The taking of nests or eggs of migratory game or insectivorous or nongame birds shall be prohibited, except for scientific or propagating purposes under such laws or regulations as the High Contracting Powers may severally deem appropriate.	Section 4.6	CWS
NWT Wildlife Act	A wildlife management and monitoring plan must include: (a) a description of potential disturbance to big game and other prescribed wildlife, potential harm to wildlife and potential impacts on habitat; (b) a description of measures to be implemented for the mitigation of potential impacts; (c) the process for monitoring impacts and assessing whether mitigative measures are effective; and, (d) other prescribed requirements.	Entire Document	GNWT
Species at Risk Act and *Species at Risk (NWT) Act*	Dominion Diamond will adhere to requirements of all applicable Regulations or Recovery Plans that may be developed over the duration of the Mine.	Section 2.5	CWS GNWT
NWT Wildlife Act	Draft guidelines for the preparation of wildlife monitoring documents, dated May 2013: *Wildlife and Wildlife Habitat Protection Plan (WWHPP)*	Section 4.1.1 - Non-Vehicle Wildlife Incidents and Mortalities Section 4.1.2 – Airstrip Deterrents Section 4.1.3 – Vehicle-Wildlife Collisions Section 4.1.4 – Waste Management Section 4.1.5 – Open Pits Section 4.1.6 – Dust Section 4.1.7 – Health Effects from Contaminants Section 4.2.1 – Direct Habitat Alteration and Loss Section 4.2.3 – Barrier Effects from Roads	GNWT

Table 1.5-1 Concordance of Legislation/Regulation Requirements and Wildlife Effects Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WEMP	Responsible Regulatory Agency
		Section 4.3.1 – Direct Mine-Related Mortality and Injury Section 4.3.2 – Management of Toxic Substances Section 4.3.3 – Management of Attractants Section 4.3.4 – Deterring Wildlife Section 4.4 – Education Section 5.1 – Direct Wildlife Habitat Loss Section 5.2 – Waste Management Section 5.3 – Wildlife Mortalities Section 5.4 - Wildlife Incidents Section 5.5 - Wildlife-Vehicle and Aircraft Interactions Section 5.6.2 – Incidental Caribou Observations Section 5.6.3 – Caribou Road Surveys Section 5.6.4 – Collared Caribou Monitoring Section 5.6.6 – Caribou Behaviour: Activity Budgets and Response to Stressors Section 5.6.7 – Camera Trapping Section 5.6.8 - Long Lake Containment Facility Monitoring Section 5.7.1 – Incidental Observations Section 5.8.1 – Incidental Observations Section 5.9.1 – Incidental Observations Section 5.10.1 – Pit Wall Nest Monitoring and Incidental Observations Section 5.11.1 Incidental Observations Section 5.12.1 – Incidental Observations Section 5.13 – Rare or New Species	

Table 1.5-1 Concordance of Legislation/Regulation Requirements and Wildlife Effects Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WEMP	Responsible Regulatory Agency
	Draft guidelines for the preparation of wildlife monitoring documents, dated May 2013: *Wildlife Effects Monitoring Program*	Section 4.1.6 – Dust Section 5.6.1 – Barren-ground Caribou Management Strategy Section 5.6.5 – Caribou Zone of Influence Monitoring Section 5.7.2 – Hair Snagging Study (Grizzly Bear) Section 5.8.2 – Wolf Den Occupancy and Productivity Section 5.9.2 Hair Snagging Study (Wolverine) Section 5.10.2 – Regional Falcon Surveys Section 5.12.2 – North American Breeding Bird Survey	

Table 1.5-1 Concordance of Legislation/Regulation Requirements and Wildlife Effects Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WEMP	Responsible Regulatory Agency
Jay Project MVEIRB Decision Report Measures	Measure 6-1: Road mitigations for caribou a) In order to mitigate significant incremental and cumulative adverse impacts to caribou from roads used by the Jay Project, Dominion will: – use convoys or other methods to manage traffic on the road and maximize intervals between disturbance from vehicles. – use real-time collared caribou information and other detection systems to enable early detection of caribou in the vicinity of the road as a trigger for action levels for management responses. – construct caribou crossing features along a minimum of 70% of the length of the Jay Road. b) In addition, Dominion will update and revise the Wildlife Effects Monitoring Plan with the Caribou Road Mitigation Plan according to the GNWT requirements under section 95 of the *Wildlife Act* and any future section 95 regulations. The plan(s) required under section 95 will be in force for the duration of the Jay Project. In the Caribou Road Mitigation Plan, Dominion will: – investigate and implement innovative actions to mitigate impacts to caribou from barriers to movement at the esker, such as buried power lines and pipelines, and remote sensory devices to monitor caribou and reduce impacts at the esker crossing. – define specific thresholds that trigger road management responses including actions to slow traffic, stop traffic, and close the Jay and Misery roads for an appropriate period if caribou are on or near these roads. – describe the minimum size of the kimberlite stockpiles at Jay pit and Misery pit necessary to enable extended closure(s) of the Jay road – indicate how long the road management responses described above will applied for each slow down or closure and thresholds and triggers for reopening the road	Appendix C: Caribou Road Mitigation Plan	GNWT

Table 1.5-1 Concordance of Legislation/Regulation Requirements and Wildlife Effects Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WEMP	Responsible Regulatory Agency
	• investigate methods for monitoring approaching caribou at intermediate distances beyond line of sight from the roads, including at night and in poor visibility. • Use Traditional Knowledge when designing – The Caribou Road Mitigation Plan – The project components in the Caribou Road Mitigation Plan (including the Jay Road, esker crossing, and waste rock storage area) – The monitoring of caribou responses to these components during the operations phase – Describe specific monitoring and mitigation for caribou impacts related to the road during construction, operations and closure phases of the Jay Project c) The Caribou Road Mitigation Plan will detail the means to be employed to avoid and minimize habitat disturbance and include a response framework that links monitoring results to changes in mitigation. When developing monitoring and mitigation, Dominion will give special consideration to the esker crossing and specify contingency measures if caribou do not cross the Jay Road at the esker. d) Dominion will submit the Caribou Road Mitigation Plan to the GNWT ENR for approval before constructing the Jay Road. As part of the approval process, the GNWT should provide the opportunity for public comment. Dominion will annually report monitoring results, success or failure of mitigation and adaptive management to communities in person, in a culturally appropriate manner.		
	Measure 6-1: b) • prepare a dust management best practices document with adaptive management triggers for additional dust suppression and link to the Air Quality and Emissions Monitoring and Management Plan	Air Quality and Emissions Monitoring and Management Plan	GNWT EC

GNWT = Government of Northwest Territories; CWS = Canadian Wildlife Service; WEMP = Wildlife Effects Monitoring Plan: EC = Environment Canada; ENR = Department of Environment and Natural Resources, Government of the Northwest Territories.

2 DEVELOPMENT OF THE WILDLIFE EFFECTS MONITORING PLAN

2.1 Wildlife Study Area and Setting

Beginning in 1997, wildlife monitoring was conducted in a study area of approximately 1,600 square kilometres (km^2) surrounding the Ekati mine, which expanded to an area of 2,800 km^2 by 2005. In 2006, the caribou aerial survey study area was expanded to 6,300 km^2, referred to as the Ekati study area, which included a 30 km buffer around the Mine site (Map 2.1-1).

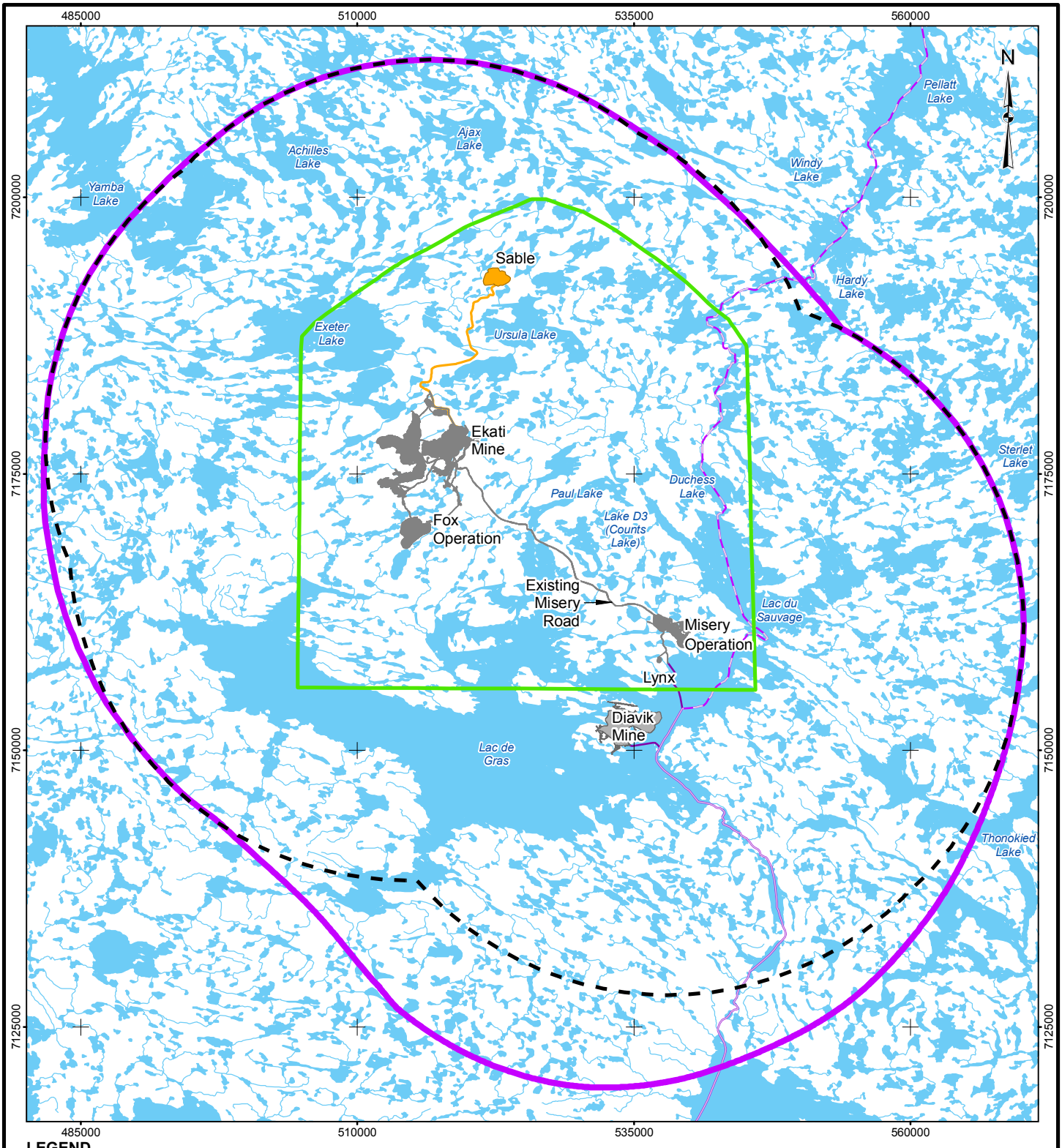
In August 2009, the Ekati and Diavik mines collaboratively expanded the aerial survey study area after consultation with regulators and permission from the ENR. The study area was expanded south so that an effective buffer around Diavik Mine was surveyed to accurately assess caribou distribution relative to mine development. The existing transect lines were extended to cover the new area.

The Ekati mine and its surrounding claim block are located approximately 200 km south of the Arctic Circle and 300 km northeast of Yellowknife in the NWT, Canada. The Mine is located within the headwaters of the Coppermine River drainage basin, which flows north to the Arctic Ocean in the Level III Tundra Shield Low Arctic (south) Ecoregion in the Level II Tundra Shield Ecoregion as defined by the Ecological Classification Group (ECG 2012). This Ecoregion is characterized by short, cold summers, very cold, long winters. The annual average temperature in the Tundra Shield Low Arctic (south) Ecoregion is -9 degrees Celsius (°C), ranging from +10°C to +12°C in July to -30°C in January. Average annual precipitation is from 200 to 300 millimetres (mm) with approximately 60 percent (%) occurring as rain and 40% occurring as snowfall (ECG 2012).

The topography of the region is relatively flat, with the local area characterized by undulating to rolling terrain with northwest to southeast trending ridge features known as eskers and exposed bedrock outcrops. The local terrain is characterized by boulder fields, tundra, and wetlands, and by numerous lakes with interconnecting streams. Permafrost is continuous, typically extending to a depth of 300 metres (m), and is overlain by an active layer, which thaws during the summer and refreezes during the winter. The active layer is typically within 1 to 2 m of the ground surface. The lakes and streams of the area are characterized by clear, soft and low-nutrient waters, typical of Northern aquatic environments. The biological productivity and biomass of plants and animals in streams and lakes are low compared to streams and lakes in southern Canada.

Characteristic vegetation of the Tundra Shield Low Arctic (south) Ecoregion includes continuous to discontinuous low-shrub complexes and erect dwarf-shrub tundra (ECG 2012). The terrestrial vegetation community around the Ekati mine is composed mainly of heath tundra. Characteristic species are Labrador tea, bog cranberry, bearberry, black crowberry, and dwarf birch. Lichen-dominated communities are found on the crests and upper slopes of eskers where the snow does not accumulate and on bedrock or boulder complexes where exposed rock outcrops support these communities. Shrubs, such as willows and dwarf birch, are found in sheltered riparian areas along streams, seeps, and lakeshores associated with poorly drained soils. The vegetation characteristics of the sedge wetlands and tussock hummock plant communities occurring in depressions are dominantly sedges, cotton grasses, and peat mosses (Dominion Diamond 2014).

Despite the harsh climate, the area supports many species of mammals and birds. Most of these animals are migratory (e.g., caribou, wolf, peregrine falcon), others are non-migratory (e.g., grizzly bear, wolverine, Arctic fox, red fox, Arctic hare, and raven). Although uncommon, moose and muskox have been observed in the study area (Dominion Diamond 2014).



LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- PROPOSED SABLE FOOTPRINT
- SABLE ALL-SEASON ROAD
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- WATERCOURSE
- WATERBODY
- WIDLIFE STUDY AREA, 1997 - 2005
- WILDLIFE STUDY AREA, 2006 - 2008
- WILDLIFE STUDY AREA, 2009

10 0 10

SCALE 1:500,000 KILOMETRES

REFERENCE

NATIONAL TOPOGRAPHIC BASE DATA (NTDB) 1:250,000
CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

PROJECT

DOMINION DIAMOND

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

EKATI WILDLIFE STUDY AREAS, 1997 TO 2009

Golder Associates

PROJECT 1546701.6000.20			FILE No.	
DESIGN	TM	13/05/15	SCALE AS SHOWN	REV. 0
GIS	ANK	17/11/16		
CHECK	DC	17/11/16		
REVIEW	JV	17/11/16		

MAP 2.1-1

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2.2 Monitoring Framework and Adaptive Management

Adaptive management is a structured process of decision making to deal with uncertainty. The objective of adaptive management is to reduce uncertainty through monitoring, or "learning by doing" (WLWB 2010). In the case of wildlife monitoring, the "doing" is the environmental monitoring, and the "learning" is continual improvements to environmental management and the monitoring programs. This requires the monitoring program to be adaptive and flexible. The monitoring program must be flexible enough to incorporate comments, suggestions, and information based both on science and local and TK. The Ekati mine WEMP has and will continue to incorporate adaptive management.

The process of developing a WEMP is collaborative and requires input from communities, IEMA, government and other regulators. As indicated in Section 1.2, the overall objectives of monitoring include:

- testing effects predictions, which can be related to measuring the response of the environment or VEC population to Mine stressors and/or testing the assumptions associated with the predictions;
- testing the effectiveness of mitigation;
- contributing to the assessment and management of regional cumulative effects; and,
- meeting and fulfilling regulatory requirements.

Results from local (i.e., Mine-specific) and regional collaborative monitoring programs are used to provide feedback to Ekati mine operations to determine if the objectives are being met (Figure 2.2-1). Modification and/or implementation of additional mitigation may be required as determined through monitoring results and the adaptive management process. Similarly, changes to the objectives and/or study methods for local and regional monitoring programs may be required if it is determined that the measurement indictor for the associated effects pathway has a low sensitivity to detect Mine-related changes or that the scale of the response does not match the objective. Problems with sampling methods and/or sample size and duration would also require a review and potential modification of the monitoring program for a particular objective (e.g., previous grizzly bear sign surveys and wolverine snow track surveys).

Alternately, the data and results may be sufficient to demonstrate that Mine-related effects on the VEC are negligible, confirming the objective and supporting the decision to stop monitoring that component of the program (Figure 2.2-1). Examples include raptors and upland breeding birds, which after a decade of sampling showed little effects from the Ekati mine relative to natural factors occurring at larger regional scales. Through discussions and engagement with communities, monitoring agencies, and government, the decision was made to remove these VECs from Mine-specific objectives of the monitoring program, and contribute to regional data through the North American Breeding Bird surveys and the Canadian Peregrine Falcon Survey (Marshall 2009; Handley 2010).

In some cases, even when Mine-related effects are determined to be negligible, monitoring may be continued because it can increase the confidence of impact predictions in future environmental assessments and contributes to the assessment and management of cumulative effects by government (Figure 2.2-1). For example, the WEMP provides regional data on caribou, grizzly bear, wolverine, upland migratory birds, and raptors that can be used to better understand the potential cumulative effects on these species. This will further the overall understanding of the tundra ecosystem. In other cases, public

concern may be the key reason to continue monitoring even after years of detecting negligible effects (Figure 2.2-1).

Dominion Diamond has and will continue to actively seek input from regulatory authorities and communities through engagement activities and other regional programs led by the GNWT, such as the Zone of Influence Technical Task Group. Annual reports and meetings are ways that Dominion Diamond will present the results of the monitoring program, and the basis for communities and regulatory agencies to provide feedback and direction. In accordance with the concept of adaptive management, monitoring programs and mitigations in the WEMP have and will continue to be adaptively managed over the life of the Mine.

The objective of adaptive management is to reduce uncertainty through monitoring, or 'learning by doing' (WLWB 2010). Adaptive management is generally considered to include four themes (Greig et al. 2008; WLWB 2010):

- learning to reduce management uncertainties;
- using what is learned to change policy and practice;
- focusing on improved management; and,
- basing adaptive management on a structured and systematic approach.

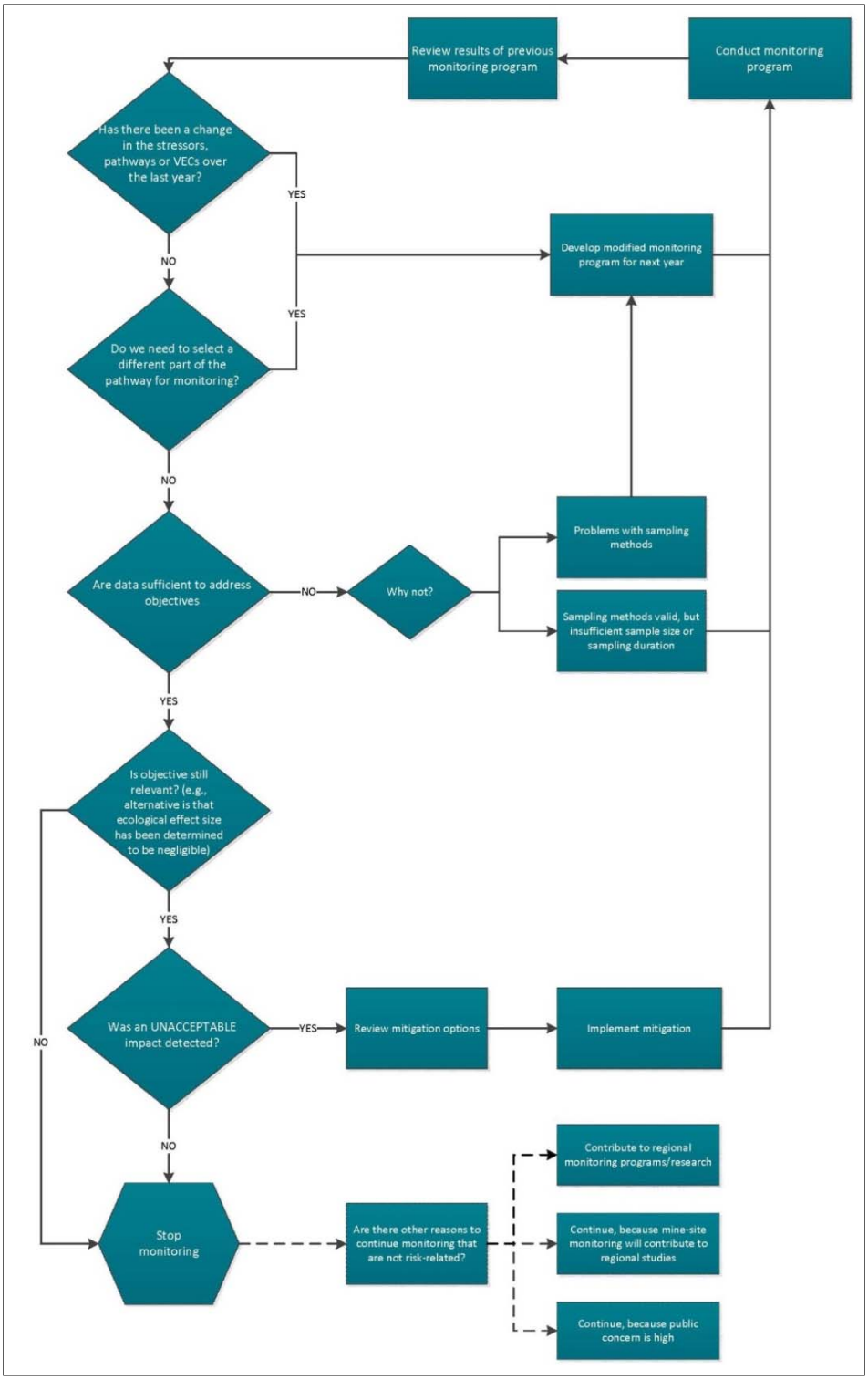
Monitoring programs must be flexible enough to incorporate comments, suggestions, and information based both on science and local and TK. There are no regulator established guidelines for wildlife critical values, threshold conditions, or action levels. If changes to the receiving environment are determined to be greater than the predictions in the DAR, then the most suitable course of action will be determined by Dominion Diamond, in discussion with communities and regulatory agencies. This type of process has been used successfully in the past (e.g., Marshall 2009; Handley 2010).

Following the principles of adaptive management, wildlife monitoring has undergone changes since the initial development of the WEMP in 1998 (BHP 1998) and 2000 (BHP 2000a). These changes have been implemented following the results of monitoring and effectiveness of mitigation, recommendations and suggestions from communities, the IEMA, and government agencies. A history of changes to the WEMP since 1997 is provided in Appendix D.

Adaptive management will be an ongoing process throughout the life of the Ekati mine and may include the outcome of no change. If changes are required to the WEMP, they will occur as monitoring results are analyzed and assessed over time. If negative effects are detected, the actions available to Dominion Diamond include the following:

- increase monitoring effort;
- implement special studies to further understand the effects; and/or,
- implement additional mitigation to reduce the effects.

Figure 2.2-1 Adaptive Management Decision Tree for the Ekati Mine



2.3 Environmental Impact Review

An EIR report is a requirement of the Environmental Agreement signed in 1997 between BHP Diamonds Inc. (purchased by Dominion Diamond Corporation) and the governments of Canada and the Northwest Territories. As required by the Environmental Agreement, the EIR compares the results of environmental monitoring activities conducted by Dominion Diamond at the Ekati mine against the predictions of the 1995 EIS (BHP 1995a). The most recent reporting period for this comparison was from 2009 to 2011 (BHP Billiton 2012).

For the 2009 to 2011 EIR process, there were 22 key residual environmental risks identified by communities, the IEMA, and government within the VEC categories of Air, Land, Water, and Wildlife. Four of the top five environmental risks identified in the EIR report pertain to wildlife (BHP Billiton 2012). The following key residual environmental risks related to wildlife are included in the WEMP:

- caribou migration routes;
- caribou interaction with roads;
- ability to detect changes in carnivore populations;
- caribou interactions with Mine activities and infrastructure (other than roads);
- habituation of carnivores; and,
- breeding bird interactions with Mine activities and infrastructure.

The WEMP also includes monitoring programs and mitigations related to the predicted residual effects from the Jay Project (Dominion Diamond 2014). The complete list of effects pathways, associated assumptions, and predictions appear in Appendix A. The three primary effects pathways (or residual environmental risks) from the Jay Project on caribou and other wildlife were:

- direct loss and fragmentation of habitat from the Jay Project footprint causes changes in wildlife abundance and distribution;
- sensory disturbance (lights, smells, noise, dust, viewscape) and barriers to movement causes changes to wildlife movement and behaviour, and changes to caribou energetics and reproduction; and,
- increased traffic on the Misery Road and Jay Road, the above-ground power line along these roads, and the pipelines along the Jay Road may create barriers to wildlife movement, change migration routes, and reduce population connectivity.

Caribou herds are a key concern and Dominion Diamond will continue to provide site-specific information relevant to regional cumulative effects studies. Extensive camera monitoring at the Mine has contributed to a better understanding of the fine-scale effects of roads on caribou behaviour and movement. Ekati wildlife advisors have participated in regional government studies and workshops to improve caribou monitoring and examine opportunities to synchronize monitoring with other mines. When possible,

collaboration with DDMI has been better able to address the regional impacts of mining on caribou populations (e.g., aerial surveys and integrated methods for behavioural and other ground-based surveys). Community site visits have also been completed on a regular basis to share caribou monitoring knowledge and address monitoring improvements at Ekati.

Collaborative work with the GNWT, communities, and monitoring agencies on carnivore monitoring continues. This collaboration is intended to address the ability of detecting trends in carnivore populations. Dominion Diamond's participation in DNA studies on grizzly bear and wolverine has produced useful results, and it is anticipated that future work will provide information on Mine impacts on carnivore populations. The WEMP will continue to evolve, and will be responsive to issues and risks identified through the EIR process.

2.4 Valued Ecosystem Components

Valued ecosystem components represent physical, biological, cultural, social and economic properties of the environment that are considered to be important by society. The rationale for choosing the VECs selected for monitoring in the WEMP included the following:

- species are present in sufficient numbers to collect meaningful information;
- monitoring initiatives already exist that Dominion Diamond can contribute to;
- monitoring is important to communities, wildlife managers, and regulators;
- species can be monitored effectively with practical and efficient measurement indicators;
- measurement indicators are sensitive enough to detect Mine-related effects; and,
- species of concern (i.e., listed species) are located within the study area and should be monitored.

The VECs included in the WEMP are provided in Table 2.4-1.

Table 2.4-1 Valued Ecosystem Components for the Wildlife Effects Monitoring Plan

Valued Ecosystem Component	Rationale
Barren-ground caribou	Barren-ground caribou are seasonal migrants to the area, are an important component of the culture and economy of the NWT, and Dominion Diamond is contributing to the Barren-ground Caribou Management Strategy.
Grizzly bear	Grizzly bears are a species of concern, and regional monitoring is being undertaken.
Wolf	Wolves are secure in the NWT, but Dominion Diamond monitors wolves near infrastructure and supports regional wolf monitoring initiatives.
Wolverine	Wolverine are a species of concern, and regional monitoring is being undertaken.
Raptors	Peregrine falcon and short-eared owl are species of concern. Peregrine falcons are known to nest on cliffs in the Mine regional study area. However, based on technical workshops with government, monitoring agencies and Aboriginal communities, falcons have been removed as a VEC from Mine-specific monitoring, and Dominion Diamond contributes to regional monitoring.

NWT = Northwest Territories.

Other non-VEC wildlife species, such as fox and upland migratory birds, are monitored because they interact with the Mine regularly or results can support regional monitoring initiatives (e.g., North American Breeding Bird Survey). Incidental observations of other wildlife species during monitoring, such as moose and muskox will also be recorded. Following the principles of adaptive management, the VECs and monitoring objectives may be periodically reviewed and changed as necessary.

2.5 Species of Concern

The intent of the federal *Species at Risk Act* (SARA) and the *Species at Risk (NWT) Act* is to prevent wildlife species from becoming extirpated or extinct, to provide for the recovery of extirpated, endangered or threatened species, and to manage species of special concern to prevent them from becoming at further risk. This legislation may be used to prohibit the killing, harming or harassing of listed species, the damage and destruction of their residences, and the destruction of critical habitat. The *Species at Risk (NWT) Act* applies only to birds not already covered by the *Migratory Birds Convention Act*. In the NWT, the Species at Risk Committee will assess species, and the Conference of Management Authorities will prepare the List of Species at Risk, providing legal protection.

For the purposes of the WEMP, species may be considered of concern as a result of their national or territorial status, or their status under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). As the *Species at Risk (NWT) Act* is implemented, the NWT Species at Risk Committee will make further assessments, and the Conference of Management Authorities will prepare the List of Species at Risk, providing legal protection for these species, and possibly leading to changes in the species at risk considered for the Mine and the WEMP.

There are six wildlife species of concern with ranges that are known to overlap or likely overlap with the Mine (Table 2.5-1). In the case of migratory birds, only those birds that breed or winter near the Mine were included; other species that may migrate through the area were not included. Each of the species of concern will be monitored through the WEMP to reduce direct impacts as part of the adaptive management process. Mitigation and monitoring strategies will be consistent with any final and applicable COSEWIC assessment report, SARA recovery strategy, action plan, and management plan that may become available during the life of the Mine.

Table 2.5-1 Species of Concern at the Ekati mine

Species	*Species at Risk (NWT) Act*	COSEWIC Assessment	Federal *Species at Risk Act*	Potential Mine Impacts	WEMP
Grizzly bear (western population)	no status	Special Concern	under consideration	• may be attracted to developments if food is available • sensitive to disturbance particularly when accompanied by young or during denning • long generation time means one individual may be affected by disturbance seasonally over multiple years, resulting in potential regional population effects	hair-snagging surveys; habitat loss; and site monitoring
Wolverine (western population)	not at risk	Special Concern	under consideration	• may be attracted to developments if food or shelter are available	hair-snagging surveys; habitat loss; and site monitoring
Peregrine falcon (anatum-tundrius complex)	no status	Special Concern	Special Concern	• peregrines have been known to nest on Mine infrastructure and in open pits, where they may be at risk of harm or may cause delays to operations	monitoring nest occupancy and productivity in the regional study area habitat loss; and site/pit monitoring (particularly for nesting activity)
Red-necked phalarope	not applicable	Special Concern	under consideration	• loss of shoreline habitat for breeding • water birds that use Mine-altered waters may be harmed	NABBS; habitat loss; and site monitoring (particularly for nesting activity)
Rusty blackbird	no status	Special Concern	Special Concern	• may nest on Mine infrastructure • experiencing population declines as a result of changing environmental conditions on breeding and overwintering habitats	NABBS; habitat loss; and site monitoring (particularly for nesting activity)
Short-eared owl	no status	Special Concern	Special Concern	• may be affected by habitat loss • sensitive to noise and disturbance and human activity during nesting	NABBS; habitat loss; and site monitoring (particularly for nesting activity)

Source: NWT SAR (2015).

COSEWIC = Committee on the Status of Endangered Wildlife in Canada; NWT = Northwest Territories; WEMP = Wildlife Effects Monitoring Plan; NABBS = North American Breeding Bird Survey.

3 ENGAGEMENT AND INCORPORATION OF TRADITIONAL KNOWLEDGE

As part of their commitment to the environment, Dominion Diamond is mandated under their Environmental Agreement to incorporate available TK in environmental monitoring programs. Wildlife monitoring uses scientific methods and is informed by TK regarding local wildlife and ecology.

The WEMP focuses on wildlife species and habitats identified as being of social or economic importance, or of particular ecological or conservation concern (i.e., VECs). Each year the program is refined as a result of previous information collected and input from government and non-government agencies, Aboriginal communities and IEMA. With the assistance of community experts, land users, and/or TK holders during wildlife and habitat surveys, TK has been used to help understand monitoring results and provide ways of preventing or reducing impacts to wildlife. The WEMP will continue to evolve as Dominion Diamond explores further options to improve the program through community and regulatory workshops, community assistant participation, and site visits.

The physical presence of roads and associated traffic can cause wildlife to alter their movement and behaviour. Increased traffic along the Misery and Jay roads, and associated power lines and pipelines that results in barriers to the movement of caribou and other wildlife the Ekati mine site is a key concern for Dominion Diamond and communities. In the DAR for the Jay Project, Dominion Diamond proposed to construct caribou crossings at appropriate discrete locations along the Jay Road (Dominion Diamond 2014). However, due to the importance of the esker for caribou movement as identified through community engagement, the portion of the Jay Road that cuts through the esker will be constructed as a caribou crossing. Approximately 72% of the main section of the Jay Road will be constructed as a caribou crossing to enable caribou movement through area (see Appendix C, Section 4.1.1). Dominion Diamond is committed to further integration of TK in the construction of caribou crossings for the Jay Road, which would be incorporated into the final design of the road.

Dominion Diamond is responsible for engagement with affected Aboriginal people. In taking ownership of the Mine, Dominion Diamond is responsible for respecting existing Impact-Benefit Agreements, and abiding by the Environmental Agreement. As well, Dominion Diamond has committed to work with communities so that TK is incorporated into the day-to-day operation of the Ekati mine where appropriate (Dominion Diamond 2014).

The overall intent of Dominion Diamond's Community Engagement Program is to demonstrate and provide hands-on experience for community members (Elders, adults, and youth) so that they may gain a general awareness on how the Ekati Environment Department conducts its day-to-day, site-based, environmental monitoring programs. The goals for community engagement include:

- increase TK inclusion into site-based monitoring programs;
- enhance feedback to communities on TK initiatives;
- incorporate TK input into community development projects;
- incorporate TK input into Ekati-specific projects; and,
- incorporate TK input into reclamation research (Dominion Diamond 2014).

Dominion Diamond is committed to engaging with communities to explain proposed changes to the WEMP, to listen to comments, respond to questions and consider suggestions to improve the wildlife monitoring programs. Dominion Diamond continues to seek recommendations for improvements from the technical and community workshops to incorporate into future versions of the WEMP. Following the WEMP workshop on June 25, 2015, Dominion Diamond committed to producing a WEMP engagement plan, which was provided to the Mackenzie Valley Environmental Impact Review Board on July 24, 2015. This engagement plan details Dominion Diamond's commitment to engaging communities, government, and IEMA as the Jay Project regulatory process progresses.

3.1 Support of Community-Based Traditional Knowledge Studies

The Ekati mine has a strong history of supporting community-based TK projects that extends back to the mid-1990s. This includes:

- TK studies for the Ekati mine such as *A Tłı̨chǫ Perspective on Biodiversity* (Dogrib Treaty 11 Council 2000); and *Weledeh Yellowknives Dene: A Traditional Knowledge Study of Ek'ati* (Weledeh Yellowknives Dene 1997) and the *Naonaiyaotit Traditional Knowledge Project* with the Hamlet of Kugluktuk and Kitikmeot Inuit Association (KIA) (Banci et al. 2006);
- support of the West Kitikmeot Slave Study (completed) (WKSS 2001);
- the preservation and digitization of older, analogue TK records with the Tłı̨chǫ Government, the Goyatiko Language Society (Yellowknives Dene First Nation [YKDFN]) and the Łutselk'e Dene First Nation (LKDFN);
- support of heritage research and database compilation with the North Slave Métis Alliance (NSMA);
- the Caribou and Roads Project (KIA);
- the TK Research Project with the YKDFN, which included a site visit with an archaeologist to provide advice on locations of cultural significance around Lac du Sauvage, and to provide advice on the crossing of the esker for the Project (2014); and,
- the What'aa Eskers Research Project with the Tłı̨chǫ (Dominion Diamond 2014).

As part of the Caribou Mitigation Plan (CMP), Dominion Diamond has committed to develop a Caribou Monitoring Strategy/Plan with Impact Benefit Agreement (IBA) communities that will be supported by at least $100,000 (either direct financial and/or in-kind support) annually from the start of construction of the Jay Project until the end of operations. The expectation is that part of this funding would go towards TK-based research. In addition, Dominion Diamond has committed to $1,050,000 in financial offsetting to support the implementation of technically advanced caribou collars, and research in determining the drivers of the zone of influence and factors responsible for the decline of the Bathurst herd. It is also expected that Aboriginal communities and TK Holders would be involved in guiding the research and follow-up for these projects.

In addition to support for research, Ekati hosted numerous site visits and community meetings to discuss archaeology, wildlife, habitat, water and waste management at the Mine site. Representatives from the

communities have also helped design project activities and components in an effort to minimize potential impacts. For example, in 1996, the Tłı̨chǫ, Inuit, and YKDFN provided information for the development and design of a rope fence to guide caribou around the Mine site and away from the airstrip (BHP 2000b). Other site-based TK and community engagement programs related to the wildlife monitoring programs have included:

- annual youth and Elder visits for caribou monitoring;
- community participation in wolverine and grizzly bear monitoring field programs;
- annual community participation in group workshops and site visits to demonstrate and discuss air quality, dust, and vegetation monitoring, and other specific topics of interest;
- Caribou and Roads program with Kugluktuk Elders group (2004 to 2008); and,
- periodic Winter Road tours.

Ekati mine staff also regularly participate in community-based meetings and workshops to discuss questions and concerns about ongoing mining activities and monitoring programs.

3.2 Incorporation of Traditional Knowledge in Effects Monitoring

With the assistance of community experts, land users and/or TK holders during wildlife and habitat surveys, TK has been used to help understand the results, or provide ways of preventing or reducing impacts to wildlife. Inclusion of TK in the monitoring of caribou, wolf, wolverine, and grizzly bear is provided below.

3.2.1 Caribou

Caribou monitoring programs include satellite collar, aerial surveys, remote camera and ground surveys that document caribou movement, distribution and behaviour at and around the Mine site. Elders and holders of TK are regularly invited to site to participate in monitoring programs and to share their knowledge about caribou behaviour, diet, health and body condition, and migration movements. Since 2011, all the community engagement programs have included youth participants, which was recommended in previous meetings. These programs have provided opportunities for Elders to pass on their TK to youth, youth to provide support to their Elders and the youth to be equal participants (Rescan 2011).

Dominion Diamond is committed to providing communities with the opportunity to participate in mitigation and monitoring study designs and programs for the Jay Road, esker crossing, WRSA, and other Ekati mine roads, and provide feedback on the results. Once the Jay Road is constructed, the effectiveness of the caribou crossings will be monitored during community visits to the Ekati mine as part of adaptive management. Monitoring of the interactions between the Jay Road and caribou by communities may also be conducted through the research funding provided in the CMP.

3.2.2 Wolf and Wolverine

As of 2007, Inuit participants in the Caribou and Roads Program recognized that the wolf population around Ekati was beginning to decline. They noted that wolf and caribou have been living together for thousands of years and that wolves will decline with caribou (Banci et al. 2007). The Inuit have recommended that the eskers and denning areas for wolves and wolverines be protected. One of the main concerns was potential impacts on the presence and health of game in the area for hunting and trapping in the future (BHP 1995f). Incidental sightings are reported and den surveys are carried out as part of the WEMP to monitor wolf presence, occurrence, and productivity near the Mine. Overall, wolf presence within the Ekati mine area has been consistent over the last 12 years (ERM 2015).

In 2000 and 2001, the presence of wolverine in the study area was documented through winter track surveys. According to TK, the best time to obtain estimates of wolverine numbers within an area from snow track surveys was during November and December. More of the young animals' tracks could be located within their mother's home range and all the caribou have gone south for the winter and any animals that have followed the caribou will have usually left the area (BHP Billiton 2002). In 2005, 2006, 2010, 2011, and 2015, a cooperative DNA/hair snagging study was undertaken by Ekati and the Government of the Northwest Territories Department of Environment and Natural Resources (ENR) to replace the snow track survey and monitor wolverine density, abundance and movement on a regional scale (Rescan 2012).

3.2.3 Grizzly Bear

At technical and community workshops held in 2010, regulators, monitoring agencies and community members recommended that the mining industry collaborate on a large scale regional grizzly bear program to assess population status and monitor trends over the long term (Handley 2010). In response, Dominion Diamond and DDMI agreed to work together on a large scale, grizzly bear mark-recapture study surrounding their diamond mine properties in the central barrens of the NWT (ERM Rescan 2014a).

A hair snagging pilot study was completed jointly by DDMI and Ekati mine in 2010 and 2011 (DDMI 2012; Rescan 2012). Elders, land users and youth from Kugluktuk, Łutselk'e Dene, Yellowknives Dene, and the NSMA participated in site visits for the Community Engagement Program during the initial planning phases of the program and helped Ekati staff identify habitat locations around the Mine for establishing plots for the grizzly bear DNA Program (ERM Rescan 2014a). Surveys were completed by a biologist and a community assistant. Hair samples collected from the barbed wire were identified to species by a community assistant and archived for possible DNA fingerprinting to validate species identification (ERM Rescan 2014a).

3.2.4 Traditional Knowledge Inclusion in Effects Mitigation and Deterrents

In 1997, a semicircular arrangement of wooden stakes formed into crosses with lengths of yellow and silver metallic tape was built around Panda Pit and a rope fence with red and pink flagging tape was constructed around part of airstrip. Historically, these deterrents were designed using TK to redirect caribou to specific locations (Dene Cultural Institute 1995). The purpose of this fence was to deter caribou by deflecting individuals and encouraging them to walk parallel to the fence.

Based on the results of the 1997 caribou/fence monitoring and TK, modifications were made to the fence in 1998, increasing its height by the addition of another strand of rope. Observations made during 1998 and 1999 suggested that the fence was largely unsuccessful at deflecting caribou from the airstrip (BHP 1999, 2000a). While some animals would be deterred along the fence, several animals moved through the fence. Therefore, after further consultation with communities, BHP constructed an electric fence, which was in place by the spring of 2000. In 2001, caribou reportedly gained access to the airstrip on several occasions (BHP Billiton 2002). To further reduce the possibility of caribou entering the airstrip area, improvements to the electric fence were made; an additional two strands of electrical wire were added in 2001 and another two were added in 2002, for a total of eight strands (Rescan 2013).

Between 2002 and 2007, participants in the Caribou and Roads Program provided feedback to Ekati staff to help minimize impacts on caribou and other wildlife. The Kugluktuk Elders Advisory Group recommended that more inokhok (stone markers) be built and made more visible by adding flagging tape, making them larger or painting “hats” on them. They also suggested that inokhok be rebuilt and moved each year. Inokhoks and berms are now located at intervals around the airstrip, Beartooth Pit, Fox Pit, and other potentially hazardous Mine structures to deter caribou from these areas. They further recommended that BHP Billiton erect a fence to deflect and protect caribou from mining at the Beartooth Pit (Banci et al. 2007). This fence was erected and regular monitoring began in 2007 (Rescan 2008).

In 2010, after three caribou mortalities due to interactions with the electric fence (and previously the rope), the airport electrical fence was removed and replaced with the same type of fencing as at Beartooth, which is a heavy grade 1.3 m high plastic orange fence with a 5 centimetre (cm) diamond shaped mesh. New fences were also installed to deflect animals at the Pigeon Pit and Misery Camps (Rescan 2011). Participants in the 2011 annual monitoring report workshop suggested that Ekati should install fencing around all the open pits to protect caribou and other wildlife, but also noted that caribou observed around the site appeared to be in good health (Rescan 2012).

Roads and other infrastructure have been of particular interest since they can act as potential barriers to wildlife movement. During site visits, Elders have identified potential barriers and hazards to caribou movement including high ridges and sharp rocks along the edges of site roads (Rescan 2011). Communities and regulators have expressed the need to understand better how caribou respond to encountering roads. Over the years, recommendations from the Elders have been implemented through the construction of caribou crossings to allow caribou to cross with greater ease. These crossing ramps have been constructed using crushed rock (6 inches or less in size) so that the side slopes of the road are flatter and provide easier walking for caribou, and were built where caribou trails were present along sections of the Fox and Misery roads. These crossings are intended to minimize habitat fragmentation by increasing the permeability of the roads. With the help of Elders during the Caribou and Roads Program, caribou crossings that required improvement and places where new crossings were needed were identified (Rescan 2006a). Ground and remote camera observations on how caribou interact with the Mine, roads, pits, and traffic are included as part of the annual monitoring program.

4 MITIGATION

The environmental design features and mitigation policies, practices, and procedures that Dominion Diamond will implement to avoid and minimize (limit) effects to wildlife abundance and distribution are collectively referred to as mitigation. The WEMP includes a large number of mitigations implemented on a hierarchy of intensity (action) levels and spatial and temporal scales to protect wildlife and wildlife habitat (Appendix E). Standard mitigation hierarchy includes the following classifications (IFC 2012; BBOP 2015):

- **Avoid:** actions taken to completely avoid creating impacts from the outset, such as careful spatial or temporal placement of elements of infrastructure and engineered designs of facilities (e.g., waste rock storage areas).
- **Minimize:** actions taken to reduce the duration, intensity and/or spatial extent of impacts that cannot be avoided.
- **Reclaim:** actions taken to rehabilitate degraded ecosystems or restore ecological function following exposure to impacts that cannot be completely avoided and/or minimized.
- **Offset:** measures taken to compensate for any residual significant, adverse impacts that cannot be avoided, minimized and/or rehabilitated or restored. Offsets are achieved once compensation is sufficient that the outcome is no net loss or a net gain for the feature (e.g., VEC) for which compensation was developed. Offsets can take the form of positive management interventions, such as restoration of degraded habitat, arrested degradation or averted risk, and protecting areas where there is imminent or projected loss.

Adverse effects from a mine or development should be mitigated as much as possible using avoidance, followed by minimization, and reclamation. This is because effects that are avoided entirely or minimized mean that the effects from a development prior to implementing reclamation are reduced.

The Ekati mine and Jay Project will use mitigation that avoids, minimizes, and reclaims adverse effects associated with environmental risks or effects pathways. The results of the environmental assessments for the Ekati mine (BHP 1995a; BHP 2000c) and Jay Project (Dominion Diamond 2014) indicate that there are no significant adverse environmental effects. However, during the Jay Project EA review, most of the communities and the IEMA contended that cumulative effects from existing developments, other factors, and the Jay Project on the Bathurst caribou herd are significant. As a result, Dominion Diamond developed the framework for a CMP to compensate (offset) the residual adverse effects from the Jay Project on caribou. The CMP is to be formalized and completed through further engagement during 2016 and finalized within one year of Ministerial approval of the Jay Project.

Mitigation at the Ekati mine is applied and intensified or reduced within an adaptive management framework (Appendix E). The ability to manage the intensity of mitigation will depend on the type of environmental design feature and mitigation. For example, designing the development footprint to cover the smallest practicable spatial extent is applied at its maximum level and is therefore constant. Other mitigation, such as the use of wildlife deterrents, occur intermittently and are applied as required. The intensity of the application of this kind of mitigation can be implemented through monitoring and adaptive management. For example, the frequency with which wildlife deterrents are applied could increase or decrease, depending on results of monitoring (Section 2.2; Figure 2.2-1). Similarly, if monitoring

demonstrated that wildlife-vehicle collisions were high or increasing, then the scope or frequency of driver training, speed limits, or other mitigation can be managed adaptively in a way that is intended to reduce the effect. Adaptive management could also include increasing monitoring, consideration of alternate mitigation, or implementing a special study to better understand an effect.

4.1 Mitigation Effectiveness at the Ekati Mine

The Jay Project is an extension of the Ekati mine, which has been in operation for 18 years. Various mitigation designs, policies, practices, and procedures have been implemented, monitored, and evaluated at the Ekati mine and other operating mines such as the Diavik, Snap Lake, and Jericho (now dormant) mines. The WEMP assesses the effectiveness or success of different mitigations implemented at the Ekati mine and incorporates the lessons learned through adaptive management. Some of the improvements include modified landfill practices, use of fencing, construction of skirting around buildings, employee education, and monitoring site nesting activity by raptors. A qualitative assessment of the effectiveness of mitigation is provided below.

4.1.1 Non-Vehicle Wildlife Incidents and Mortalities

Employees at the Ekati mine have found that wildlife mitigation efforts to reduce wildlife conflicts with the Mine can vary. For example, the chain-link fence around the Misery camp that was designed to reduce the presence of wildlife in the camp area is only successful if the gates are kept closed and if the fence is maintained in proper function. Once an animal gains entrance, the chain-link fence makes removal more difficult.

4.1.2 Airstrip Deterrents

The airstrip was initially surrounded by a rope fence with electrical flagging tape in 1997. Caribou were observed moving freely between the crossbar structures and the rope without appearing to notice them. Some employees felt that the metallic tape actually attracted caribou rather than deterring them. In an attempt to improve the deterrence, an additional strand of rope was added to the fence in 1998. Based on the results of monitoring this deterrent was not successful and after engagement with stakeholders, an electric fence was added in 2000. In 2001 and 2002, additional electric strands were added to the fence (from 4 to 8) to help prevent caribou from entering the airstrip.

In 2006, inokhok (traditional rock structures used to deflect wildlife) were added as an additional deterrent to keep caribou away from the airstrip. In response to several mortalities due to interactions with the rope and electric fence, the inokhok and fence posts were painted to provide greater contrast and all the rope was removed. In response to several more caribou mortalities in 2009 and 2010, the electric fence was removed and replaced with a heavy-weight orange barrier fence.

Caribou have been observed jumping this orange barrier fence, and in 2011, one caribou was euthanized after many attempts to deter the individual from the airstrip. Plans are being developed to heighten the barrier above a caribou's line of sight to prevent caribou from jumping over it in the future (Rescan 2013). Monitoring indicates that wildlife are able to get past the orange barrier fencing, and the effort required for annual maintenance and ongoing airstrip inspection/clearing is high.

4.1.3 Vehicle-Wildlife Collisions

Mitigation efforts to limit vehicle-caribou collisions, such as speed limits, giving animals the right-of-way, radio communication of wildlife presence, and temporary road closures have been successful. No caribou have been killed at the Ekati mine from vehicle collisions. One wolf (2002), a rough-legged hawk (2005), and a short-eared owl (2013) were killed by vehicles (ERM Rescan 2014b). Most wildlife-vehicle collisions involve fox, Arctic hare, ptarmigan, and Arctic ground squirrel.

Radio communications about the presence of wildlife have limited wildlife-vehicle collisions. The placement of wildlife crossing signs is re-assessed when necessary, when habitat around the Mine changes due to operational or reclamation activities, or as new information about habitat use becomes available. The Ekati mine provides employee training about the wildlife right-of-way policy, including how the Environment Department responds to the calls.

A substantial addition to the WEMP was the deployment of 90 motion sensor wildlife cameras to monitor the interaction of wildlife with Mine infrastructure, with a particular focus on Misery Road (Rescan 2013). The program has provided information on primary caribou movement paths along the Misery Road.

Dominion Diamond is currently reviewing the construction and placement of Misery Road berms. The goal of this review is to explore options to minimize caribou deflections from the road while still maintaining compliance with the *NWT Mine Health and Safety Act*.

Dominion Diamond has implemented several mitigation practices to minimize potential interactions between Mine-related traffic and wildlife:

- hunting, trapping, harvesting, and fishing are prohibited at the Ekati mine site by all employees and contractors;
- wildlife always have the right-of-way;
- speed limits are posted and enforced; speed limits are 60 kilometers per hour (km/h) along haul roads, and 20 km/h and 40 km/h along other roads;
- vehicles encountering wildlife on roads are required to stop and communicate the presence of wildlife on the road(s) to the Environment Department and others in the area;
- roads are temporarily closed, and these closures are communicated site-wide when wildlife are in the vicinity of the road;
- wildlife carcasses on or near roads are removed to minimize the attraction of predators and scavengers to roads and road edges where they would be at an increased risk of colliding with vehicles;
- wildlife crossing signs are erected at sections of road where wildlife crossings are frequent, or in areas where animals reside near roads;
- visual inspections at the airstrip for wildlife are completed prior to take-off and landing of all aircraft;
- a barrier fence is maintained around the airstrip to deter wildlife from the area;
- a fence is maintained around Misery Camp to prevent wildlife from entering;

- inokhoks are placed at intervals around the airstrip, Pigeon Culvert, Fox Haul Road, and other potentially hazardous Mine structures to deter caribou from these areas; and,
- TK is utilized to enhance caribou monitoring activities.

4.1.4 Waste Management

Mitigating the attraction of carnivores and scavengers (e.g., gulls and ravens) to food garbage, petroleum products, and potential shelter has been an on-going concern at all operating mines. A major improvement in mitigation occurred with a re-design of the Ekati mine landfill in 2002. Prior to the changes, the landfill was a stand-alone facility, covered occasionally with waste rock. In 2002, the Ekati mine incorporated the landfill directly into the waste rock pile. This led to much more frequent covering of garbage, and with improvements to employee education, the percent of landfill inspections where attractants were observed dropped from over 90% to 65% from 2001 to 2003 (BHP Billiton 2004). The number of scavengers present at the landfill was also reduced.

There are indications that improved and continual employee education has resulted in a decrease in the presence of scavengers and food waste items at landfills (Rescan 2010). Specifically, training and education is provided for each department at the Ekati mine and new employees on the importance of following waste management policies and practices, and wildlife awareness to reduce interactions with wildlife. Changes in the operations of waste management practices, in addition to the education and awareness programs for new and current employees include:

- more frequent burning of camp waste in order to reduce chance of wildlife encounters;
- juice boxes are no longer used;
- signs have been added in lunchrooms and additional labels have been added to waste bins to indicate proper waste disposal; and,
- removal of bear proof outdoor waste bins.

The use of skirting on buildings at the Ekati mine has also successfully prevented wildlife from accessing the area underneath buildings as shelter or dens (Rescan 2008). Skirting is most effective if wire mesh, sheet metal sheathing or other chew-resistant material is used and frequent monitoring of the skirting integrity is necessary to prevent wildlife being trapped under buildings.

4.1.5 Open Pits

Open pits may lead to wildlife injury or mortality through the presence of steep sides, fly rock, and traffic. No caribou or other wildlife mortalities from animals entering the open pits at the Ekati mine have been reported (ERM Rescan 2014b). At high risk areas, heavy weight orange barrier fencing was erected to mitigate hazards to caribou and other wildlife. At Beartooth Pit, a single line of fencing was installed in 2006 on the northeast side to deflect caribou around the immediate area, which demonstrated that fencing of this nature can be effective. At Pigeon, a similar type of heavy weight orange barrier fence was placed around the test pit after its completion in 2011. No caribou have been seen inside the Pigeon fence.

Monitoring has been introduced to detect possible nesting by raptors and ravens at the Ekati mine. In 2002, there were two instances of rough-legged hawks nesting or attempting to nest within open pits and a peregrine falcon nested on the stairs of a fuel tank (BHP Billiton 2002). Following these instances, monitoring was implemented each spring to detect nesting behaviour before egg-laying occurred. Mitigation is completed case-by-case in consultation with GNWT, but may include removing or covering the nest or isolating the area from disturbance, depending on the level of risk to the birds. Other types of deterrents that have been less successful in the past include propane cannons, noise makers, and bear bangers. Dominion Diamond will not deter birds from nesting in inactive pits. If a bird successfully nests in an active pit, ENR will be contacted to discuss a buffer zone that will be applied to the nest where no work can be undertaken. For example, a 250 m work exclusion buffer zone was applied to a falcon nest in an active pit in 2013.

4.1.6 Dust

The Ekati mine produces dust through various sources including blasting and crushing rock, road construction and traffic. As noted in the Traditional Land Use and Traditional Knowledge Baseline Report, concern exists that dust from the Mine could affect animal migration (e.g., caribou), small furbearing animals, birds, hatching birds and birthing animals, vegetation, fish (and specifically in the Lac de Gras area), plants and water (and specifically plants and water to the east of development activity). Dominion Diamond will manage dust and particulate emissions with water and chemical suppressant application to control dust emissions on haul roads and the Ekati mine airstrip during summer or the non-frozen period.

Dust is predicted to settle in the area near and around the Mine; however, mitigation and monitoring of dust will not be addressed in the WEMP. Mitigation to control dust at the Ekati mine has included watering and applying dust suppressant to the roads, and monitoring is completed through the AQMMP. The Ekati mine implemented a dustfall monitoring program in 2006 to determine the deposition patterns of fugitive dust from haul roads and other mining activities, which by 2008 was expanded to include additional monitoring stations. The objective of this monitoring program is to assist in determining effective mitigation strategies and monitor performance, based on collected dustfall data.

Further studies on the rate and spatial extent of dust deposition, triggers for adaptive management, and the effectiveness of mitigation methods to limit dust generation are part of the Air Quality and Emissions Monitoring and Management Plan (AQEMMP) for the Jay Project (Section 2.4 Dominion Diamond 2016). For example, as part of the CMP and AQEMMP, Dominion Diamond will expand the pilot study on determining the effectiveness of dust suppressants along the Misery Road. If successful, the suppressant would be applied to all roads at the Ekati mine as an off-site offset for the Jay Project. Best practices will be shared with other operators, which if successfully used would also be considered as off-site offsetting. Information from the AQEMMP will be also used to help assess the potential drivers of detected changes in the zone of influence (ZOI) on caribou distribution and behaviour (see Sections 5.6.5 and 5.6.6).

4.1.7 Health Effects from Contaminants

Further research on metals bioaccumulation related to caribou interaction with processed kimberlite deposited in the LLCF will be conducted as part of Dominion Diamond's Reclamation Research Plan (Rescan 2006b). In addition to the reclamation research, an increase in the frequency of wildlife surveys in the LLCF commenced in 2012 to provide a better understanding of wildlife activity as reclamation activities progress.

4.2 Mitigation of Key Environmental Risks or Pathways

Similar to the environmental assessments for the Ekati mine (BHP 1995a; BHP 2000b) and Jay Project (Dominion Diamond 2014), the WEMP provides specific mitigation for each of the following key environmental risks or pathways:

- direct habitat alteration and loss;
- indirect habitat alteration and loss;
- barrier to caribou movement and migration from roads and associated power lines and pipelines; and,
- protection to caribou and other wildlife from direct Mine-related mortality.

4.2.1 Direct Habitat Alteration and Loss

Direct habitat loss refers to the physical disturbance and immediate loss of wildlife habitat (e.g., upland and riparian vegetation, wetlands, and water) within the footprint of the Ekati mine. Direct habitat disturbance occurs during construction, such as the creation of roads, WRSAs, core Mine facilities, and increased water levels in local lakes and streams. Direct habitat loss is monitored in the WEMP.

Mitigation for direct habitat loss is designed so that the physical footprint of the Ekati mine does not exceed that authorized in the Land Use Permits and includes the following.

- maintain downstream flows within the natural range of variability;
- maximizing the use of the existing Ekati mine infrastructure for the Jay Project to reduce the environmental footprint to the extent practical;
- new access roads will be as narrow as feasible, while maintaining safe construction and operation practices;
- only one access road crosses the Lac du Sauvage esker, and will be constructed as a caribou crossing;
- the cut through the esker will be aligned to minimize the amount of material removed;
- existing (Misery) and new (Jay) power lines will be parallel to the haul roads to avoid additional fragmentation and minimize the environmental footprint;
- a pipe bench will be constructed to accommodate the pipelines, which will follow existing and proposed road alignments to the extent practical to minimize the Jay Project footprint;
- pipelines will be covered with crushed rock at caribou crossings;
- soil disturbance will be limited to only those areas required for construction and operation of the Jay Project;
- existing Misery and Lynx pits will be used for dewatering and minewater management, limiting the requirement for additional areas to be disturbed for minewater management;

- management practices already in place at the Ekati mine will be implemented to control erosion and sediment; and,
- conditions will continue to be monitored over time to evaluate the success of the ICRP and, using industry best practice, adaptive management, and newer proven methods as available, to adjust the ICRP as necessary and appropriate.

4.2.2 Indirect Habitat Alteration and Loss

Indirect habitat loss is a result of a decrease in the perceived quality of habitat by wildlife and subsequent changes in movement and behaviour of individuals that occurs outside of the Ekati mine footprint. These changes in movement and behaviour can affect the local abundance and distribution of animals. Changes in movement and behaviour in wildlife can result from sensory disturbance around mining operations (i.e., a zone of influence), which may be caused by dust deposition, noise, lights, general human activity, and animal memory of previous encounters with industrial developments. Thus, sensory disturbance can reduce habitat quality for wildlife even where vegetation remains intact.

Currently, it is expected that indirect habitat alteration and loss for caribou (ZOI) will be monitored through regional programs in collaboration with ENR, potentially through the Barren-ground Caribou Management Strategy (Section 5.6.1). Potential mechanisms for the ZOI will be monitored through the WEMP and other plans such as the AQEMMP.

Mitigation is intended to reduce the changes to less than the ZOI predicted in the DAR (15 km; Dominion Diamond 2014), and includes the following:

- regular maintenance of equipment to limit noise and particulate matter emissions will continue at the Ekati mine;
- dust suppression will be applied as appropriate to roads, airstrip, and laydown areas;
- speed limits are posted and limit fugitive dust;
- use of existing surface facilities will limit the area disturbed during construction of the Jay Project and minimize the quantity of new sensory disturbances;
- use of shielded lighting fixtures for infrastructure associated with the Jay Project will be considered;
- only one access road crosses the Lac du Sauvage esker, and the intersection will be constructed as caribou crossing;
- the Jay WRSA is set back 200 m from the Lac du Sauvage esker;
- wildlife always have the right-of-way;
- kimberlite stockpile areas have been designed in strategic locations that facilitate continued Mine operations through short-term and long-term of road closures (Section 4.5);
- Misery Road surface height was constructed close to surrounding land surface to facilitate crossing for caribou and other wildlife;

- wildlife crossing signs are erected at sections of roads where wildlife crossings are frequent, or in areas where animals reside near roads;
- minimum flying altitude of 600 m above ground level (except during takeoff and landing and field work) will be maintained for cargo, passenger aircraft, and helicopters outside of the Mine site;
- vehicles are restricted to designated roads and prepared work areas (recreational use of off-road vehicles is prohibited);
- continued education and environmental sensitivity training will be provided to employees and contractors; and,
- continue to use TK to enhance caribou monitoring activities and adaptive management.

4.2.3 Barrier Effects from Roads

The physical presence of roads and associated traffic can also cause wildlife to alter their movement and behaviour. Depending on species and traffic volume, some animals may cross roads, be deflected along roads before crossing, or completely avoid roads. Increased traffic along the Misery and Jay roads, and associated power lines and pipelines that results in barriers to the movement of caribou and other wildlife the Ekati mine site is a key concern for Dominion Diamond, communities, IEMA, ENR, and the public. In the DAR for the Jay Project, Dominion Diamond proposed to construct caribou crossings at appropriate discrete locations along the Jay Road (Dominion Diamond 2014). However, because of input from Aboriginal communities, ENR, IEMA and the Mackenzie Valley Environmental Impact Review Board during the engagement and environmental review process, Dominion Diamond has changed the approach to caribou crossings along the Jay Road to reflect that feedback. Furthermore, a specific Caribou Road Mitigation Plan (CRMP) has been developed to avoid and minimize effects from roads at the Ekati mine on wildlife mortality and barriers to movement (Appendix C).

Because of the importance of the esker for caribou movement as identified through community engagement, the portion of the Jay Road that cuts through the esker will be constructed as a caribou crossing using crushed rock (6 inches or less in size) (Section 3). The pipelines will be covered with crushed rock at caribou crossings, except where there are valves or joints that require visual inspection for safe operation as per the NWT *Mine Health and Safety Act*. Dominion Diamond will strategically construct the pipelines to reduce the number of joints or valves through the esker crossing. Most of the main section of the Jay Road will be constructed as a caribou crossing to enable caribou movement through area, which was identified as an important migration route by communities and baseline studies on historic trail mapping (Appendix C; Section 4.1.1). The road design allows for approximately 1.8 km of caribou crossings over a total length of 2.5 km between JR1+100 (close to King Pond) and JR3+560 close to the intersection with the Jay North Road (i.e., 72% of the road will be built with caribou crossings). This includes a 1.3 km stretch of road through the esker. Two additional caribou crossings will be added to the Jay North Road and one crossing will be added to the eastern section of the Jay Road towards the dike (Appendix C; Section 4.1.1).

The response of caribou to the Misery and Jay roads, and the effectiveness of mitigation will be monitored in the WEMP and include Aboriginal community members. Mitigation is intended to avoid and limit the barrier effects from roads on caribou and other wildlife, and includes the following.

- only one access road crosses the Lac du Sauvage esker, and the intersection will be constructed as a caribou crossing;
- an increased number of caribou crossings will be constructed along the main section of the Jay Road (i.e., between King Pond Dam and the approach to the active operations area at Lac du Sauvage) to enable caribou movement through area;
- caribou crossings will be constructed using crushed rock (6 inches or less in size) so that the side slopes of the road are flatter and provide easier walking for caribou than the large roadfill rock;
- pipelines will be covered with crushed rock at caribou crossings, except where there are valves or joints that require visual inspection for safe operation;
- roads will be designed that have low side-slopes and low banks to facilitate caribou crossing, except in areas where rock berms are necessary to adhere to regulatory requirements;
- road snow berm height will be managed during winter;
- kimberlite stockpile areas have been designed in strategic locations that facilitate continued Mine operations through short-term and long-term road closures;
- wildlife always have the right-of-way;
- speed limits are posted and enforced;
- vehicles encountering wildlife are required to communicate the presence of wildlife on roads;
- four levels of mitigation and monitoring are included in the CRMP, and the intensity of mitigation and monitoring increases when specific action levels (triggers) are met (Appendix C);
- speed limits will be reduced, and short and long-term road closures may be implemented according to action levels in the CRMP; and,
- Dominion Diamond will work with communities to monitor caribou movement and effectiveness of mitigation and provide feedback to adaptive management.

4.3 Protection of Caribou and Other Wildlife

Occasionally, mining operations have contributed to the mortality or injury of wildlife. This may be either accidental (such as vehicle collisions with wildlife), or the deliberate removal (re-location or intentional destruction) of problem wildlife to protect worker safety. Deterrent actions always start with the least intrusive method and then increase with intensity as needed. In the past, an effective way to reduce wildlife mortality has been to establish and enforce low speed limits on Mine roads. Reducing the availability of food and shelter for wildlife, thus limiting the attraction and presence of animals within the Ekati mine, is also highly effective at preventing mortality or harm to wildlife. Incidents and mortalities, and effectiveness of mitigation for the protection of caribou and other wildlife are monitored in the WEMP.

4.3.1 Direct Mine-Related Mortality and Injury

Mitigation to avoid and limit direct Mine-related mortality and injury to caribou and other wildlife from collisions with vehicles or aircraft, physical hazards (e.g., pits, blasting), Jay Project fish-out, and destruction of migratory bird nests includes the following:

- implementation of the CRMP (Appendix C);
- the current mitigation policies and practices for safety of wildlife on roads, airstrip and other areas of the Ekati mine will be continued (Section 4.1). These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff;
- site environmental technicians will investigate all caribou and other wildlife incidents and mortalities, report to government, and recommend follow-up;
- routine, systematic monitoring of different areas of the Ekati mine will be conducted, including the Jay Project dike, pit area, and WRSA. Information collected will be used for adaptive management;
- the Jay WRSA will have caribou egress ramps to allow animals to exit the structure. Dominion Diamond will ask for input from TK Holders and communities on the design of the ramps;
- caribou and other wildlife will be deterred from areas of risk;
- a blasting plan will be implemented to protect caribou and other wildlife from fly-rock during the early stages of pit development (i.e., until the pit is deep enough to contain fly-rock);
- a fish-out plan will be developed for the Jay Project, and will include a mitigation strategy for minimizing the risk of mortality and injury to diving birds. The mitigation strategy will be developed through engagement with Environment Canada, and the fish-out will be monitored to determine the effectiveness of mitigation. Results will be provided in the annual monitoring report;
- wildlife always have the right-of-way;
- speed limits are posted and enforced;
- mitigation is currently in place to minimize human-wildlife interactions, including awareness training;
- pit wall monitoring procedures for raptor nests implemented at the Ekati mine will include the Jay Project;
- birds showing nesting activity in areas of critical risk will be actively deterred. Dominion Diamond will not deter birds from nesting in inactive pits;
- if a peregrine falcon, gyrfalcon or rough-legged hawk successfully nests in an active pit, ENR will be contacted to discuss a buffer zone that will be applied to the nest where no work can be undertaken. Nests will be monitored for success and results provided in the annual monitoring report.
- mine-altered waterbodies will be regularly monitored for use by migratory birds, and data collected will be used for adaptive management;
- guy wires are secured and removed if deemed unnecessary;
- visual airstrip inspections for wildlife are completed prior to take-off and landing of all aircraft;

- a barrier fence is maintained around the airstrip to deter wildlife from the area;
- a fence is maintained around Misery Camp to prevent wildlife from entering;
- inokhoks (traditional rock structures used to deflect wildlife) are placed at intervals around the airstrip, Pigeon Culvert, Fox Haul Road, and other potentially hazardous Mine structures to deter caribou from these areas;
- wildlife carcasses on or near roads are removed to minimize the attraction of predators and scavengers to roads and road edges where they would be at an increased risk of colliding with vehicles;
- vehicles encountering wildlife on roads are required to stop and communicate the presence of wildlife on the road(s) to the Environment Department and others in the area;
- the power line will incorporate perching deterrents on poles including cone-shaped pole caps and cross arm perch preventers to prevent large birds from perching and nesting on poles or on dangerous areas around phase conductors;
- bird deterrents (e.g., spinning reflectors) will be installed on the power line in identified areas of concern (e.g., near waterbodies known to represent staging areas); additional locations will be identified through monitoring of bird strikes along the power line;
- to the extent practicable, vegetation clearing will occur outside of the migratory bird nesting period;
- if vegetation clearing is required during the sensitive migratory bird nesting period (May 20 to August 17), activities will be managed to comply with the *Species at Risk Act* and the *Migratory Birds Convention Act*. Non-intrusive survey methods will be used to search the area for nesting activity prior to clearing. Environment Canada will be consulted to determine the most appropriate search method; and,
- Environment Canada (2015) recommended setback (buffer) distances specific to species groups be implemented around nests detected during pre-clearing (Table 4.3-1). Implementation of setback distances will be based on further discussion with Environment Canada to determine the most practicable setback distances for protecting migratory birds within an adaptive management framework, and how best to monitor the success of such nests. Results will be provided in the annual monitoring report.

Table 4.3-1 Environment Canada Recommended Setback Distances for Nests of Migratory Birds Species Groups

Species Group	Setback Distance for Pedestrians/All-Terrain Vehicles (m)	Setback Distance for Clearing and Construction Activities (m)
Songbirds	30	100
Shorebirds	50[(a)]	100[(a)]
Terns/gulls	200	300
Ducks	100	150
Geese	300	500
Swans/loons/cranes	500	750
Rusty blackbird	300	300
Short-eared owl	1,500	1,500
Red-necked phalarope	100	100

a) If project activities may disturb nest of American golden plover, then setbacks should increase to 150 m and 300 m for pedestrians and clearing, respectively.

m = metre.

4.3.2 Management of Toxic Substances

The following mitigation policies and procedures are intended to decrease the risks to caribou and other wildlife from ingestion of toxic substances or encounters with toxic spills on the Ekati mine site:

- regular equipment maintenance (e.g., regular checks for leaks);
- drip trays are used during servicing and refuelling;
- hazardous substances are stored and handled on site in accordance with applicable regulations;
- fuel is stored at a central bulk fuel farm at the Ekati main camp and at satellite fuel farms located at Misery, Fox, and Koala North. Fuel tanks are housed within bermed areas;
- follow Ekati's Spill Response Plan in the event of a spill (spill response training is provided and updated);
- soil and snow affected by hydrocarbon spills will continue to be handled in accordance with the existing Hydrocarbon-impacted Materials Management Plan and soil will be remediated in the landfarm or shipped off-site;
- dewatering and minewater management in the Wastewater and Processed Kimberlite Management Plan will include the pipelines used for ongoing water management of the Jay Pit;
- minewater and fine processed kimberlite slurry pipelines will be monitored and inspected throughout construction (i.e., dewatering of diked area), operations, and closure. Additional mitigation will be applied, if required; and,
- any leaks or spills identified along the pipelines will be addressed and clean-up, and if required, will be implemented following the existing Spill Contingency Plan.

4.3.3 Management of Attractants

The following mitigation and management plans are intended to reduce the numbers of predators and scavenging wildlife (such as carnivores, gulls and ravens) attracted to the Ekati mine, and avoid and limit human-wildlife interactions and changes to predator-prey relationships.

- apply the Waste Management Plan, Landfill Management Plan, and Incinerator Management Plan;
- separate bins will be located throughout the accommodations complex, shops, and other facilities on-site for immediate sorting of domestic wastes;
- food wastes will be collected in specific bins for transport directly to the incinerator storage area for incineration;
- incinerator is enclosed and camp waste is burned regularly;
- littering and feeding of wildlife is prohibited;
- raised, heated buildings will be skirted to prevent wildlife access to shelter under the buildings, and monitored regularly;
- wildlife activity will continue to be monitored at waste management areas, and provide feedback into adaptive management;
- landfill sites and waste storage areas will be inspected;
- the efficiency of the waste management program will be reviewed as needed and improved through adaptive management;
- education and reinforcement of proper waste management practices and issues surrounding wildlife habituation is provided to all workers and visitors to the site; and,
- a chain-link fence is maintained around Misery Camp to prevent wildlife from entering.

4.3.4 Deterring Wildlife

The goal of wildlife deterrent action is to respond to situations using humane methods that keep both humans and wildlife safe. Wildlife will only be deterred when there is a risk to either humans or wildlife, as judged by the environment staff. All deterrent actions start with the least intrusive method, and then increase in intensity as needed. Each deterrent action will stop as soon as the animal moves away from the potentially hazardous site and no longer poses a threat to humans. Deterrents may be used to remove wildlife from the airstrip and potentially hazardous sites and activities. All deterrent actions will be documented and reported to ENR. Specific deterrent actions for caribou consider the following:

- all incidents involving interactions, use of deterrents or potential injury of caribou will be documented and evaluated;
- caribou will only be moved away from roads or the airstrip under specific circumstances, such as when there are incoming flights or if there is an emergency; and,

- caribou will be deterred from the airstrip by driving a truck down the strip, getting out of the vehicle, and making noise by yelling and, if required, firing bear bangers (this will only be done when there is an imminent flight scheduled to land at the airstrip and an immediate need to mitigate risk to human or wildlife safety).

4.4 Education

Environmental education is part of every employee's mandatory training upon starting at the Ekati mine. Environmental education training includes:

- review of Corporate Sustainability Policy;
- wildlife awareness;
- spill reporting;
- wildlife reporting policy;
- Workplace Hazardous Materials Information System (WHMIS); and,
- waste management.

The environment department also provides role and department-specific training and presentations based on seasonal environmental issues. For instance, haul truck drivers will be given presentations prior to the Bathurst herd spring migration reminding them of mitigation and alerting them to the increased likelihood of caribou presence.

4.5 Mitigation Review

The mitigation in the WEMP stems from current practices at Ekati and existing mines; however, an annual review system is required to evaluate the mitigation. A review will be undertaken to evaluate the following:

- which mitigation has been implemented;
- which mitigation is perceived to be or shown to be successful;
- if new mitigation has been implemented in response to new issues; and,
- if some mitigation has become redundant or ineffective.

The mitigation review will be provided in the annual monitoring report.

5 MONITORING

5.1 Direct Wildlife Habitat Loss

Dominion Diamond has monitored the annual amount of direct habitat loss accrued to the construction and operation phases of the Ekati mine since 1998. These losses were anticipated and approved through the Environmental Impact Assessment process (i.e., the Environmental Assessment Review Panel and the environmental assessment conducted for Sable, Pigeon, and Beartooth pits in 2000).

Past Scope and Improvements

In 1997, an Ecological Land Classification (ELC) system for the Lac de Gras area was developed as part of the original Ekati Environmental Impact Statement. This system identified 11 ELC units or habitat associations and was used to model predicted habitat loss at Ekati. A subsequent study conducted by Epp and Matthews (1998) and Matthews et al. (2001) classified the entire Slave Geological Province into 15 units or habitat associations. Since 2000, this 15 unit ELC system has been used to assess the amount of habitat loss per habitat association at Ekati.

Objectives

The objective for this component of the WEMP is to:

- determine the amount of direct habitat loss due to Ekati activities.

Methods

The area of direct habitat loss is determined by superimposing the current Mine footprint on the pre-development (i.e., baseline) habitat map of the study area using Geographic Information System (GIS) software. Both the Mine footprint and the baseline habitat map were developed from LANDSAT Thematic Mapper satellite imagery. Direct habitat loss is measured by classifying pre-disturbance land cover into 15 habitat types (Table 5.1-1) that represent an association of vegetation, soil, and moisture characteristics, using the ELC system. Direct habitat loss is measured in hectares (ha) and determined from cumulative annual changes in the Mine footprint.

Table 5.1-1 Description of Habitat Types within the Ekati Study Area

Habitat Type	Description
Bedrock complex (>80% rock)	Exposed bedrock with very little vegetative cover.
Birch seep/riparian shrub	Vegetation in areas of active water seepage through boulder fields and boulder streams. Moist and well drained areas of low shrub with continuous vegetation cover. Birch and willow species dominate these areas.
Boulder complex (>80% rock)	Large areas of boulder fields including boulder outcrops, boulder streams, and drainages. This land cover type supports very little plant growth.
Deep water (>2 m)	Deep, clear lakes and major river systems with water depths greater than 2 m.
Esker complex	Linear structures of sand and gravel, formed by glacial rivers that provide significant topographic relief. Eskers support a number of plant communities and are important to wildlife. Esker tops are wind-swept and accumulate very little snow during winter.

Table 5.1-1 Description of Habitat Types within the Ekati Study Area

Habitat Type	Description
Heath tundra (<30% rock)	Closed mat plant community that grows on moderate to well drained soils, covering most of the upland areas. Plants generally belong to the heath family (*Ericaceae*) and vegetation covers at least 70% of the ground surface.
Heath tundra (30-80% bedrock)	Sparse heath tundra and bedrock outcrops are exposed; vegetation is discontinuous and described as open mat heath tundra.
Heath tundra (30-80% boulder)	Open mat plant community with heath tundra and boulder fields.
Lichen veneer	Flat islands, low peninsulas, and esker tops are covered with a continuous mat of lichen that appears as "veneer." Sites are windswept and dry, allowing very little plant growth.
Riparian tall shrub	Linear plant associations of birch, willow, and alder that follow active stream courses, usually with a cobble or boulder substrate. Under-storey plant species may include dwarf raspberry, dwarf marsh violet, cloudberry, grasses, sedges, club mosses, and common horsetail.
Sedge wetland	Wet sedge meadows and other sedge associations of non-tussock plant species. Sedge species such as *Carex aquatilis* and *C. bigelowii*, and cotton grass (*Eriophorum angustifolium*) are dominant vegetation types within wet, low lying sites where standing water is present throughout much of the growing season.
Shallow water (<2 m)	Waterbodies that contain submergent or emergent vegetation with water depths less than 2 m.
Spruce forest	Spruce-lichen woodland in lowland, sheltered areas such as river valleys. Typically clumped forest in a predominantly tundra landscape.
Tussock/hummock	Plants belonging to the sedge family (*Cyperaceae* spp.) are dominant, and tussock cotton grasses such as *Eriophorum vaginatum* and *E. russeolum* are common. These sites are drier and less frequently flooded than sedge wetlands.
Unclassified	Pixels (the smallest sub-division of the mapped area) that could not be successfully assigned to one of the above classes are considered to be unclassified.

Data from Matthews et al. (2001).

m = metre; % = percent; > = greater than; < = less than; spp = multiple species.

Frequency

Mine footprint updates will be provided annually and will include the construction of the Jay Project.

Data Analyses

Analyses will be completed in a GIS platform to compare predicted and observed cumulative area of ELC units altered due to Mine activities, including revegetated areas. The area and percent area of each habitat type directly disturbed by the Ekati mine will be included in the annual monitoring report.

5.2 Waste Management

Waste is managed to minimize the presence of attractants and toxins in the Ekati and Misery landfills. Unlike a municipal landfill (which contain batteries, various chemical wastes, and food wastes), no reactive products or food waste products are permitted in the Ekati and Misery landfills. Waste is sorted by using specific garbage containers for each type of waste (e.g., oil rags, used absorbent pads, oil and fuel filters, used grease, aerosol cans, incinerator waste, and inert waste). Hazardous materials such as

oil filters, paint, and batteries are transported off the Mine site for recycling. Food-contaminated wastes (such as lunch bags) and most wood products are segregated and incinerated, with the remnant ash deposited into landfills. Beginning in 2011, wooden pallets and heavy cardboard containers are being segregated for recycling. Inert wastes (such as treated wood and metal) are placed directly in the landfills, and recyclable materials are segregated at the landfill. Attractants and hazardous materials are sometimes misdirected to landfills, where they may be available to wildlife. Therefore, as part of the WEMP, Dominion Diamond monitors the waste in the landfills.

As part of the Waste Management Plan, waste is collected at source waste bins on a regular basis for redirection to final disposal. Waste bins destined for landfills are monitored regularly.

This component of the WEMP is designed to address the following residual risk identified in the 2012 EIR (BHP Billiton 2012):

- at Ekati, the habituation of carnivores to the presence of humans is managed; however, there is still a safety risk for humans that can lead to the destruction of an animal.

5.2.1 Landfill Monitoring

Past Scope and Improvements

Surveys of the Ekati Landfill site have been conducted since 1999. The Misery Landfill survey was initiated in 2001, after Misery Road was completed in 2000. From 1999 to 2001, surveys were conducted only during summer months. In 2002, winter surveys from October to mid-April were added to monitor both Ekati and Misery landfills.

In 2002, further improvements were made to reduce the attractiveness of landfill sites to wildlife. Modifications included enclosing the landfill with a large berm and a single entrance. The dumping area was clearly marked and the added garbage was covered with 30 cm of rock. From 2004 onward, photographs and descriptions of wildlife behaviour were included in landfill surveys to identify habituated animals.

Due to a temporary suspension of Misery Pit operations, Misery Camp was officially closed on April 29, 2008, and had limited activity through 2010. Operations in Misery Camp recommenced in 2011 in preparation for the reactivation of Misery Pit in 2012. The Misery incinerator was not active in 2009, 2010, or 2011; however, the Misery Landfill was open for disposal of any inert materials from exploration activities and inspections were conducted by Dominion Diamond staff until September 2011 when the landfill access was closed.

Objectives

The objective of this component of the WEMP is to:

- determine whether the Ekati landfill contains potential wildlife attractants or evidence of wildlife visitation and habituation.

Methods

The survey involves visual investigations of the Ekati landfill on foot. The amounts and types of animal attractants (e.g., food, food packaging, oil products, and oil-contaminated wastes) and other misdirected wastes (e.g., batteries and aerosol cans) will be recorded. The availability of attractants will be categorized as none, low (1 piece), medium (2 to 5 pieces), high (6 to 10 pieces), and very high (>10 pieces). All attractants and other misdirected wastes will be safely removed and properly discarded.

The presence of wildlife and wildlife signs (such as tracks and scats) will be recorded during surveys. Photographs will be taken of most wildlife sighted, and behaviour of animals will be observed and recorded to determine if animals are habituated.

Frequency

Surveys will be conducted at least twice per week throughout the year. More inspections may be undertaken if required.

Data Analyses

Data analyses will be completed to identify trends over time in the number of wildlife attractants observed at the landfill. Analyses will also attempt to identify any further mitigation that would improve the effectiveness of the Waste Management plans with respect to wildlife.

5.2.2 Waste Bin Monitoring

Past Scope and Improvements

Since 2001, waste bins have been monitored for misdirected waste. In 2004 and 2005, improvements were made to the waste bin monitoring that included colour coding waste bins, and updating waste bin labelling for better tracking and recording. Since 2006, site departments responsible for specific waste bins are required to remove attractants if found.

Due to temporary suspension of Misery Pit operations, waste bins were removed from site after the Misery Camp was officially closed on April 29, 2008; therefore, in 2009 and 2010, waste bin surveys were only conducted at Ekati main camp. Expansion of Misery Camp began in 2011 in preparation for the reactivation of Misery Pit in 2012, and waste bins at Misery Camp were once again surveyed in 2011.

Objectives

The objective of this component of the WEMP is to:

- monitor the misdirection of wildlife attractants and hazardous wastes to waste bins to avoid and minimize possible wildlife incidents at these locations.

Methods

The amount and type of animal attractants (e.g., food, food packaging, oil products, and oil-contaminated wastes) and other misdirected wastes (e.g., batteries and aerosol cans) within the bins will be counted, recorded, and removed if possible. All attractants and misdirected waste will be reported to environmental

staff. The supervisor of the area served by the contaminated waste bin will be contacted regarding the removal of all misdirected wastes from waste bins prior to disposal in landfills.

Frequency

The waste bins will be surveyed approximately three times every two weeks. The survey involves a visual investigation of up to 47 waste bins.

Data Analyses

Data analyses will be completed to identify trends over time in the amount of misdirected waste and the type of animal attractants. Analyses will also attempt to identify any further mitigation that would improve the effectiveness of the Waste Management plans with respect to wildlife.

5.3 Wildlife Mortalities

Past Scope and Improvements

From 1998 to 2001, only Mine-related mortalities for wolverine, fox, and grizzly bear were provided in the annual monitoring reports. Improvements in the reporting procedures were made in 2002 to include more detail and comprehensive reporting for all wildlife mortalities, including both Mine-related wildlife mortalities and natural deaths. Mortalities of VEC and non-VEC species (e.g., hare, ground squirrel, and ptarmigan) were recorded. During the 2010 reporting period, Dominion Diamond Environment staff reviewed, communicated, and followed a “Mortality Reporting” protocol developed in consultation with ENR that includes mortality reporting procedures required by ENR and Environment Canada.

Objectives

The objectives for this component of the WEMP are to:

- document and mitigate potential effects of Mine activities on wildlife; and,
- reduce risks to both wildlife and people.

Methods

Wildlife mortalities observed by Dominion Diamond staff will be reported immediately to the Environment Department, and an inspection by Environment staff will be made to determine the probable cause of death. Obvious injuries, the position of the animal, and anything considered unusual is photographed and recorded. Further information such as time, date, location, estimated time of death, and any sightings of other wildlife in the area are also recorded.

Wildlife mortality details will be reported to either ENR or Environment Canada each time an animal is found dead anywhere in the Ekati study area, including the area near the Jay Project. In all of the above circumstances, the regulating organization will be consulted regarding carcass disposal. Unless otherwise directed by government, carcasses found close to the Mine will be incinerated or moved away from any work areas (i.e., further out onto the tundra) to prevent attraction of carnivores and other scavengers to the Mine site. Carcasses found in an area where they do not pose any threat to wildlife or human safety will be left on the tundra.

Frequency

Wildlife mortality monitoring will be undertaken as required, continuously throughout the life of the Ekati mine. All mortalities will require follow-up to determine if anything can be done to prevent similar mortalities from occurring in the future. All wildlife mortalities will be reported to either ENR or Environment Canada as soon as possible, depending on the applicable regulatory authority.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related mortalities. Analyses will also attempt to determine the cause of mortalities, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.4 Wildlife Incidents

At the Ekati mine, natural and human-caused wildlife mortalities are monitored within the study area. Wildlife mortality is monitored to maximize wildlife and human safety. Wildlife carcasses can attract carnivores to the Ekati study area, creating risks for both carnivores (e.g., if carnivores are attracted to the road by carrion and subsequently get hit by a vehicle) and people who encounter them. Mitigation, such as removing carcasses, is used to avoid any potential negative interactions between wildlife and humans. As part of the WEMP, all wildlife mortalities are recorded and descriptions are reviewed to determine if Mine operations contributed to a mortality event (Section 5.3). Documenting mortalities also provides feedback for adaptive management.

An “incident” is defined as an interaction between animal(s) and human(s) that may compromise the safety of the animal(s) and/or human(s). Incidents also include any action where deterrents are deemed necessary. Incidents involving wildlife in close proximity to the Mine and infrastructure, such as roads, open pits, waste rock storage areas, and mine-altered waterbodies must be managed to minimize risk to wildlife and staff.

For example, mine-altered waterbodies can freeze later in the autumn and open earlier in the spring relative to natural lakes and streams, which has the potential to be attractive for migratory birds (e.g., waterfowl and shorebirds). Other wildlife may also drink from these waterbodies. Mine-altered waterbodies include the LLCF Cells A, B, C, D, and E, King Pong, and water collection sumps. These waterbodies will be will be surveyed as part of the regular site surveillance program for the Ekati mine, but limited to the open-water period. Data on the use of mine-altered waterbodies by migratory birds (and other wildlife) will provide feedback for mitigation and adaptive management, if required.

Esker material removed for the construction of the Jay Road will be stored for use during closure and reclamation. Caribou may use the esker stockpile for insect relief and foxes and ground squirrels may excavate dens and burrows. Similar to monitoring other infrastructure and components of the Ekati mine, surveys of the esker stockpile for wildlife use can be used to inform mitigation and adaptive management, if required.

The purpose of managing wildlife incidents is to reduce the potential for wildlife-related safety concerns for employees, and to minimize potential effects on wildlife. Natural wildlife activity and ecological processes are left undisturbed unless there is risk of harm to people.

Dominion Diamond practices successive levels of deterrents, starting with avoidance (removing crews from the area), visual monitoring, truck deterrence (including horn), bear bangers, rubber bullets, and helicopters (Section 4.6.4). Relocation or killing of an animal is only done after successive levels of deterrents do not deter an animal from site and only after consultation and approval from ENR.

Past Scope and Improvements

Incident recording began in 2001 with the reporting of carnivore incidents, mostly involving wolverine and fox encounters at Misery and Ekati camps. Improvements to incident reporting procedures were made:

- In 2002, included observations of all wildlife species and Mine interactions.
- In 2002, included the development of a formal reporting system to ENR to provide details of wildlife incidents where deterrents were used.
- In 2004, the reporting system became more specific as to what qualified as an incident.

Skirting and fencing inspections began in 2005. The fencing investigations were completed in response to caribou mortalities resulting from entanglement with the fencing surrounding the airport. All barrier fences were regularly monitored for their effectiveness at deterring wildlife from Mine infrastructure and to protect wildlife. Fencing structures around Misery Camp (chain link erected in 2011), the airport (plastic barrier fence erected in 2010), Pigeon Pit (plastic barrier fence erected in 2010), and Beartooth Pit (plastic barrier fencing erected in 2006) are included in the survey and any wildlife signs are noted and damage is reported. The results are provided in the annual monitoring report.

In 2006, inspections were initiated to monitor whether skirting was successful in restricting wildlife access under buildings and to look for the presence of animal tracks around buildings. Areas underneath buildings were skirted using a chain-link fence at the Ekati camp, and later at the Misery camp to prevent wildlife access.

Objectives

The objectives for this component of the WEMP are to:

- document and mitigate potential effects of Mine activities and infrastructure on wildlife; and,
- reduce risks to both wildlife and people.

Methods

Wildlife incidents will be reported to the Environment Department, recorded on an Incident/Accident Form, and entered into a database. Incidents include observations of wildlife-Mine and wildlife-human interactions where there is a potential risk of harm to people, wildlife, and/or Mine infrastructure. A description of management responses will be recorded for all incidents. The ENR will be contacted to inform them of the use of deterrents and to seek advice when necessary.

A helicopter is typically used to remove personnel from an unsafe situation. However, some wildlife incidents require the use of a helicopter to deter bears away from areas where personnel are working. During these instances, Environment staff will be in the helicopter whenever possible and able to direct

the deterrent actions of the helicopter. The well-being of the animals is monitored at all times during deterrent efforts. The intent is to guide bears away from personnel and infrastructure without over-exerting them. For example, the animal is allowed to rest and recover when approaching difficult terrain. In addition, the helicopter will back off when the animal is cooperating (i.e., continuing to travel in the direction of the move without further prompting). At all times, the animal's energy, the terrain, and the air temperature will be considered during a move.

Detailed skirting surveys of Ekati and Misery Camp buildings will be conducted bi-weekly in order to determine if wildlife are accessing structures from underneath, and to observe any wildlife sign occurring around camp. Specifically, surveyors will walk around both Ekati and Misery buildings, recording any sign of wildlife (e.g., scats, tracks, digs), as well as evidence of damage (e.g., holes, tears) to the skirting or access points leading to underneath the buildings.

Detailed inspections of fencing structures at Misery, around the Ekati airport, and around Pigeon and Beartooth pits will be conducted bi-weekly to monitor wildlife activity along the fencing and detect any damage to the fencing. Specifically, surveyors will walk around the fences, recording any sign of wildlife (e.g., scats, tracks, digs), as well as evidence of damage (e.g. holes, tears).

Frequency

Wildlife incident monitoring will be undertaken as required, continuously throughout the life of the Ekati mine. All incidents will require follow-up to determine if anything can be done to prevent similar incidents from occurring in the future.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.5 Wildlife-Vehicle and Aircraft Interactions

This component of the WEMP is designed to address the following residual risks identified in the 2012 EIR (BHP Billiton 2012) and the Jay Project (Dominion Diamond 2014):

- caribou injuries and mortalities as a result of vehicle interactions; and,
- caribou mortalities and injuries as a result of Mine infrastructure and/or Mine activities can have further impacts to regional populations.

Past Scope and Improvements

Vehicle and aircraft-related wildlife interactions for VECs (e.g., caribou, grizzly bear, wolverine, wolf, raptors) have been reported since 1997. Reporting of vehicle-related wildlife mortalities and injuries for non-VEC wildlife species (e.g., ptarmigan, Arctic hare, fox, and Arctic ground squirrel) was first conducted in 2002. A summary of changes to mitigation for avoiding and limiting the risk to wildlife from collisions with vehicles and aircraft was provided in Section 4.1.2 and Section 4.1.3.

Objectives

As a baseline against which to measure potential effects of the Ekati development, it was predicted that no caribou, carnivores or raptors will be killed or injured by vehicles or aircraft collisions each year. The objectives for this component of the WEMP are to:

- determine if any wildlife are killed or injured as a result of vehicle and aircraft interactions; and,
- determine the effectiveness of mitigation for minimizing the risks of wildlife injury and mortality from vehicles and aircraft.

Methods

Vehicle and aircraft interactions with wildlife will be reported to the Environment Department. Reported incidents will focus on VEC wildlife species (i.e., caribou, grizzly bear, wolf, wolverine, and raptors) on roads or the airstrip; however, fox interactions are also reported. In cases where safety is a concern, Environment Department staff will actively deter carnivores (mostly bears and foxes) from the Mine area using bear bangers, trucks, air horns, and helicopters.

Frequency

Vehicle and aircraft interaction monitoring will be undertaken as required, continuously throughout the life of the Ekati mine. All interactions will require follow-up to determine if anything can be done to prevent similar incidents from occurring in the future.

Data Analyses

Data analyses will be completed to identify trends over time in the number of vehicle and aircraft interactions with wildlife. Analyses will also attempt to determine the cause of interactions, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.6 Caribou

Bathurst caribou movements through the area surrounding the Ekati mine have historically occurred from July through October annually, but the timing has varied by year. Results from aerial surveys indicate that Bathurst caribou tend to move through the Ekati mine area in pulses where large numbers of caribou are present for approximately two weeks (Appendix C, Figure 2-1). From 1998 to 2005, when herd size was likely greater than 100,000 individuals (Adamczewski et al. 2009), peak numbers of caribou were typically observed during July (Appendix C, Figure 2-2). Since then, peak caribou movements have occurred later from September to mid-October.

Caribou in the Ekati mine area are typically from the Bathurst herd, and some seasonal patterns are evident in their behaviour and distribution. The first caribou arrivals of the year are typically cows on their way from the wintering grounds south of the treeline to the calving grounds near Bathurst Inlet. These caribou travel quickly, feed little, and have a clear directional movement northward regardless of lakes and topography. Their presence in the Ekati mine study area is typically confined to a few weeks in May. Bulls begin to arrive from the wintering grounds in July. The bulls typically move less, feed frequently, and are solitary or in small groups.

Nursery groups (cows with calves) begin to arrive in July. They usually travel in groups and frequently stop for feeding, but development, large lakes, insect abundance, and other environmental factors influence their movement and behaviour. As the rut begins in late September, and as the caribou begin to leave the barren lands for the forest for winter, groups become mixed with cows and bulls. Caribou are not typically present in the Ekati study area during winter.

The Bathurst caribou herd is one of six barren-ground caribou herds in the NWT, previously considered the only herd with a range that included the Ekati study area. Information from satellite collared cows collected by ENR indicates that both the Bathurst herd, and to a lesser extent the Ahiak herd, have seasonal home ranges that overlap with the Ekati study area. The most recent population survey, conducted in June 2015, estimated the Bathurst herd to be 16,000 to 22,000 individuals (GNWT-ENR 2015a). The last census for the Ahiak herd was in 1996 and estimated 200,000 individuals (GNWT-ENR 2006). A census was planned in 2010, but was subsequently cancelled due to weather and funding constraints. Both traditional and scientific knowledge indicate that caribou herd size cycles relatively regularly with climate patterns (GNWT-ENR 2005, 2006). Caribou herds also exhibit periodic changes in seasonal migration routes and in calving and winter ranges (Gunn et al. 1997; Gunn and D'Hont 2002; Boulanger et al. 2004; Bathurst Caribou Management Planning Committee 2004).

5.6.1 Barren-ground Caribou Management Strategy

The NWT Barren-ground Caribou Management Strategy 2011-2015 (GNWT-ENR 2011), outlined several action items including research priorities, development of best management practices, education, stewardship, and population and habitat modelling. There has been growing interest in the development of collaborative regional partnerships amongst industry to contribute to herd-wide research and monitoring initiatives as an effective and consistent means to participate in caribou management and recovery. Furthermore, this approach has broad support from communities. The Caribou Management Strategy focused on five key components:

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

Each of the components had two or three associated strategies.

Engaging all Partners

- Strategy #1: Complete and implement management plans and agreements to promote recovery of herds and conserve habitat.
- Strategy #2: Complete inter-jurisdictional agreements, where needed, to ensure a coordinated and cooperative approach to the management monitoring of shared herds.
- Strategy #3: Enhance and promote the exchange of TK and scientific information on the status and use of caribou across the circumpolar north.

Information for Herd Management

- Strategy #4: Continue to monitor all NWT caribou herds and update or develop caribou population models using current information.
- Strategy #5: Continue to identify, support, and implement studies necessary to understand the effect of environmental conditions on caribou populations.

Managing Impacts of Key Factors

- Strategy #6: Monitor the effectiveness of management actions to reduce harvest and predation of caribou.
- Strategy #7: Assess cumulative impacts of land use activities and natural factors on caribou habitat and develop best management practices to mitigate and minimize these impacts in the NWT.

Public Education and Compliance

- Strategy #8: Develop and implement a public information and hunter education program to share information on caribou herds and promote hunter excellence.
- Strategy #9: Document and support community-based hunting rules and traditional laws and practices to promote respect for caribou.
- Strategy #10: Continue to enhance compliance actions, including collaborative programs with Aboriginal governments.

Maximizing Benefits

- Strategy #11: Continue to work with Department of Industry, Tourism, and Investment and Aboriginal governments to support access to alternate country foods (fish, moose, bison, musk ox) and meat sources and to promote alternate harvesting opportunities.
- Strategy #12: Work with the Department of Industry, Tourism, and Investment and commercial ventures to address impacts to businesses.

Strategy 5 is supported by Dominion Diamond's monitoring of incidental observations (Section 5.6.2) and monitoring of caribou behaviour and distribution (Sections 5.6.3 to 5.6.6). The monitoring framework (Section 2.2) incorporates results from monitoring to develop best management practices (Strategy 7) through adaptive mitigation (Section 4.5). The design of caribou crossings for the Jay Road and pipeline and the development of the CRMP (Appendix C) represent additional contributions to the development of best management practices. Results from this work have been and will be reported annually, supporting Strategy 3.

Recent work by Dominion Diamond in support of Strategies 3 and 4 includes contributing to the Zone of Influence Technical Task Group, work on detecting zones of influence (ERM 2015), and population modelling for the Jay Project environmental assessment. During the Jay Project EA review process, Dominion Diamond also committed to analyzing the 2009 and 2012 aerial survey data from the combined

Ekati-Diavik study area using the new R-code model to estimate the distance and magnitude of the ZOI (Section 5.6.5). Collaborative work on the ZOI is related to one of the standardized caribou monitoring objectives for the diamond mines, which is determining whether the ZOI changes in relation to mine activity (Handley 2010). As well, information from the caribou assessment of the Jay Project contributed to the Caribou Range Management Plan. As part of the CMP for the Jay Project, Dominion Diamond committed to provide financial support ($500,000) for studies to identify the key factors limiting the Bathurst herd, which supports Strategy 5.

In addition, Dominion Diamond will maintain its commitment throughout the life of the Jay Project to doing what it reasonably can to contribute to and support GNWT-led regional programs to improve the state of the Bathurst caribou herd. This will include working with the GNWT towards identifying and undertaking mutually acceptable actions that will support regional processes and programs such as those outlined in the Cumulative Effects Assessment Mitigation and Management Framework, and revising its WEMP to include this commitment and resulting activities. By definition, the WEMP is focused on Ekati mine-specific (including the Jay Project) mitigation and monitoring, and any collaboration with the GNWT (and other agencies, communities, and mines) on regional programs for the assessment and management of cumulative effects is outside the scope of analysis and reporting in the WEMP.

5.6.2 Incidental Caribou Observations

Incidental caribou observations in the study area are monitored and recorded to minimize potential risks associated with human and wildlife interactions, and to identify Mine structures that are acting as potential barriers to caribou movement. Furthermore, recording incidental caribou observations helps determine the composition (e.g., age and sex) of caribou moving through the study area.

Past Scope and Improvements

Since 2006, incidental caribou sightings of individuals and groups have been recorded by Dominion Diamond staff. Prior to 2006, aerial surveys were the only method used to record caribou sightings within a broader regional study area. In 2006, it was recognized that information regarding caribou presence and herd size should be recorded on an ongoing basis at the Ekati mine to better assess caribou habitat use in and around the Mine site.

Objectives

The objectives of this component of the WEMP are to:

- identify the composition of caribou groups moving through the study area;
- document the annual timing of caribou movement through the study area to compare temporal trends in migration patterns; and,
- track any trends in the number of caribou moving through the study area among years.

Methods

Incidental caribou observations in and near the Ekati study area will be reported by helicopter operators, ground-based field workers, other Mine personnel, and people from visiting communities. Other information

recorded with caribou observations will include location, group size and composition, dominant behaviour, and distance to Mine infrastructure.

Caribou observations reported on the Mine site in close proximity to roads, personnel, or Mine structures will be investigated and the caribou visually monitored, as these are a potential concern to human and wildlife safety.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

As incidental data are biased by observer effort and location (i.e., no standardized sampling design) no formal analysis of these data are proposed. Instead results will inform where and when additional monitoring or mitigation may be required, and trends in the occurrence of caribou in the area.

5.6.3 Caribou Road Surveys

Road surveys will be completed by truck along the Jay and Misery roads to determine the location and numbers of caribou as they approach the Ekati mine. Environment personnel surveying the roads will allow for more proactive implementation of mitigation, such as, signs identifying the presence of caribou or the need for road closures.

Past Scope and Improvements

The road surveys proposed as part of the Jay Project represent a new type of monitoring. Data on the location, number, and group composition of caribou near and on roads will be collected to provide feedback for mitigation and adaptive management. The volume of vehicle traffic, particularly heavy haul trucks, will also be collected for the Misery and Jay roads.

Objectives

The objective of this component of the WEMP is to:

- determine the location, numbers, and proximity of caribou relative to Mine roads.

Methods

One to two observers will travel by light vehicle along Mine roads to record the location, number, and proximity of caribou adjacent to roads. Observers will also record group composition and behaviour. The volume of vehicle traffic (e.g., vehicles per day), particularly for heavy haul trucks, will be collected for the Misery and Jay roads.

Frequency

Road surveys will be implemented once per week outside of the northern and post-calving migrations. The number of surveys completed during these caribou migrations will be determined by the number of caribou in the regional study area and the proximity to Mine roads. The frequency of surveys will begin at one per week and will become more frequent as higher action levels are met as outlined in the CRMP (Appendix C).

Data Analyses

The results of road surveys will be assessed daily at the Mine site to determine the appropriate location and type of traffic mitigation to be used to reduce the risk of vehicle collisions and barrier effects associated with road traffic. The results will also be summarized in the annual monitoring report.

5.6.4 Collared Caribou Monitoring

Monitoring the location of collared caribou cows is useful for predicting the overall movements of the Bathurst herd. Recent analyses completed for the Diavik Mine found a significant negative correlation between the number of caribou counted during aerial surveys and the mean distance of collared caribou locations from the study area during both migration periods (Golder 2011). This relationship indicates that when more caribou were observed during a survey, the mean distance of collar locations to the study area decreased (i.e., the collared animals were closer to the Mine on average when higher numbers of caribou were counted during aerial surveys).

The location of collared caribou provided by ENR will be monitored to determine the proximity of caribou relative to the Ekati mine. This monitoring will occur year-round and will be used to inform the Environment Department if a change in mitigation level or local monitoring is necessary.

Past Scope and Improvements

Collared caribou monitoring as proposed as part of the Jay Project represents a new type of monitoring. Previous collar data were used to delineate seasonal distribution of the Bathurst herd (e.g. ERM Rescan 2014b). During the Jay Project EA review process, Dominion Diamond has agreed to develop a CMP, which will provide financial support ($300,000) for the installation of 50 geo-fenced collars to provide Ekati-specific information on caribou movement.

Objectives

The objective of this component of the WEMP is to:

- provide advance detection of caribou approaching the study area.

Methods

Pending a data sharing agreement with ENR, the locations of collared Bathurst caribou will be obtained and mapped in relation to the Ekati mine study area.

Frequency

Maps will be generated and reviewed by the Ekati mine Environment Department. The frequency will depend on the collar duty cycle and receipt of data from ENR.

Data Analyses

Data will be analyzed to determine the distance of individual collared caribou from the study area boundary and Mine site. Analyses will also determine temporal and spatial trends in the movement of collared animals through the Lac de Gras area. Collar data will also be compared against the results of the other monitoring programs that evaluate caribou presence (e.g., road surveys). This will be used to

determine if triggers based on collar distances are appropriate for increasing caribou road surveys as outlined in the CRMP (Appendix C).

5.6.5 Caribou Zone of Influence Monitoring

Dominion Diamond has participated or contributed to regional wildlife monitoring initiatives intended for conservation and management including the GNWT's Barren-ground Caribou Management Strategy (GNWT-ENR 2011) and the Bathurst Range Plan Working Group. One initiative that is supported in part by Dominion Diamond is the Bathurst caribou census surveys used to determine herd composition, cow:calf ratios and population estimates. Dominion Diamond is also involved in the Zone Of Influence Technical Task Group, which is tasked with determining the most effective methods for future monitoring of caribou distribution near mine sites. As part of the CMP, Dominion Diamond has agreed to provide funding ($250,000) for studies to determine the key drivers of the magnitude and spatial extent of the ZOI, with the goal of reducing the ZOI. Furthermore, the current pilot study on dust suppressants will be expanded to include the Misery Road with the objective to determine the most effective product for mitigating dust, which could be applied to other mine sites. These programs are intended to provide data to support cumulative effects assessment and management by the GNWT.

Past Scope and Improvements

Information on the distribution of caribou around the Ekati mine has been collected since 1998. A number of alterations in the design of aerial surveys for monitoring changes in the distribution of caribou have occurred (Golder 2011). Changes include increasing the aerial survey transect spacing from 4 km to the current design of 8 km and expanding the size of the study area. In addition, continued monitoring of the northern migration was no longer required as a component as agreed at the 2010 Wildlife Monitoring Workshop (Handley 2010).

The most recent ZOI estimate for the combined Ekati-Diavik mine footprint is 14 km and is based on aerial survey results from 1998 to 2008 (Boulanger et al. 2012). Additional aerial survey data were collected in 2009 and 2012, but no analysis was completed. As part of the EA review process for the Jay Project, Dominion Diamond committed to analyzing the 2009 and 2012 aerial survey using the new R-code statistical model to provide estimates of the distance and magnitude of the ZOI for the combined Ekati-Diavik study area. For future data collection and analyses, guidelines on standardized caribou ZOI monitoring are expected to be developed by a Zone of Influence Technical Task Group administered by the GNWT (GNWT-ENR 2015b). Changes to ZOI monitoring and results from additional analyses will be provided in the annual monitoring report.

Objectives

The objective of this component of the WEMP is to:

- determine whether the zone of influence changes in relation to mine activity.

Methods

Dominion Diamond will work with the Zone Of Influence Technical Task Group administered by the GNWT, regulators and communities on appropriate methods for monitoring the caribou ZOI.

Frequency

Dominion Diamond will work with the Zone Of Influence Technical Task Group on the appropriate frequency for monitoring the caribou ZOI.

Data Analyses

Dominion Diamond will work with the Zone Of Influence Technical Task Group on the appropriate data analyses for measuring the spatial extent and magnitude the caribou ZOI.

5.6.6 Caribou Behaviour: Activity Budgets and Response to Stressors

Caribou behaviour can be influenced by industrial development (Bradshaw et al. 1997). Adult female caribou with calves are more sensitive to disturbances than other caribou groups (Spence and Gratton 2005). Roads and traffic may affect caribou behaviour, as roads can act as visual barriers or breaks in habitat. In response to traffic, caribou may run, move away, and/or increase vigilance behaviour (Wolfe et al. 2000). In some situations, the Mine and associated activities can inhibit normal caribou behaviours such as feeding and resting (Nellemann and Cameron 1996).

Mine-related stressors expected to potentially influence caribou behaviour include aircraft activity, vehicle traffic, blasting, dust, lights and smells. The WEMP provides results of monitoring initiatives aimed at documenting such influences on caribou in the Ekati study area.

Past Scope and Improvements

Information on the activity budgets of caribou has been collected since 1998. Since this time, observations of caribou groups at various distances from Mine infrastructure have been made and group behaviours at specified time intervals have been recorded (scan sampling methods, as in Altmann 1974). In 2001, the study was expanded to collect information on the responses of caribou groups to stressors. From 2001 to 2009, the scope of the behaviour work had remained the same, including data collection on both the stressor and activity budget studies.

In 2004 and 2005, increased effort was made to collect samples greater than 7 km from the Mine. This effort was maintained through 2008. In 2009, Environment Department staff at the Ekati mine and Diavik Mine worked collaboratively to increase the effort at sites farther away from the two mines. Diavik focused their effort in areas greater than 14 km from either mine (outside of the estimated ZOI), and Ekati focused effort at distances close to the Mine. The data were shared between Dominion Diamond and DDMI. These analyses are provided in the 2009 annual monitoring report.

In 2010, Ekati opted to record caribou behaviours using focal sampling where a single animal is observed for a minimum period of time, and changes in behaviour over that time period are analyzed. Scan sampling is ideal for identifying the frequency of dominant behaviours in a group over a period of time. Focal observations are more useful for obtaining information on activity budgets (Altmann 1974; Martin and Bateson 1993), that is, for calculating the proportion of time an animal is engaged in a particular behaviour and the length of time it takes an animal to return to a non-alert state following a stressor event.

Objectives

The standardized objective of caribou behaviour studies (Handley 2010) is to:

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

Methods

Both focal and scan sampling (Altmann 1974) will be used to record the behaviour of individual caribou and groups of caribou, respectively. For both focal and scan sampling, when first arriving on site, the observers will wait five minutes before commencing the surveys. During that time, information on group location and insect harassment will be recorded, and a composition count conducted. In the event that caribou do not remain on site for sufficient periods of time, or additional personnel are not available, priority will be given to focal sampling over scan sampling. This program is completed in collaboration with Diavik Mine, where Ekati is responsible to observe caribou adjacent to the Ekati mine.

Focal Sampling

An individual caribou is randomly selected from a group of caribou. Observations will be conducted on, in order of priority, cows with calves, lone cows, bulls, and juveniles for a minimum of 30 minutes. Depending on the size of the group, observations on several individuals may occur, time permitting. Data may be supplemented with the use of video recordings.

Observations will be conducted during the northward migration/calving (May/June), post-calving (July/August), and autumn/rut (September/October) periods. For each individual, the following behaviours will be recorded: bedding, feeding, standing, alert, walking, trotting, and running. The majority of observations will be on individuals from groups of animals passing through site, as opposed to solitary animals.

In the event that a stressor occurs during a focal observation, the observers will record the immediate response of caribou to stressors as either exhibiting no reaction, or a reaction (caribou look towards disturbance; caribou walk away; caribou trot or run away). Estimated distance from the stressor will also be recorded. Stressors include aircraft (helicopter and airplane), three categories of vehicles (light [e.g., pick-up truck], medium [e.g., water truck], and heavy truck [e.g., haul truck]), blasts from pits, and human presence. Observers will watch the animal for at least 15 minutes following a stressor event to record the time it took to return to a non-alert behaviour (bedding or feeding), if this was the behaviour prior to being stressed.

Scan Sampling

Scan samples will distinguish between nursery and non-nursery groups as they pass through site. Observations will be conducted during the northward migration/calving (May/June), post-calving (July/August), and autumn/rut (September/October) periods. For groups of up to 30 animals, all individuals will be included in the scan. For larger groups, a sub-sample of 20 to 30 animals will be observed. There may be multiple observations from a single large group, consisting of several consecutive scans on different sub-groups. If additional personnel are available, focal and scan observations may proceed concurrently. Data may be supplemented with the use of video recordings. The length of a scan survey is 32 minutes, and a scan observation will be conducted every four minutes. Similar to focal surveys, in the event that a stressor occurs during a scan observation, the observers will record the immediate response of caribou to stressors

as either exhibiting no reaction, or a reaction (caribou look towards disturbance; caribou walk away; caribou trot or run away). Estimated distance from the stressor is also recorded. Stressors include aircraft (helicopter and airplane), three categories of vehicles (light [e.g., pick-up truck], medium [e.g., water truck], and heavy truck [e.g., haul truck]), blasts from pits, and human presence.

Frequency

This monitoring will be completed every year, depending on the presence of caribou observed at site. Large numbers of observations are required to detect differences in caribou behaviour, which is strongly affected by environmental conditions such as wind, temperature, and insect abundance (BHP Billiton 2004). Ekati will implement this program when caribou are detected in the study area. The goal will be to obtain as many observations annually as required to statistically analyze the data at various distances from the Mine footprint.

Data Analyses

Depending on the amount of data available, analyses will be performed to test for the effects of year (Mine activity), habitat, group composition, and distance from the Mine on the proportion of time caribou spend feeding, resting, and moving. Environmental variables such as wind speed, rainfall, and level of insect activity may be included as factors in the statistical models.

5.6.7 Camera Trapping

A substantial addition to the caribou monitoring is the use of wildlife cameras (Reconyx PC800 HyperFire™ Professional Semi-Covert Infrared) to document caribou (and other wildlife) activity along roads, fencing structures, and on the tundra. Camera trapping refers to the use of remotely triggered cameras that automatically take images of whatever moves in front of them (Rovero and Marshall 2009). Most cameras are triggered by a passive infrared sensor detecting a moving object warmer than the ambient temperature such as animals, people, and vehicles. Camera trapping is most often used to capture images of medium to large sized terrestrial mammals and birds (Rovero and Marshall 2009). Camera trapping methods have undergone substantial advances and have been increasingly used in the last decade (O'Connell et al. 2010). Besides their use for carrying out animal inventories and obtaining information on activity pattern and habitat preference, scientifically robust, inferential sampling studies using camera traps can estimate occupancy and density (Rovero and Marshall 2009).

Automated cameras have been used to estimate bear density (Mace et al. 1994; Bowman et al. 1996; Martorello et al. 2001), deer abundance (Dougherty 2010; McKinley et al. 2006), and as a non-invasive method to document community composition of carnivores (Kelly and Holub 2008; Grompper et al. 2006), as well as to evaluate activity patterns for a variety of small (Cutler and Swann 1999) and large (Bridges et al. 2004a; Lucherini et al. 2009) mammal species. Recently researchers have used remote cameras to examine behaviour (Bridges et al. 2004b). Automated remote camera systems are also being used extensively to monitor wildlife crossing structures along highways (Ford et al. 2009; Van Manen et al. 2001).

The costs of a sampling method are commonly a limiting factor for surveying large areas (Silveira et al. 2003). Despite the high initial costs of camera trapping, this method, compared with track censuses and line-transects, can be handled more easily and with relatively low costs in the long term.

The advantages of camera trapping include:

- non-invasive (Grompper et al. 2006);
- effective tool for rapidly detecting species richness and relative abundance (Silveira et al. 2003);
- accuracy of species determinations (Seydack 1984; Kelly et al. 1998);
- possibility of evaluating age, sex, population structure, and density (Mace et al. 1994);
- low environmental disturbance (Silveira et al. 2003);
- similar efficiency in the detection of nocturnal and diurnal species, and the possibility of studying activity patterns (Silveira et al. 2003);
- ease of handling by non-trained personnel (Silveira et al. 2003); and,
- large area extent that can be simultaneously sampled (Silveira et al. 2003).

Past Scope and Improvements

Camera-based monitoring was initiated in 2011 with the deployment of 49 cameras along mine roads, and continued in 2012 and 2013 with the implementation of 90 cameras in each year. Data collected were used to make improvements in each subsequent year, such as:

- management, processing and analysis of data;
- identifying and correcting for observer bias;
- understanding that the area in each photo is variable, which influences the ability for comparison among photos taken in different habitat types, particularly as distance from the camera to caribou increases; hence cameras were positioned to control for field of view; and,
- position of the camera relative to the road has a strong effect on the ability to accurately classify the type of truck involved in the reaction of caribou; thus cameras were positioned to increase correct classification of vehicle types.

Objectives

The objectives for this component of the WEMP are to:

- determine the level of caribou (and other wildlife) activity and traffic along Misery and Jay roads;
- determine caribou (and other wildlife) responses to the road (i.e., crossing or deflecting);
- determine caribou (and other wildlife) activity at other Mine infrastructure and along historic movement corridors; and,
- have holders of TK document indicators of caribou condition and health during site visits.

Methods

Cameras will be used to monitor Misery and Jay roads, as well as other strategic locations where wildlife may be observed (e.g., Sable Road extension and culvert, Jay Road esker crossing, and airstrip and

Beartooth Pit fences, and locations recommended by TK Holders). The cameras will be programmed to take photographs at 10 minute intervals as well as triggered by motion infrared sensor. The cameras have trigger speeds of 1/5s, can record at near video speeds (2 frames/s), and have an effective trigger range of approximately 30 m.

Frequency

This monitoring will be completed annually from May to November.

Data Analyses

Data analyses will be completed to identify patterns associated with caribou behaviour and traffic, roads and other Ekati mine infrastructure.

5.6.8 Long Lake Containment Facility Monitoring

The LLCF is monitored as part of the WEMP. Small particle processed kimberlite (sand sized and smaller) from the processing plant is deposited in the LLCF. The processed kimberlite enters the LLCF suspended in water and settles out and dries, taking on the consistency of hard, fine sand. Concern has been expressed that caribou may become trapped in the processed kimberlite slurry before it has dried, which could potentially lead to injury or death.

Ingestion of processed kimberlite within the LLCF is of further potential concern. An important consideration is that the processed kimberlite at the Ekati mine does not contain the same amount of metals and processing chemicals typical of gold and other metal mines. Environmental studies have shown that the risk to caribou from processed kimberlite is very low. In 2006, a Tier 1 wildlife and human health risk assessment was completed on the potential risks to wildlife and human receptors exposed to metals from the LLCF. The objectives of this risk assessment were to identify and assess metals that could pose a potential risk to wildlife grazing on vegetation at the LLCF and to humans that consumed the wildlife. Acceptable risks were predicted for wildlife receptors at the individual and population level from exposure to all metals evaluated except aluminum and magnesium. The assumptions made throughout the risk assessment process were conservative and likely caused potential risks to be overestimated (Rescan 2006b).

Past Scope and Improvements

In 1999, monitoring for caribou in processed kimberlite containment areas, specifically the LLCF, was initiated. The amount of processed kimberlite deposited in the LLCF has consistently increased and, correspondingly, the area of monitoring has expanded from 2000 to 2011. Since 2000, monitoring of the LLCF included data collection for presence of caribou, group size, group composition, and dominant group behaviour.

Previous objectives of this study (1998 to 2003) were to determine if caribou were injured due to the LLCF. In 2004 and subsequent years, two additional objectives were included to examine frequency of caribou use and caribou group composition within the LLCF. In addition, wildlife and wildlife sign observed during the surveys were recorded to document use of the LLCF by other wildlife.

Objectives

The objectives for this component of the WEMP are to:

- determine if any caribou injuries can be attributed to the LLCF;

- determine the frequency that caribou use the LLCF; and,
- determine the group size, group composition, and dominant group behaviours of caribou observed within the LLCF.

Methods

The LLCF survey will proceed as in previous years. The survey involves a visual scan of the LLCF to observe and record caribou presence. Incidental sightings of caribou in the LLCF outside of the formal survey are reported to the Environment Department and recorded as incidental observations. Camera trapping is included in LLCF monitoring.

The group size, composition, dominant behaviour, and signs of caribou stress will be recorded. Behavioural categories include bedding, feeding, standing, standing-alert, walking, trotting, and running. Temperature and wind speed will also be recorded.

Observations of other wildlife and wildlife sign within the LLCF are also recorded during each survey, particularly the presence, abundance, and nesting activity of waterfowl. Information from surveys may support direction in reclamation research and planning.

Frequency

The LLCF will be surveyed three times per week during the period of May 1 to November 30. During these surveys, the focus will be on the containment cells (i.e., A, B, and C). At other times of the year, these cells will be surveyed twice per week. The non-deposition cells (i.e., cells D and E) will be surveyed approximately once per week year-round to document wildlife activity. As the use of the LLCF will change during the life of the Jay Project, monitoring frequency of the LLCF may be adjusted accordingly.

Data Analyses

Data analyses will be completed to identify the presence, group size, composition, behaviour, tracks and injuries of caribou at the LLCF.

5.7 Grizzly Bear

All populations of grizzly bears in Canada are classified as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2015) and have no status in the NWT (NWT SAR 2015).

Waste from Mine sites may potentially act as wildlife attractants, increasing the likeliness of human-wildlife interactions and wildlife habituation. Bears moving through the Mine site area are a concern from the perspective of both human and wildlife safety. In response to these concerns, barren-ground grizzly bears are included in the WEMP.

5.7.1 Incidental Observations

The recording of incidental grizzly bear observations in the study area allows bear activity to be identified and monitored, which can help locate and eliminate bear attractants and minimize human-bear interactions. Incidental observations can also be used to monitor changes in bear activity near the Mine over time and to assess potential attraction or avoidance of the Mine area by different demographic (e.g., age, sex) groups.

Past Scope and Improvements

A previous study design sampled seasonally preferred habitats in spring and autumn for grizzly bear sign (e.g., tracks, scat, and digs). This survey attempted to address the possibility that bears were avoiding the Mine. The results of the surveys showed that there was a high degree of variability in the frequency of grizzly bear sign among years, which may represent varying habitat preferences, or may correspond to a change in the number of bears moving through and using the study area during each season. The sign survey design did not distinguish between these two possibilities. After engagement with and approval from ENR and communities, the grizzly bear sign survey was discontinued, and was replaced with a DNA hair snagging study that commenced in 2012, in collaboration with other diamond mines in the region.

Objectives

The objectives of this component of the WEMP are to:

- avoid and minimize bear-human interactions; and,
- determine the level of grizzly bear activity within the Ekati study area.

Methods

Incidental observations of grizzly bears in the vicinity of the Ekati study area will be reported to the Environment Department. This includes all grizzly bear observations from helicopter, field workers, and by other Dominion Diamond staff. Each bear observation includes the date, number of individuals, location, behaviour, and presence or absence of a collar.

All grizzly bear observations reported in close proximity to roads, personnel, and Mine structures will be investigated, as these incidents pose a threat to human and wildlife safety. When necessary, grizzly bears will be deterred from the Mine site area through the use of vehicles, helicopter, bear bangers, screamers, bean bags, and rubber bullets. During helicopter deterrent efforts, the health and safety of the grizzly bear is of primary concern. Bears observed within the Mine site that do not pose an immediate potential threat to human and bear safety will be visually monitored until the bear moves out of the area.

Grizzly bear activity that is a potential concern for human and wildlife safety, or that requires deterrent efforts, will be documented and recorded as incidents (Section 5.4). All deterrent activities will be reported to ENR.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents and occurrence of grizzly bears in the study area. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.7.2 Hair Snagging Study

The DNA from hair samples can be used to confirm sex (Taberlet et al. 1993), species, genetic population structure (Proctor et al. 2005), and individual genealogies (Haig 1998). Roots of mammalian hair contain sufficient DNA for analysis (Higuchi et al. 1988). Because bears are readily attracted by scent lures, methods to obtain hair samples from free-ranging bears permits systematic sampling (Woods et al. 1999). This method avoids live capture of bears, allows individuals to be identified with a small risk of error, and hair removal sites are faster to set up and are checked less often than live-capture sites (Mowat and Strobeck 2000). Simpler logistics allow a study design that comes closer to meeting the assumptions and sample size requirements of current mark-recapture techniques (Mowat and Strobeck 2000).

Past Scope and Improvements

In February and September, 2009, and again in June and October, 2010, technical meetings were held with communities, the IEMA, and government and it was determined that an important objective for grizzly bear monitoring was to determine the abundance and distribution of grizzly bears relative to mine sites (Handley 2010). A DNA approach is required to meet this objective, and a pilot study was conducted at Ekati that spanned 2010 and 2011.

On November 2, 2011, ENR hosted a workshop on grizzly bear monitoring in Yellowknife. The purpose of this workshop was to discuss the potential for the four diamond mines to collaborate on regional scale grizzly bear monitoring based on DNA mark-recapture techniques. Attending this workshop were representatives from the three operating diamond mines (Ekati mine, Diavik Mine, Snap Lake Mine), the Gahcho Kué Project, and monitoring agencies (IEMA, Environmental Monitoring Advisory Board, Snap Lake Environmental Monitoring Agency). Each mine provided a brief presentation on their current grizzly bear monitoring. Various study designs were presented for a regional grizzly bear DNA monitoring program.

Objectives

The standardized objective of caribou behaviour studies (Handley 2010) is:

- to provide estimates of grizzly bear abundance and distribution in the study area over time.

Methods

Grizzly bear monitoring will follow the standardized methods described in Rescan (2013).

Frequency

The initial 2-year program was completed in 2013, and the study is anticipated to be repeated in four years, subject to discussion with regulators, monitoring agencies, and communities.

Data Analyses

Hair samples collected during the program will undergo DNA analyses to identify individual grizzly bears for use in mark-recapture modelling. Analyses will identify any trends over time in the abundance and distribution of grizzly bears in the study area, and the effects of year and distance from the Mine, which may provide an estimate of the ZOI from the Mine. Year effects comprise both potential Mine-related influences and the temporal changes in the local abundance of grizzly bears from natural factors.

5.8 Wolf

Wolves are considered a wildlife VEC within the Ekati study area. Wolves in this area depend on the Bathurst caribou herd as their main source of prey, particularly during the winter (Kuyt 1972; Walton et al. 2001). During the spring, wolves follow the Bathurst caribou herds north of the treeline and choose den sites south of the Bathurst calving grounds. This strategy likely optimizes the availability of food resources for rearing pups (Heard and Williams 1992). Wolf pups usually leave the natal den in early August, but do not leave the summer range until October.

Wolves are considered not at risk by COSEWIC (2015). However, potential risks for the local population may arise from habitat removal and human disturbance (Clarke et al. 1996). Human development can result in wolves avoiding certain areas (Johnson et al. 2005). Conversely, certain features of human developments (such as landfills and infrastructure) can act as wildlife attractants, increasing the likeliness of wildlife attraction and habituation.

5.8.1 Incidental Observations

Reporting incidental wolf sightings at Ekati is one component of the WEMP. Monitoring and recording incidental wolf observations in the study area can avoid and minimize potential risks associated with human and wildlife interactions. Once a wolf is sighted within the Mine site, people or workers that may be at risk of encountering the wolf will be notified and work actions will be adjusted accordingly. Recording incidental wolf observations helps determine the presence, timing, and family composition of wolf packs moving through the study area.

Past Scope and Improvements

Wildlife sightings have been documented by Mine staff and consultants since 1995. However, the majority of these early logs were not provided in annual monitoring reports. Since 2001, a formal incidental wolf sighting log has been filled out by observers. As of 2004, family group observations have been consistently reported.

Objectives

The standardized objectives of this component of wolf monitoring at diamond mines (Handley 2010) are to:

- minimize wolf-human interactions and identify the presence and composition of incidental wolf den and wolf pack observations in the study area; and,
- document and determine the cause of direct Mine-related mortality of wolves.

Methods

Incidental wolf observations in and near the Ekati study area will continue to be reported to the Environment Department. Incidental observations include those made from helicopter surveys and ground-based field work, and Dominion Diamond staff. Each wolf observation includes the date, location, number of individuals sighted, dominant behaviour, and the presence or absence of a radio collar.

Wolf observations reported in close proximity to roads, personnel, or Mine structures will be investigated, as these are a potential concern to human and wildlife safety (Section 5.4). Wolves will be deterred from

the Mine site area with the use of vehicles and/or bear bangers when necessary. Wolves observed within close proximity to the Mine and not an immediate potential threat to safety will be monitored visually until the wolves move out of the area.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents and occurrence of wolves in the study area. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.8.2 Wolf Den Occupancy and Productivity

Wolves require specific habitat features that allow them to dig denning structures. In a landscape that is dominated by Precambrian Shield bedrock, eskers and other glacial deposits provide the best habitat for den sites (Cluff et al. 2002). Denning habitat is potentially a limited resource for wolves, as eskers comprise a small fraction (2% to 3%) of the Arctic tundra ecosystem (McLoughlin et al. 2004).

There is evidence that wolves exhibit fidelity to den sites (Cluff et al. 2002). The quantity of available den sites may be functionally reduced as a result of disturbances, as wolves tend to avoid human activity (Johnson et al. 2005). Therefore, the preservation of existing habitat with suitable dens may be important, as the loss of den sites due to disturbance could have a negative effect on wolves.

The quality of a den site may potentially affect the reproductive success of wolves. Wolves may be most sensitive to human disturbance when they are caring for and feeding young pups, as they are less mobile and less able to evade human activity (Walton et al. 2001).

Past Scope and Improvements

The methods for wolf den monitoring have been refined since studies began in 1995. An intensive aerial and ground survey of eskers and glacial fluvial deposits was conducted in 1995 and 1996 to document baseline numbers of wolf and fox dens. These surveys identified five wolf dens within the Ekati study area. Ground surveys of all major esker systems were conducted in 1997 and two additional dens were located. From 1998 through 2001, all major esker systems (on either side of each esker) were surveyed from the air in late May. No new wolf dens were identified during these surveys. One wolf den was located in 2000 during surveys for grizzly bear activity. Another den containing a radio-collared wolf was located in 2001 by ENR. As the number of new wolf dens discovered along esker systems was negligible, this survey technique was discontinued in May 2001, following consultation with ENR. In 2002 and 2003, the survey for active or occupied dens was restricted to all known historic den sites.

In 2004, a survey of radio-collared wolves was also introduced in order improve the tracking of wolf movements (with a focus on breeding activity), wolf interaction between packs, and wolf interactions with Ekati (Rescan 2005).

In 2005, the wolf den survey again included all known historic dens and new dens (identified by aerial surveys) in the Ekati study area. In 2006, 2007 and 2008, ENR completed a targeted survey of select den locations. Surveys that included all known historic and new den locations were repeated from 2009 to 2014.

Objectives

The standardized objective of wolf monitoring at diamond mines (Handley 2010) is to:

- determine the presence, distribution and productivity of active wolf dens throughout the study area.

Methods

It is anticipated that aerial surveys for wolf den occupancy will continue to be conducted by ENR staff. Dens will be classified as active if wolves are observed at the den. Active dens will be subsequently re-surveyed by ENR during late August to determine the presence of pups. It is anticipated that ENR will continue to provide the information from aerial surveys to Dominion Diamond. Locations of any satellite-collared wolves within the Ekati study area will also be provided by ENR. The Environment Department at Ekati will continue working in conjunction with ENR, and to share information from incidental observations to assist wolf studies conducted by ENR.

Frequency

Dominion Diamond will continue to support ENR in the future to complete these regional monitoring surveys. However, if these surveys are no longer completed by ENR, Dominion Diamond plans to continue to survey the historic den sites that are found within the Ekati study area and will update the WEMP methods accordingly.

Data Analyses

Data analyses will identify trends in the use (occupancy) and productivity of wolf dens.

5.9 Wolverine

The western population of wolverine, including those in the NWT, are listed as a species of Special Concern by COSEWIC (2015). The status of wolverine in the NWT is not at risk (NWT SAR 2015).

Wolverine are curious animals and will investigate human-made structures and food caches when humans are not present (COSEWIC 2015). Wolverine prefer undisturbed areas, but home ranges may overlap with human-caused disturbances (COSEWIC 2015). However, human activity, including mining, hunting, trapping, and major transportation routes, may displace or alter wolverine travel routes and lead to increased human-caused mortalities (Weir 2004).

Wolverines moving through human occupied areas are a potential cause for concern with regards to wildlife and human safety. Food and food waste may potentially act as wolverine attractants, increasing the possibility of wolverine habituation.

5.9.1 Incidental Observations

Monitoring and recording incidental wolverine observations in the Ekati study area may minimize the potential risks associated with human-wolverine interactions. Once a wolverine is sighted within the Mine

site area, Dominion Diamond staff that are potentially at risk of encountering the wolverine will be notified, and work activities will be adjusted accordingly.

Past Scope and Improvements

Incidental wolverine observations have been formally recorded by Dominion Diamond staff since 2003.

Objectives

The objectives of this component of the WEMP are to:

- avoid and minimize wolverine-human interactions; and,
- determine the level of wolverine activity within the Ekati study area.

Methods

Incidental observations of wolverines will continue to be reported to the Environment Department. This includes all wolverine observations made from helicopter, field workers, and other Dominion Diamond staff. Each wolverine observation will include the date, number of individuals, location, and behaviour.

All wolverine observations reported in close proximity to roads, personnel, and Mine structures will be investigated, as these are of particular concern with regard to human and wildlife safety. When necessary, wolverines will be deterred from the Mine site through the use of vehicles and/or bear bangers.

Wolverine activity will be recorded as an incident if it is of potential concern to human or wolverine safety, could cause damage to Mine infrastructure, or requires deterrent efforts (Section 5.4). Wolverine observed within the Mine site that do not pose an immediate potential threat to human and wildlife safety will be visually monitored until the wolverine moves out of the area.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents and occurrence of wolverine in the study area. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.9.2 Hair Snagging Study

The use of genetic markers (maternal DNA and allozymes) to study wolverine populations in the NWT has provided insight into the distribution and connectivity of these populations (Wilson et al. 2000; Kyle and Strobeck 2002).

Past Scope and Improvements

To obtain reliable information on wolverine population size and distribution at Ekati, a DNA-based population assessment was conducted in 2005 and 2006 in conjunction with ENR and DDMI. This study was repeated in 2010, 2011, and 2015.

The wolverine DNA-based study within the Ekati mine study area was carried out to obtain reliable population and range estimates, so that wolverine density and activity relative to mines could be tracked. The regional DNA-based study replaced the wolverine snow track survey that was conducted at Ekati mine from 1997 to 2004. The wolverine DNA study covers four sampling grids, including Daring Lake, Ekati, Diavik, and Gahcho Kué mines. The Ekati mine sampling grid encompasses an area of approximately 1,200 km^2, and includes the Mine site.

The standardized monitoring objective for wolverines at the diamond mines (Handley 2010) is to:

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

Methods

Dominion Diamond will implement monitoring that supports cumulative effects assessment and management by the GNWT. The hair snagging methods follow those outlined in the document *Draft Monitoring Protocol for Wolverine DNA Hair Snagging* (GNWT-ENR 2013b).

Frequency

There are currently no formalized protocols on the frequency at which these surveys should be completed. Dominion Diamond will continue to evaluate its participation in the program.

Data Analyses

Hair samples collected during the program will undergo DNA analyses to identify individual wolverine for use in mark-recapture modelling. Data from the Ekati mine program and other programs (i.e., Snap Lake Mine, Gahcho Kué Mine, Diavik Mine, and Daring Lake) will be provided to ENR for analysis and reporting. It is assumed the analyses will identify any trends over time in the abundance and distribution of wolverine in the study area, and support similar information for the North Slave Geological Province. No analyses of these data are anticipated to be completed by Dominion Diamond.

5.10 Raptors

Raptors are birds of prey, such as, falcons, eagles, hawks, and owls. Raptor species observed frequently nesting with the Mine study area include peregrine falcon, gyrfalcon, and rough-legged hawk. Short-eared owls, snowy owls, and northern harriers have been observed in the study area (Dominion Diamond 2014). The peregrine falcon and the short-eared owl are classified as species of Special Concern by COSEWIC (2015) and the federal *Species at Risk Act*. Both species have no status in the NWT (NWT SAR 2015). Two subspecies of peregrine falcon, *anatum* (boreal) and *tundrius* (tundra) occur in the NWT. The *tundrius* subspecies breeds mainly on the tundra and is likely the subspecies that is observed nesting near Ekati.

5.10.1 Pit Wall Nest Monitoring and Incidental Observations

In northern environments, raptor species such as peregrine falcons, rough-legged hawks, gyrfalcons, and common ravens nest on ledges and cliff faces. In landscapes with human-made structures, cliff-nesting birds have been observed to nest on human-built ledge structures such as cairns, buildings, towers, mining dredges, and bridges (Kessel 1989). Open pit walls at Ekati resemble steep-sided ledges and offer attractive nesting locations for falcons and other cliff-nesting birds.

The monitoring of cliff-nesting birds on pit walls is a priority at Ekati. The eggs, nests, and individuals of gyrfalcon, peregrine falcon, and other raptor species (e.g., rough-legged hawk, golden eagle) are legally protected under the NWT *Wildlife Act, Section 38*. Potential pit wall nesting species likely to be found at Ekati include peregrine falcon, gyrfalcon, rough-legged hawk, and common raven.

Past Scope and Improvements

A formal monitoring and reporting program for bird nesting activity along pit walls was initiated in 2004. Pit walls were monitored on an informal and largely incident-based capacity in years prior to 2004. Beginning in 2006, the Fox Fuel Farm and Long Lake Road power poles were also monitored for bird nesting activity.

Objectives

The standardized monitoring objectives for raptors at diamond mines (Handley 2010) are 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; and,
- document and determine the cause of direct Mine-related mortalities of raptors.

Methods

Pit walls will continue to be monitored at Ekati. Visual surveys for nesting activity will occur at all open pits at Ekati between April and August, and include Beartooth, Misery, Fox, Koala North, Panda, Koala, Lynx and Jay pits, as well as power poles and fuel farm. Observations of birds, nests, and nesting activity (i.e., nest construction, perching, and incubation) will be recorded by Environment staff. If nests are observed in an active pit, ENR will be contacted immediately for advice on mitigation.

Incidental raptor observations in the Ekati study area will be reported by helicopter operators, ground-based field workers, and other Mine personnel. Each raptor observation will include the date, number of individuals, location, and behaviour. Raptor interactions and mortalities at the Mine will also be documented and reported to ENR.

Frequency

Nests detected on pit-walls and on other Ekati mine infrastructure will be monitored annually. Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety. Nests detected on infrastructure will be analysed for trends in use and productivity.

5.10.2 Regional Falcon Surveys

Gyrfalcon and peregrine falcon breeding activity is monitored as part of the WEMP because falcon species are legally protected under the NWT *Wildlife Act* (GNWT-ENR 2013a), and because they are valuable indicators of environmental change (Holroyd and Banasch 2003). For example, the population trends and breeding success of peregrine falcon have been used as indicators of pollution loads because of the recognized effects of pesticides and contaminants on eggshell thinning in falcons (White et al. 2002; Wegner et al. 2005). Moreover, because falcons are top predators, their population dynamics may also reflect changes in prey populations (Nystrom et al. 2005).

Past Scope and Improvements

Gyrfalcon and peregrine falcon nest monitoring began in 1995 with visual surveys conducted by ENR at least once during the summer to determine falcon species occupancy at identified breeding sites. Starting in 1998, methods were formalized to include a spring and summer survey. For all years after 1998 (except 1999), two surveys were conducted; the first generally occurring in late May or early June and the second in late July. Timing of the surveys has varied between years; 1998 was the most atypical year for timing of surveys, as both the spring and summer surveys were conducted much later in the season (on June 28 and August 13, respectively) relative to other years. Since 2000, spring surveys have been conducted between May and June. The timing of summer surveys has generally ranged from July 22 to July 28.

Over a decade of sampling showed little effects from the Ekati mine on nesting raptors relative to natural factors operating on a regional scale. Through discussions and engagement with communities, monitoring agencies, and government, the decision was made to remove this VEC from Mine-specific objectives of the monitoring program and contribute to regional data through the Canadian Peregrine Falcon Survey (Marshall 2009; Handley 2010). Currently, the Canadian Peregrine Falcon Survey is not being conducted from Yellowknife. Instead, regional falcon (and other raptors) data are collected and stored by ENR for distribution.

Objectives

The standardized monitoring objective for raptors include is to:

- determine site occupancy and productivity of historic peregrine falcon nest sites in the study area to contribute to the regional falcon data for monitoring long-term population trends.

Methods

Falcon nest sites are monitored at least twice during the breeding season. Sites accessed by helicopter are monitored once during the spring and once during the summer. The spring occupancy survey (June) assesses occupation of historically occupied gyrfalcon and peregrine falcon territories. The summer productivity survey (July) determines the number of chicks produced at each site. Nest productivity is

evaluated on the basis of a single site visit; therefore, reported productivity may not reflect the final status of each site.

Frequency

Following recommendations from technical sessions held in 2010, the regional falcon survey will occur every 5 years. The last survey was conducted in in 2015, and the next scheduled survey is in 2020.

Data Analyses

Data from raptor nest monitoring will be provided to ENR to support regional monitoring initiatives. It is assumed the ENR or other wildlife managers will assess the spatial and temporal trends in raptor nest use and productivity across the NWT. As raptor monitoring is no longer required to test impact predictions (Handley 2010), no analyses on these data are anticipated to be completed by Dominion Diamond.

5.11 Fox

Two species of fox inhabit the Slave Geological Province of the NWT: the red (or “coloured”) fox, and the Arctic fox. Foxes (especially Arctic fox) are considered important furbearers in the north.

Foxes are opportunistic foragers. As human activities in the Arctic increase, fox populations occasionally thrive near landfills and other artificial food sources. Along with increased fox populations near mining camps and areas with other human activities, the risk of disease transmission also increases. Of particular concern is the transmission of rabies to humans. The Arctic fox is the primary animal vector of rabies in the NWT (Walker and Elkin 2005).

5.11.1 Incidental Observations

Monitoring and recording incidental fox observations in the study area may help avoid and minimize risks associated with human and wildlife interactions. Once a fox is sighted within the Mine site area, people and workers that are at risk of encountering the fox are notified, and work activities are adjusted accordingly.

Past Scope and Improvements

Incidents involving fox have been formally recorded since 2004. Since 2008, incidental fox observations have also been formally recorded by the Environment Department, and the WEMP has included a section dedicated to fox observations. These additional data will help Dominion Diamond in mitigating fox interactions around the Ekati mine site.

Objectives

The objectives for this component of the WEMP are to:

- avoid and minimize fox-human interactions;
- document the level of fox activity in the Ekati study area; and,
- document abnormal behaviour in foxes to identify possible cases of rabies.

Methods

Incidental observations of foxes will continue to be reported to the Environment Department. These observations include those made by staff from helicopters or by field workers and other Dominion

Diamond staff. Each fox observation will include the number of animals, sex, age, location, and behaviour.

All observations of persistent foxes reported in close proximity to roads, personnel, and Mine structures at Ekati will be investigated as these are of particular concern with regards to human and wildlife safety. Where necessary, foxes will be deterred from these areas through the use of vehicles, air horns, screamers, bear bangers, and/or bean bags.

Fox activity will be recorded as an incident if it poses a potential threat to human or fox safety, damage to Mine infrastructure, or requires deterrent efforts (Section 5.4). Foxes observed within the Mine site that do not pose an immediate potential threat to human and wildlife safety will be monitored visually until they move out of the area.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents and occurrence of fox in the study area. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.12 Upland Breeding Birds

The period in which upland birds lay eggs in the Ekati Diamond Mine study area typically begins the first week of June and extends until the third week of June (BHP 1998). Small perching birds and shorebirds are the most common breeders in the Ekati mine study area, including the American tree sparrow, Harris's sparrow, Lapland longspur, least sandpiper, and savannah sparrow. Some other species that are present but less common in the study area include lesser yellowlegs, pectoral sandpiper and yellow-rumped warbler. The rusty blackbird has been infrequently observed in the Ekati study area and is listed as species of Special Concern by COSEWIC (2015) and the federal *Species at Risk Act*. The species has no status in the NWT (NWT SAR 2015).

Natural and human-induced disturbances that occur during the breeding period can correlate with changes in breeding bird density, species richness, and diversity (Rottenborn 1999; Debinsky and Holt 2000; Hennings and Edge 2003; Jokimaki and Kaisanlahti-Jokimaki 2003; Thorington and Bowman 2003). Consequently, upland breeding birds within the Ekati mine study area have been monitored annually from 1996 to 2009. Over a decade of sampling showed little effects from the Ekati mine on upland breeding birds. Through discussions and engagement with communities, monitoring agencies, and government, the decision was made to remove this VEC from Mine-specific objectives of the monitoring program and contribute to regional data through the North American Breeding Bird Survey (Marshall 2009; Handley 2010).

5.12.1 Incidental Observations

Bird monitoring can provide information on the availability of prey for larger animals that rely on birds as a food source. Changes in the upland bird community, for instance, may influence raptor species that utilize

this food source. Incidental observations of breeding birds in the study area are monitored and recorded to document any signs of breeding activity in the area and to identify Mine structures that provide potential nesting platforms. Bird species of special concern or uncommon in the region are also documented when observed.

Past Scope and Improvements

Although the formal breeding bird survey was stopped in 2009, Dominion Diamond continues to monitor upland breeding birds through the North American Breeding Bird Survey and incidental observations.

Objectives

The objectives for this component of the WEMP are to:

- document the presence of breeding birds at the Ekati mine; and,
- document sightings of uncommon birds or species of conservation concern in the area.

Methods

Incidental breeding bird observations around the Ekati mine are recorded by Environment Department staff. For each bird observation, the species, number of individuals, date, location (UTM coordinates, where possible), breeding evidence, and behaviour is recorded.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati mine. Environment staff will review the logs weekly and respond to wildlife sightings or trends of concern when they occur.

Data Analyses

Data analyses will be completed to identify trends over time in the number of Mine-related incidents and occurrence of uncommon and listed birds in the study area. Analyses will also attempt to determine the cause of incidents, and identify any further mitigation that would improve the effectiveness of wildlife safety.

5.12.2 North American Breeding Bird Survey

The North American Breeding Bird Survey (NABBS) is an avian survey designed to collect long-term data on the population status and trends of breeding birds throughout North America. The NABBS was initiated in 1996 and is now conducted at approximately 500 locations across Canada each year. These data are managed by the Canadian Wildlife Service (CWS) and are used to monitor the status and trends of North American bird populations. The survey at Ekati provides an important contribution to this program since northern regions are under-represented in most continental-scale monitoring programs.

Past Scope and Improvements

In 2003, a NABBS route was established along Misery Road, the land portion of the Lac de Gras winter road, and the LLCF road.

Objectives

The objective of this component of the WEMP is to:

- contribute data to a regional or national bird monitoring program.

Methods

Surveys will be completed by two observers performing point counts along Misery Road and the LLCF road, stopping at 0.8 km intervals. The survey will begin at 3:15 a.m. (30 minutes before official sunrise) and the required 50 stops are completed within five hours. At each of the 50 identified stop points along the survey route, the observers conduct three-minute point counts, where all birds seen and heard within 400 m are recorded. Start and finish times, as well as weather conditions, are also recorded. The data from the survey will be submitted to eBird (www.eBird.org).

Frequency

The NABBS will be completed annually in June.

Data Analyses

The data will be reported in the annual monitoring report to track annual variation in breeding bird densities and diversity within the Ekati study area.

5.13 Rare or Uncommon Species

Dominion Diamond will record all incidental observations of rare or uncommon species (e.g., species that have expanded or shifted their range so that they occur more frequently in the study area) that are observed within the Ekati mine study area. These observations will be reported in the annual monitoring report. The WEMP may be expanded to include rare or uncommon species depending on the frequency of observations and likelihood and severity of potential effects from the Mine. Dominion Diamond will make the final decision whether or not to include a rare or uncommon species based on discussions with communities and relevant government agencies.

6 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality assurance (QA) refers to plans or programs encompassing internal and external management and technical practices designed so that data of known quality are collected, and that such collections match the intended use of those data (Environment Canada 2012). Quality control (QC) is an internal aspect of quality assurance. It includes the techniques used to measure and assess data quality and the remedial actions to be taken when QC assessment criteria are not met. The QA/QC procedures are implemented so that field sampling, laboratory analyses, data entry, data analysis, and report preparation produce technically sound and scientifically defensible results.

All components of the WEMP, study designs, field methods, and data collection techniques will be reviewed on an ongoing basis by Dominion Diamond and their environmental consultant. These QA/QC procedures will provide consistency and integrity of study designs, field protocols, and data collection techniques. Furthermore, continuous evaluation of study methods and results will be used to identify elements for modification or implementation of new techniques. In addition, raw data will be available for review by IEMA, community organizations and government. This approach is intended to provide a WEMP that generates feedback for adaptive management and which concurrently complies with the terms and conditions in the Environmental Agreement for the Ekati mine.

7 REPORTING

Data analysis and reporting will continue to focus on the analysis and meeting of objectives, and providing results that can be used in a timely manner to adjust mitigation as necessary. The use of adaptive management as a scientific backdrop for the WEMP is integral to its effectiveness as a monitoring and mitigation tool. Adaptive management enables mitigation to be properly focused on those areas where the greatest potential for impacts exist and where the greatest reduction in risk can be achieved. Adaptive management is an ongoing process based on a consistent and well-founded framework that continually adjusts according to new information. In this way, the success of mitigation can be reliably monitored.

Accordingly any necessary changes to mitigation procedures will be instituted should monitoring results indicate there is a need. Throughout the field season, progressive analysis of data will be performed wherever possible. At the conclusion of the monitoring season, all data will be analyzed in preparation of reporting. The annual monitoring report will be produced and distributed to communities to provide feedback. The annual report will summarize monitoring results for the previous season and make comparisons to previous years. It will briefly describe methods and related objectives. A discussion and interpretation of results will be presented. The report will use plain English and make effective use of graphics and photographs.

The annual monitoring report will include, but will not be limited to the following information:

- any updates or recommended changes to mitigation, environmental design features, or other strategies required to meet the WEMP objectives;
- occurrences of human-wildlife interactions, incidents, accidents, injuries or mortalities involving wildlife;
- records of disturbances to wildlife habitat that were not predicted; and,
- documentation of all monitoring activities that occurred during the previous calendar year.

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APPENDIX A

EFFECTS PATHWAYS

Table A-1 Effects Pathways, Effects Assumptions, Predictions, and Relevant Monitoring Programs and Management Plans for Wildlife and Wildlife Habitat

DAR Effects Pathways	General Pathway	DAR Pathway Assessment	DAR Assumptions	Effect Prediction Summary	Magnitude of the Incremental Effect	Relevant Monitoring Programs
Direct loss and fragmentation of habitat from the Project footprint may cause changes in abundance and distribution of grizzly bear, wolverine, water birds, and raptors	Direct and indirect habitat loss	Primary	• Modelling of direct effects to habitat accurately reflected the level of disturbance to herd range • Best practices will limit effects to vegetation	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Aquatic Effects Monitoring Program • Closure and Reclamation Plan • Dewatering Plan • Mine Water Management Plan • Waste Rock and Ore Storage Management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Direct loss and fragmentation of habitat from the Project footprint may cause changes in abundance and distribution of wolves and upland breeding birds	Direct and indirect habitat loss	Secondary	• Best practices will limit effects to vegetation	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Aquatic Effects Monitoring Program • Closure and Reclamation Plan • Dewatering Plan • Mine Water Management Plan • Waste Rock and Ore Storage Management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Physical hazards (open pit, blasting, buildings, WRSAs) may result in increased risk of injury or mortality to individual animals	Physical and chemical hazards	Secondary	• Frequency of mine-related mortalities at diamond mines in the NWT, including the Ekati Mine, is extremely low	Mortality will be negligible	Low	• Engagement Plan • Wildlife Effects Monitoring Program
The Misery and Jay power lines may cause increased risk of injury or mortality to birds	Physical and chemical hazards	Secondary	• Distribution lines are anticipated to result in few bird mortalities	Mortality will be negligible	Low	• Engagement Plan • Wildlife Effects Monitoring Program
Site preparation and construction may result in the destruction of nests, eggs, and individuals of migratory birds (incidental take)	Physical and chemical hazards	Secondary	• Best practices will limit incidental take	Mortality will be negligible	Low	• Wildlife Effects Monitoring Program
Air and dust emissions and subsequent deposition can change the quantity or quality of plant forage, and subsequently prey abundance	Dust deposition	Secondary	• Dust modelling predicts that dust will be largely confined to the Project footprint	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Wildlife Effects Monitoring Program
Ingestion of water, soil, and vegetation, or inhalation of air that has been chemically altered by air emissions or dust deposition may affect wildlife health	Dust deposition	Secondary	• Dust modelling is accurate, indicating that dust will be largely confined to the Project footprint	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Wildlife Effects Monitoring Program
Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) may cause changes in habitat quality, movement and behaviour for grizzly bear, wolverine, water birds, and raptors	Sensory disturbance	Primary	• Habitat suitability modelling incorporated numerous conservative assumptions, and accurately reflects impacts to wildlife	Movement and behaviour will be affected	Low	• Engagement Plan • Wildlife Effects Monitoring Program
Sensory disturbance (lights, smells, noise, dust, human activity, viewscape) may cause changes in habitat quality, movement and behaviour for gray wolf and upland breeding birds	Sensory disturbance	Secondary	• Effects to upland breeding bird and gray wolf were assessed using conservative assumptions	Movement and behaviour will be affected	Low	• Engagement Plan • Wildlife Effects Monitoring Program
Increased traffic on the Misery Road and Jay Road, and the above-ground power line along these roads, may create barriers to carnivore and caribou movement, which may affect grizzly bear and wolverine population connectivity, abundance, and distribution	Traffic and power lines	Primary	• Caribou energetics modelling incorporated numerous conservative assumptions, and accurately reflects impacts to caribou, grizzly bear, and wolverine	Movement and behaviour will be affected	Low	• Engagement Plan • Waste Rock and Ore Storage Management Plan • Wildlife Effects Monitoring Program
Increased traffic on the Misery Road and Jay Road, and the above-ground power line along these roads, may create barriers to carnivore and caribou movement, which may affect wolf population connectivity, abundance, and distribution	Traffic and power lines	Secondary	• Wolf abundance and distribution is more affected by prey abundance than human disturbance	Movement and behaviour will be affected	Low	• Engagement Plan • Waste Rock and Ore Storage Management Plan • Wildlife Effects Monitoring Program
Collisions between caribou and vehicles or aircraft causes injury or mortality of animals	Physical and chemical hazards	Secondary	• Frequency of mine-related mortalities at diamond mines in the NWT, including the Ekati Mine, is extremely low	Mortality will be negligible	Low	• Engagement Plan • Wildlife Effects Monitoring Program
Attractants to site (food, shelter) may result in problem wildlife or disruption to predator-prey relationships	Physical and chemical hazards	Secondary	• Local increases in bears or wolves have not been observed at other mines • Waste management will limit the availability of food to wildlife	Mortality will be negligible	Low	• Hazardous Waste Management Plan • Hydrocarbon-Impacted Materials Management Plan • Incinerator Management Plan • Landfill Management Plan • Spill Contingency Plan • Waste Management Plan • Wildlife Effects Monitoring Program

Table A-1 Effects Pathways, Effects Assumptions, Predictions, and Relevant Monitoring Programs and Management Plans for Wildlife and Wildlife Habitat

DAR Effects Pathways	General Pathway	DAR Pathway Assessment	DAR Assumptions	Effect Prediction Summary	Magnitude of the Incremental Effect	Relevant Monitoring Programs
Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the dewatering of diked area of Lac du Sauvage leading to change in riparian habitat and caribou distribution	Direct and indirect habitat loss	No Linkage	• Dewatering will not cause water levels to exceed the high water mark	Limited change to movement and behaviour	Nil	• Aquatic Effects Monitoring Program • Dewatering Plan • Wildlife Effects Monitoring Program
Dewatering of diked area of Lac du Sauvage may result in newly established vegetation on exposed lakebed sediments, and may change caribou habitat quantity	Direct and indirect habitat loss	Secondary	• Colonization of lakebed sediments will be slow, patchy and limited area within the mine footprint	Movement and behaviour will be affected	Low	• Wildlife Effects Monitoring Program
Ingestion of seepage and surface runoff from WRSAs and kimberlite stockpiles or ingestion of water, soil, and vegetation that has been chemically altered by seepage and surface runoff may affect wildlife health	Physical and chemical hazards	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching • Ecological risk assessment results predicts negligible risk	No caribou mortality	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Surface run-off and seepage from the WRSAs and kimberlite stockpiles may change habitat quality	Direct and indirect habitat loss	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching	Movement and behaviour will not be affected	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the back-flooding of diked area of Lac du Sauvage alters riparian habitat and caribou distribution	Direct and indirect habitat loss	No Linkage	• Changes to water levels will be within the range of natural variation	Limited change to movement and behaviour	Nil	• Aquatic Effects Monitoring Program • Dewatering Plan • Wildlife Effects Monitoring Program
Ingestion of seepage and surface runoff from WRSAs after closure, or ingestion of water, soil, and vegetation that has been chemically altered by long-term seepage and surface runoff may affect caribou health	Physical and chemical hazards	No Linkage	• Seepage and runoff will be contained and managed • Sequestering of acid generating rock will limit leaching • Ecological risk assessment results were accurate, indicating negligible risk	No caribou mortality	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Long-term seepage from the WRSAs may change habitat quality	Direct and indirect habitat loss	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching	Movement and behaviour will not be affected	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Ingestion of soil, vegetation, or water that has been altered by chemical spills (i.e., fuels, petroleum products, reagents, pipelines) on site affecting caribou health	Physical and chemical hazards	No Linkage	• Spill response and clean-up will mitigate effects to wildlife	No caribou mortality	Nil	• Spill Contingency Plan • Wildlife Effects Monitoring Program

DAR = Developer's Assessment Report; WRSA = waste rock storage area; NWT = Northwest Territories.

Table A-2 Effects Pathways, Effects Assumptions, Predictions, and Relevant Monitoring Programs and Management Plans for Barren-Ground Caribou

DAR Effects Pathways	General Pathway	DAR Pathway Assessment	DAR Assumptions	Effect Prediction Summary	Magnitude of the Incremental Effect	Relevant Monitoring Programs
Direct loss and fragmentation of habitat from the Project footprint causes changes in caribou abundance and distribution	Direct and indirect habitat loss	Primary	• Modelling of direct effects to caribou habitat accurately reflected the level of disturbance to herd range • Best practices will limit effects to vegetation	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Aquatic Effects Monitoring Program • Closure and Reclamation Plan • Dewatering Plan • Mine Water Management Plan • Waste Rock and Ore Storage Management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Physical hazards leading to increased risk of injury or mortality to individual caribou	Physical and chemical hazards	Secondary	• Frequency of mine-related mortalities at diamond mines in the NWT, including the Ekati Mine, is extremely low	Mortality will be negligible	Low	• Engagement Plan • Wildlife Effects Monitoring Program
Air and dust emissions and subsequent deposition can change the quantity or quality of plant forage and alter caribou distribution and behaviour.	Dust deposition	Secondary	• Dust modelling is accurate, indicating that dust will be largely confined to the Project footprint	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Wildlife Effects Monitoring Program
Ingestion of water, soil, and vegetation, or inhalation of air that has been chemically altered by air emissions or dust deposition may affect wildlife health	Dust deposition	Secondary	• Dust modelling is accurate, indicating that dust will be largely confined to the Project footprint	Movement and behaviour will be affected	Low	• Air Quality Management and Monitoring Program • Wildlife Effects Monitoring Program
Sensory disturbance (lights, smells, noise, dust, viewscape) and barriers to movement causes changes to caribou movement and behaviour, and changes to energetics and reproduction	Sensory disturbance	Primary	• Energetics modelling incorporated numerous conservative assumptions, and accurately reflects impacts to caribou • Population modelling conclusions are correct	Movement and behaviour will be affected	Low	• Engagement Plan • Wildlife Effects Monitoring Program • Caribou Road Mitigation Plan
Increased traffic on the Misery Road and Jay Road, the above-ground power line along these roads, and the pipelines along the Jay Road may create barriers to caribou movement, change migration routes, and reduce population connectivity.	Traffic and power lines	Primary	• Energetics modelling incorporated numerous conservative assumptions, and accurately reflects impacts to caribou • Caribou crossing design for the Jay Road is implemented and effective at facilitating crossings • Implementation of Wildlife Road Mitigation Plan will reduce barrier effect	Movement and behaviour will be affected	Low	• Engagement Plan • Waste Rock and Ore Storage Management Plan • Wildlife Effects Monitoring Program • Caribou Road Mitigation Plan
Collisions between caribou and vehicles or aircraft causes injury or mortality of animals	Physical and chemical hazards	Secondary	• Frequency of mine-related mortalities at diamond mines in the NWT, including the Ekati Mine, is extremely low • Addition of Wildlife Road Mitigation Plan will further reduce likelihood of road-related mortalities	Mortality will be negligible	Low	• Engagement Plan • Wildlife Effects Monitoring Program • Caribou Road Mitigation Plan
Attractants at site (food, shelter) leading to problem wildlife or increases in predator densities and predation on caribou	Physical and chemical hazards	Secondary	• Local increases in bears or wolves have not been observed at other mines • Waste management will limit the availability of food to wildlife	Mortality will be negligible	Low	• Hazardous Waste Management Plan • Hydrocarbon-Impacted Materials Management Plan • Incinerator Management Plan • Landfill Management Plan • Spill Contingency Plan • Waste Management Plan • Wildlife Effects Monitoring Program
Continued operation of the Tibbitt to Contwoyto Winter Road results in continued opportunities for harvesting caribou, which can alter caribou movement and behaviour, and survival and reproduction	Physical and chemical hazards	Secondary	• Harvest by Non-Aboriginal and Resident hunters is currently not permitted along the Tibbitt to Contwoyto Winter Road or around the Lac de Gras area	Mortality will be negligible	Low	• Wildlife Effects Monitoring Program
Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the dewatering of diked area of Lac du Sauvage leading to change in riparian habitat and caribou distribution	Direct and indirect habitat loss	No Linkage	• Dewatering will not cause water levels downstream in Lac du Sauvage and the Narrows to exceed the high water mark	Limited change to movement and behaviour	Nil	• Aquatic Effects Monitoring Program • Dewatering Plan • Wildlife Effects Monitoring Program
Dewatering of diked area of Lac du Sauvage may result in newly established vegetation on exposed lakebed sediments, and may change caribou habitat quantity	Direct and indirect habitat loss	Secondary	• Colonization of lakebed sediments will be slow, patchy and limited area within the mine footprint • Caribou will avoid area due to limited access and proximity to human activity	Movement and behaviour will be affected	Low	• Wildlife Effects Monitoring Program
Ingestion of seepage and surface runoff from WRSAs and kimberlite stockpiles, or ingestion of water, soil, and vegetation that has been chemically altered by seepage and surface runoff may affect caribou health	Physical and chemical hazards	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching • Ecological risk assessment results were accurate, indicating negligible risk	No caribou mortality	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program • Interim Closure and Reclamation Plan

Table A-2 Effects Pathways, Effects Assumptions, Predictions, and Relevant Monitoring Programs and Management Plans for Barren-Ground Caribou

DAR Effects Pathways	General Pathway	DAR Pathway Assessment	DAR Assumptions	Effect Prediction Summary	Magnitude of the Incremental Effect	Relevant Monitoring Programs
Surface runoff and seepage from the WRSAs and kimberlite stockpiles may change habitat quality	Direct and indirect habitat loss	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching	Movement and behaviour will not be affected	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program
Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the back-flooding of diked area of Lac du Sauvage alters riparian habitat and caribou distribution	Direct and indirect habitat loss	No Linkage	• Changes to water levels will be within the range of natural variation	Limited change to movement and behaviour	Nil	• Aquatic Effects Monitoring Program • Dewatering Plan • Wildlife Effects Monitoring Program
Ingestion of seepage and surface runoff from WRSAs after closure, or ingestion of water, soil, and vegetation that has been chemically altered by long-term seepage and surface runoff may affect caribou health	Physical and chemical hazards	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching • Ecological risk assessment results were accurate, indicating negligible risk	No caribou mortality	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program • Interim Closure and Reclamation Plan
Long-term seepage from the WRSAs may change habitat quality	Direct and indirect habitat loss	No Linkage	• Seepage and runoff will be contained and managed where appropriate • Sequestering of acid generating rock will limit leaching	Movement and behaviour will not be affected	Nil	• Aquatic Effects Monitoring Program • Waste Rock and Ore Storage management Plan • Wastewater and Processed Kimberlite Management Plan • Wildlife Effects Monitoring Program • Interim Closure and Reclamation Plan
Ingestion of soil, vegetation, or water that has been altered by chemical spills (i.e., fuels, petroleum products, reagents, pipelines) on site affecting caribou health	Accidents and Malfunctions Physical and chemical hazards	No Linkage	• Spill response and clean-up will mitigate effects to wildlife	No caribou mortality	Nil	• Spill Contingency Plan • Wildlife Effects Monitoring Program

DAR = Developer's Assessment Report; NWT = Northwest Territories; WRSA = waste rock storage area.

DOMINION DIAMOND

APPENDIX B

REVIEWER RECOMMENDATIONS AND PROPONENT RESPONSES

December 2016

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
The CRMP should be incorporated into the WEMP.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Chuck Hubert (MVEIRB)	Incorporated into the WEMP as an Appendix.	Entire document
The information in the wolf section ends at 2010 and should be updated to 2015.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Andrea Patenaude (ENR)	Section was updated.	Section 5.8.2
Clarification is needed on the difference between complete and partial wolf den surveys.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Dean Cluff (ENR)	Clarification was added. Partial surveys was changed to targeted surveys.	Section 5.8.2
Clarify which sections pertain to the WWHPP and which to the WEMP in the concordance table.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Andrea Patenaude (ENR)	Concordance Table was updated.	Table 1.5-1, Section 1.5
Quality Assurance and Quality Control (QA/QC) sections and analyses sections should be added to the WEMP (similar to the AEMP).	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Mark d'Entremont (DKFN)	Quality assurance and quality control section added to WEMP.	Section 6
The objectives of the WEMP should be clarified and there should be species-specific objectives.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Mark d'Entremont (DKFN)	Added a table of objectives (including species-specific objectives).	Table 1.4-1, Section 1.4
Muskox should be included in the WEMP because they are important to Aboriginal communities.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Fred Sangris (YKDFN)	Reporting incidental observations of muskox and other rare or uncommon species within the study area will be reported in the annual monitoring report. Section 5.13 Rare or Uncommon Species was added to the WEMP.	Section 5.13
The WEMP states “There are indications that improved and continual employee education has resulted in a decrease in the presence of scavengers and food waste items at landfills (Rescan 2010)” (pg 4-3). This statement is outdated and incorrect given results from the past 2-3 years. DDEC noted in the 2015 WEMP that adherence by employees to effective waste management disposal practices at the mine site remains a challenge. Overall occurrence of wildlife attractants or misdirected wastes based upon surveys was relatively high in 2015 and similar to 2014. DDEC should update and correct this statement regarding waste management.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Since the redesign of the landfill in 2002, monitoring results indicate that less food waste is misdirected to the landfill. Dominion Diamond has recently implemented additional changes to internal procedures to further reduce misdirected food waste and will monitor whether these changes are effective. A revision for this comment was not required.	n/a
The WEMP states “Currently, it is expected that indirect habitat alteration and loss for caribou (Zone of Influence; ZOI) will be monitored through regional programs in collaboration with ENR, potentially through the Barren-ground Caribou Management Strategy (Section 5.8.1). Potential mechanisms for the ZOI will be monitored through the WEMP” (pg 4-7). Sensory disturbance at the mine site level is the responsibility of the developer, and cannot be shunted off to regional programs. Monitoring and mitigation of sensory disturbance, not just for identifying potential mechanisms, must occur. DDEC to update this section to provide methods for monitoring and mitigation of sensory disturbance.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Sections 4.2. and 5.6.5 provide descriptions of caribou ZOI monitoring and mitigation of indirect effects from Ekati mine.	Section 4.2.2 and Section 5.6.5
DDEC should clarify what is considered as the “current Mine footprint” for calculation of direct wildlife habitat loss.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Reclaimed areas that meet reclamation objectives will no longer be considered disturbed. The area disturbed and reclaimed will be tabulated in future reports. A revision for this comment was not required.	n/a
The Wildlife-Vehicle and Aircraft Interaction section is designed to address a number of residual risks including “caribou avoidance of the Mine” and changes in movement patterns (pg 5-8). However, the 2 objectives focus on risk of injury or death, and have little bearing on reducing caribou avoidance (sensory disturbance). DDEC should align these sections to address the appropriate objectives.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Reference to the residual risks of mine avoidance and barrier effects of roads has been removed from Section 5.5 of the WEMP as suggested by IEMA.	Section 5.5
The WEMP section on the Ahiak herd (pg 5-10) is dated and does not align with herd designations presented in the EIR 2016. DDEC should update this section.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	There is the potential for interaction between the Ekati mine and Ahiak caribou, based on this herd’s historical range. Dominion Diamond will continue to monitor location maps provided by GNWT ENR for the protection of caribou that may interact with the Ekati mine.	n/a

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
				A revision for this comment was not required.	
DDEC states that it will work with the ZOI Technical Task Group on appropriate methods for monitoring the caribou ZOI (pg 5-15). The Task Group has drafted methods, but is slow to make firm recommendations on which project (especially established projects) should be conducting ZOI monitoring. The Agency re-iterates that aerial surveys to monitor relative caribou distribution and abundance should be conducted to monitor the impact of the Ekati Mine and measure the effectiveness of mitigation measures for caribou, including enhanced traffic management and dust suppression. The aerial survey study area should be enlarged to include the extensions related to the Jay and Sable developments.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Dominion Diamond will work with the ZOI Technical Task Group on the appropriate methods for monitoring the caribou ZOI. The current regional study area for the Ekati mine includes the Sable and Jay development areas and does not require expansion. A revision for this comment was not required.	n/a
One of the objectives for the camera is to "determine caribou (and other wildlife) responses to the road (i.e., crossing or deflecting)" (pg 5-18). No details on how this will be conducted are provided. Since this issue has been discussed at length in previous forums, DDEC should provide appropriate methodology to examine crossing success.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Approach is to assume that caribou on roads or at edge of roads intend to cross, which is reasonable. Mitigation will be applied under this assumption and whether caribou cross when mitigation is applied will be monitored (e.g., installing caribou crossings, and reducing vehicle speeds, and stopping vehicles as caribou approach road). Dominion Diamond will provide additional detail on methods for determining crossing success and mitigation effectiveness in future documentation. A revision for this comment was not required.	n/a
DDEC states "It is anticipated that aerial surveys for wolf den occupancy will continue to be conducted by ENR staff" (pg 5-26). If the objective is to "determine the presence, distribution and productivity of active wolf dens throughout the study area", then DDEC should conduct these surveys if ENR does not do them. No surveys were conducted by either ENR or DDEC in 2015). DDEC should provide appropriate methodology to examine wolf den occupancy independent of ENR.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Wolf den monitoring is no longer a required component of the WEMP based on consensus at Wildlife Monitoring Workshops in 2009 and 2010. Dominion Diamond continues to support the GNWT-ENR wolf monitoring programs. A revision for this comment was not required.	n/a
The North Slave Métis Alliance agreed with the suggestions made by IEMA in their July 5, 2016 letter to Dominion Diamond.	Letter	08-Jul-16	Shin Shiga (NSMA)	See responses to IEMA recommendations. A revision for this comment was not required.	n/a
<u>Objectives</u> Overall this section has improved from previous WEMP versions	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A revision for this comment was not required.	n/a
<u>Objectives: P. 1-6</u> The changes to the objective section to include the overarching global objectives provides solid grounding for the WEMP for the most part; however one global objective that does not appear to be captured is testing the effectiveness of mitigation and operation practices, Recommend that this should be added as a global objective.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Testing the effectiveness of mitigation is also a global objective and will be added in a future revision.	Section 1.4
<u>Objectives: Table 1.4-1</u> We like this table. It is helpful to have an overview of the specific program objectives and how they fit in with the global objectives. Do not the results of the Incidental Observations (and Road Surveys for caribou) also inform the need for mitigation (as does the Collared Caribou monitoring as stated below)? ENR recommends adding such an objective to the objectives for the incidental observation for all monitored species	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Incidental observations can lead to the use of mitigation (e.g., bear deterrence from site). This will be included as an objective where applicable in a future revision	Section 1.4
<u>Section 1.5 Concordance: Table 1.5-1</u> Concordance of Legislation/Regulation Requirements and WEMP - updated to include Measure 6-1: Road Mitigations for Caribou.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A revision for this comment was not required.	n/a
<u>Section 1.5 Concordance: Recommendation</u> Add Measure 6-2(a) to the concordance table given that it is to be enforced under Section 95 of the *Wildlife Act* and will contain relevant content. It can also be noted that this requirement has a different	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Agreed that Measure 6-2(a) and Measure 6-5 should be included in the concordance table. These will be added in a future revision.	Table 1.5-1

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
timeline. Also, add Measure 6-5 related to Trandtional Knowledge in developing caribou monitoring programs since they are to be reported as part of the annual WEMP.					
Section 2.4 Valued Ecosystem Components: Table 2.4-1 Valued Ecosystem Components for the WEMP - ENR notes that DDEC has removed falcons as a VEC from mine-specific monitoring. Can DDEC detail specifically when it was decided that raptors be dropped as a VEC (i.e., provide meeting notes or correspondence detailing this decision? Can DDEC explain how this will change their treatment of raptors? While it is ENR's understanding that project level effects monitoring was dropped in favour of regional monitoring, ENR expects regional raptor monitoring and appropriate mitigation and mitigation monitoring for pit-wall nesting species to continue and that it is not inappropriate to include them as a VEC. The pit wall monitoring continues presumably because raptors are valued, and listed as a species of concern in Section 2.5-1.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Monitoring of raptors is included in Table 1.4. Raptors are no longer considered a VEC (Table 2.4-1) based on consensus at Wildlife Monitoring Workshops in 2009 and 2010 but because they are important to the ecosystem and Peregrine falcon is listed under SARA, raptors are included in site-surveillance and regional monitoring (Section 5.10). A revision for this comment was not required.	n/a
Section 3.0 Engagement and Incorporation of Traditional Knowledge ENR recommends to include some information specifically how DDEC is meeting Measure 6-5 i.e., outline the process and timeline for the elders group, participants etc.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 3 describes how Traditional Knowledge has been and will continue to be incorporated into wildlife monitoring. The Jay Project Road Construction Plan posted to the WLWB public registry in November provides details about the process and timeline for the Traditional Knowledge Elders Group. A revision for this comment was not required.	n/a
Section 4.0 Mitigation P. 4-1 ENR notes the update on the results of the environmental assessment	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A revision for this comment was not required.	n/a
Section 4.0 Mitigation ENR notes that Section 4.1.6 on dust was updated to make reference to the AQEMMP, the CRMP and pilot study on dust suppression, however, ENR recommends that DDEC refer to where dust suppression procedures including management triggers are found	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	All procedures and management actions related to dust are found in the AQEMMP. A revision for this comment was not required.	n/a
Section 4.0 Mitigation Question: Section 4.2.2 Indirect Habitat. What is meant by "Currently it is expected that indirect habitat alteration and loss for caribou will be monitored through regional programs in collaboration with ENR, potentially through the Barren-ground Caribou Management Strategy"? This reads as though DDEC expects ENR will be monitoring Jay/Ekati's ZOI.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Dominion Diamond will work with the ZOI Technical Task Group on the appropriate methods for monitoring the caribou ZOI. A revision for this comment was not required.	Section 4
Section 4.0 Mitigation P. 4-7 " Potential mechanisms for the ZOI will be monitored through the WEMP and other plans such as the AQEMMP." Are they listed elsewhere? If so, refer to where. If not, please list them and identify how they will be monitored.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	To clarify, any potential ZOI mechanism that is monitored will be completed through the WEMP or other plans. For example, dust has been proposed as a potential mechanism for a caribou ZOI and is monitored through the existing AQEMMP. This will be clarified in a future revision.	n/a
Section 4.2.3 Barrier Effects from Road P. 4-8 "The road design allows for approximately 1.8 km of caribou crossings over a total length of 2.5 km between JR1+100 (close to King Pond) and JR3+560 close to the intersection with the Jay North Road (i.e., 72% of the road will be built with caribou crossings). This includes a 1.3 km stretch of road through the esker. Two additional caribou crossings will be added to the Jay North Road and one crossing will be added to the eastern section of the Jay Road towards the dike (Appendix B; Section 4.1.1)." Please update this section to be in accordance with the Road Construction Plan (condition 41 of the Land Use Permit W2016F007) that DDEC is required to submit to the WLWB prior to starting construction associated with the Jay Early Works permit.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	The text provided in Section 4.2.3 regarding caribou crossings for the Jay Project is consistent with the Jay Project Road Construction Plan, which was submitted to WLWB in November 2016. A revision for this comment was not required.	n/a
Section 4.2.3 Barrier Effects from Road P. 4-8 DDEC indicated that "snow berm height will be managed during winter to below 1.7 m;" but does not provide further detail to evaluate the effectiveness of this mitigation reducing the barrier effect of the road. ENR requires DDEC to provide further description of how snow berms will be managed.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Snow berms along the Misery and Jay roads will be maintained at a height less than 1.6 m, where practicable. However, the grader used to manage snow will likely clear snow closer to a height of 1 m. A revision for this comment was not required.	n/a

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
Section 4.3.1 Direct Mine-related Mortality and Injury Noted, addition or revision of 9 new mitigations.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A revision for this comment was not required.	n/a
Section 4.3.1 Direct Mine-related Mortality and Injury Question: an addition to this section is the idea that a blasting plan will be implemented to protect caribou and other wildlife from fly-rock during early stages of pit development. Where will this be housed? What to protect caribou from disturbance from blasting? What are protocols around this currently? Not clear from WEMP.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A blasting plan is an internal operational document much like the CRMP but is not submitted externally. The same protocols are used for caribou safety during blasting as for humans. Blasts will not take place if there are people or caribou within the blast exclusion area. The blast exclusion area is determined by the blast supervisor prior to blasting based on the requirements of the Northwest Territories *Mine Health and Safety Act* and other related Acts and Regulations. Blasting will continue to be conducted in accordance with the requirements of the relevant Acts and Regulations, procedures in place at the Ekati mine, and supervised by the Ekati mine blasting team. This will ensure the safety of caribou as it does people. A response to disturbance to caribou from blasting was provided for Information Request MVEIRB-IR-98. A revision for this comment was not required.	n/a
Section 4.3.4 Deterring Wildlife ENR notes that section 4.3.4 Deterring Wildlife only addresses caribou.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 4.3.4 refers to wildlife, meaning wildlife are included, and provides some examples specific to caribou. A revision for this comment was not required.	n/a
Section 4.3.4 Deterring Wildlife What about operational procedures, training, protocols etc. for deterring nesting raptors, bears and other species? Section 95(1) of the Wildlife Act requires that wildlife management and monitoring plans include “a description of measures to be implemented for mitigation of potential impacts” ENR requires that DDEC include operational procedures for deterrence activities that describe how the health and safety of animals and humans are take into account in such activities.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Standard Operating Procedures for deterring wildlife will be included with a future revision.	n/a
Section 5.1 Direct Wildlife Habitat Loss ENR recommends that DDEC include reporting on the area of habitat reclaimed or recovered, if applicable.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	The area disturbed and reclaimed will be tabulated in future reports as part of Section 5.1. A revision for this comment was not required.	Section 5.1
Section 5.2.1 Landfill Monitoring There do not appear to be triggers for levels of wildlife and wildlife sign. Please identify what levels of animal sign detections would trigger and action.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Indices of wildlife and wildlife sign are reviewed annually to determine if there is pattern that suggests a problem at site that requires further follow-up.	n/a
Section 5.2.1 Landfill Monitoring P. 5-4 ENR notes that this section contains thresholds for waste detection but actions. Please identify what actions will be taken based on these results.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Actions would depend on the location of the problem, and would be provided in the annual WEMP report. A revision for this comment was not required.	n/a
Section 5.2.2 Waste Bin Monitoring P. 5-4 ENR notes that while actions are identified, the thresholds for triggering such actions are not stated. Please include these.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 5.2.2 indicates actions are taken if misdirected waste is found. A revision for this comment was not required.	n/a
Section 5.3 Wildlife Mortalities “During the 2010 reporting period, Dominion Diamond Environment Staff reviewed, communicated and followed a “Mortality Reporting protocol developed in consultation with ENR that includes mortality	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Standard Operating Procedures for mortality reporting be included with a future revision.	n/a

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
reporting procedures required by ENR and EC." Please include operational procedures for mortality reporting.					
Section 5.3 Wildlife Mortalities All references in the document to "Environment Canada" should be changed to "Environment and Climate Change Canada".	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Reference to Environment Canada will be changed to Environment and Climate Change Canada in a future revision.	Whole WEMP document
Section 5.5 Wildlife-Vehicle and Aircraft Interactions This section does not appear to address impact of caribou avoidance or barrier effects. Recommend removing these objectives from this section or identify where else in the document this is addressed.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Reference to the residual risks of mine avoidance and barrier effects of roads has been removed from Section 5.5 of the WEMP as suggested by IEMA.	Section 5.5
Section 5.6 Caribou Please replace "Caribou Range Management Plan" with "Bathurst Caribou Range Plan"	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Reference to the Bathurst Caribou Range Plan will be changed in a future revision.	Section 5.6
Section 5.6 Caribou "By definition the WEMP is focussed on Ekati mine-specific mitigation and monitoring and any collaboration with the GNWT (and other agencies, communities and mines) on regional programs for the assessment and management of cumulative effects is outside the scope of reporting in the WEMP". ENR wishes to clarify that wile project specific results of collaborative programs is not mandatory, it is nonetheless recommended DDEC describe within the WEMP how DDEC is contributing to such programs or make reference to any summary reports that have been provided or compiled on regional programs.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 5.7.2 for grizzly bear, 5.8.2 for wolf, 5.9.2 for wolverine, 5.10.2 for raptors and 5.12.2 on North American Breeding Bird Survey all describe how Dominion Diamond supports collaborative regional monitoring programs. A revision for this comment was not required.	n/a
Section 5.6.3 Caribou Road Surveys P. 5-13 ENR recommends that DDEC identify the method by which traffic will be recorded or reference where this information is otherwise provided	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Haul traffic is monitored at site using a Wenco system (WEMP, Appendix C, Section 4.1.1). A revision for this comment was not required.	n/a
Section 5.6.5 Caribou Zone of Influence Monitoring DDEC states that they will "work with the Zone Of Influence Technical Task Group administered by the GNWT, regulators and communities on appropriate methods for monitoring the caribou ZOI." Based on the draft ZOI guidance document so far, ENR recommends that DDEC expand its study area to accommodate Jay and Sable pits and consider modifying the design to have graduated spacing. ZOI Guidance Document says "Project for which ZOI monitoring is deemed appropriate are advised to produce an initial estimate of ZOI during the operations phase of their project. Repeat monitoring should be conducted when the project is expected to change due to a major shift in the project (e.g. mine phase change, expansion), a change in mitigation practices or other cause." ENR recommends that DDEC resume reconnaissance surveys for possible completion of full-scale ZOI surveys to generate a ZOI estimate associated with Jay within the first year of operations of Jay	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Since 1998, the regional study area has included the Jay and Sable development areas (WEMP; Map 2.1-1). The Guidance Document has remained a draft since March 2013, so there is uncertainty about what is required. Aerial surveys for caribou were discontinued after communities expressed concerns over disturbance by caribou caused by aerial surveys. A revision for this comment was not required.	n/a
Section 5.6.6 Caribou Behaviour P. 5-17 While there is probably good logistical reasons why DDMI monitors far away and DDEC closer to the mines, ENR recommends that DDEC and DDMI consider collaborating on sending out mixed survey crews to avoid bias in comparisons of close and distant observations. ENR requires that DDEC add feeding intensity surveys to their behavioural observations to help detect nutritional implications of disturbance and feed into cumulative effects modeling being used by the GNWT. ENR looks forward to continued collaboration with DDEC and the other mines towards coordinating and improving behaviour monitoring.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Ekati and Diavik mine staff use the same behaviour monitoring methods and protocols so there is no reason to expect site-specific bias that might occur if different methods were used. The behaviour monitoring completed at Ekati and Diavik includes recording feeding activity, which also has nutritional implications. In addition, Dominion Diamond uses focal sampling, which provides greater level of detail on feeding time for potential input into energetic models. A revision for this comment was not required.	n/a
Section 5.6.7 Camera Trapping In the past, this method was used to test the effectiveness of caribou crossing structures, which is noted as a requirement of the CRMP in Measure 6-1. ENR notes that this could be added as an objective of this program with respect to meeting requirement (m) of Measure 6-1. ENR suggests that modifications to past methodologies for testing of caribou crossing/deflection rates is required to properly quantify impacts to caribou, ENR recommends that paired sets of cameras be established to also detect possible deflections that occur beyond the 25-30 m trigger range of the cameras to get a	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Approach is to assume that caribou on roads or at edge of roads intend to cross, which is reasonable. Mitigation will be applied under this assumption and whether caribou cross when mitigation is applied will be monitored (e.g., installing caribou	n/a

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
more complete picture of caribou responses to the road. ENR notes that improvements to traffic monitoring noted elsewhere in the WEMP may also help with interpreting results of camera trapping studies.				crossings, and reducing vehicle speeds, and stopping vehicles as caribou approach road). Dominion Diamond is also exploring a number of different options for detecting and monitoring caribou before caribou would be detected by specific road surveys or drivers. This includes scans for caribou using thermal imaging technology at high probability of encounter points along roads identified from incidental caribou observations, camera trapping data, and TK. Dominion Diamond will provide additional detail on methods for determining crossing success and mitigation effectiveness in future documentation. A revision for this comment was not required.	
Section 5.7.2 Grizzly Bear P. 5-22 Given the objective of recording incidental observations for the purpose of monitoring "changes in bear activity near the mine over time and assess potential attraction or avoidance of the mine by different demographic groups (emphasis added), ENR recommends that DDEC ensure that detail on bear size, cub size (COYS, yearlings, 2 year olds) and gender be included as an option on the observation forms and recommends that observers take pictures in their protocols.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 5.7.1 provides age and sex as examples of the level of demographic reported. Most incidental observations are reported by mine staff other than Environment Technicians, and whom would not be expected to have the technical skill to determine bear weight, cub-of-year, yearling, or two year olds. For this reason, monitoring of bear demographic records is limited to male or female (sex) and cubs (age). Mine staff are not supplied with cameras as regular work equipment. Environment Technicians routinely take photos when following up on incidental observations when animals are present. A revision for this comment was not required.	n/a
Section 5.7.2 Grizzly Bear P. 5-23 Re: objectives for the grizzly bear hair snagging study: there is a copy and paste error referring to caribou studies.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	The reported error is no longer present in the current version of the WEMP. A revision for this comment was not required.	n/a
Section 5.7.2 Grizzly Bear Frequency for the Grizzly Bear hair snagging study: Add "the next round of grizzly bear hair snagging will be in 2017".	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	The WEMP reflects that the program was last completed in 2013 and is anticipated to be repeated in four years, which would be 2017. The year of the next scheduled program will be provided in future revisions	Section 5.7.2
Section 5.7.2 Grizzly Bear P. 5-24 Re analysis. ENR recommends that DDEC use Spatial Explicit Capture-Recapture method to analysis subsequent rounds of grizzly bear hair snagging to compensate for study area closure issues and thereby provide more robust population size and density estimates that will be more comparable to other density estimates.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	This regional monitoring program is completed by Dominion Diamond to support cumulative effects assessment and management by the GNWT. It is up to the GNWT to determine how they will analyze these data. Section 5.7.2 no longer references any particular analysis method. As has been reviewed at Wildlife Monitoring Workshops, the study design intended the use of the Pradel reverse-time capture-recapture model, which is an open population model and does not include a closure assumption. It also estimates population growth rate, which matches the monitoring objective of the program and without the need for deriving population size. A spatially	n/a

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
				explicit capture-recapture model includes an assumption of population closure. A revision for this comment was not required.	
Section 5.7.2 Grizzly Bear It is recommended that raw data from this program be submitted to WMIS	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	The regional grizzly bear hair snagging program is completed collaboratively with other mine operators and the decision to submit data to WMIS requires agreement by all collaborators. A revision for this comment was not required.	n/a
Section 5.8 Wolf P. 5-24 Objectives: ENR notes that the wording of the first bullet could be clearer. Identifying the presence of composition of observations is not quite what you are trying to do. This could also made into a new bullet.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Dominion Diamond will consider clarifying the objective in a future revision.	Section 5.8
Section 5.8 Wolf ENR acknowledges and appreciates DDEC's contributions to regional wolf monitoring. While ENR is reviewing wolf monitoring options on the Bathurst range; currently it's still uncertain if and when ENR will resume monitoring wolf dens on a regional scale. However, in the meantime, ENR encourages DDEC to continue with and perhaps enhance any ground and aerial efforts to monitor all historic den sites as well as search for new dens, in order to monitor occupancy within the study area. Periodic monitoring of active den sites during summer would likely provide insight into if or when packs are moving to alternate den sites, and better information on the productivity and survival of pups.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Wolf den monitoring is no longer a required component of the WEMP based on consensus at Wildlife Monitoring Workshops in 2009 and 2010. Dominion Diamond continues to support the GNWT-ENR wolf monitoring programs. Section 5.8.2 (Frequency) explicitly states "However, if these surveys are no longer completed by ENR, Dominion Diamond plans to continue to survey the historic den sites that are found within the Ekati study area and will update the WEMP methods accordingly." A revision for this comment was not required.	n/a
Section 5.10.1 Pit Wall Nest Monitoring and Incidental Observations Objectives. This section identified that an objective of this monitoring is to document the effectiveness of deterrent efforts that may be employed for nest relocations yet ENR is not aware of where or when such information has been reported in the past. ENR notes that the mitigations that are used to deter nesting in pits are not documented or reported elsewhere in this document. Please include operational procedures for these activities.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Standard Operating Procedures for deterring pit wall nesting by raptors will be included with a future revision.	n/a
Section 5.10.2 Regional Falcon Surveys P. 5-30 Please cite the report or source of the statement "Over a decade of sampling showed little effects from the Ekati mine on nesting raptors relative to natural factors operating on a regional scale".	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Regional raptor nest monitoring is no longer a required component of the WEMP based on consensus at Wildlife Monitoring Workshops in 2009 and 2010. Reasons for this decision included that results were highly variable annually and had not identified significant adverse effects. The monitoring data set was formally analyzed and reported by the Diavik Mine (DDMI 2011) and subsequently published in the Journal of Avian Conservation and Ecology (Coulton et al. 2013). These citations will be included in a future revision.	Section 5.10.2
Section 5.10.2 Regional Falcon Surveys The statement that "the Canadian Peregrine Falcon Survey is not be conducted from Yellowknife" gives the impression that at one point it was. This is not the case. The Canadian Peregrine Falcon Survey was a federally coordinated national survey in which ENR provided territorial data. That survey is no longer running but independent researchers and provincial/territorial representative are working to continue reporting on a five year basis. ENR continues to monitor raptors every five years in cooperation with the mines, stores these data in the NWT/NU Raptor Database, reports on certain results in GNWT's *State of the Environment Report* and collaborates on these independent efforts to maintain peregrine surveys. Please revise this section to reflect this.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A future revision will clarify that the Peregrine Falcon Survey is no longer completed and that nest monitoring will be contributed to support on-going monitoring by ENR and other researchers.	Section 5.10.2

Table B-1: Wildlife Effects Monitoring Plan Reviewer Recommendations and Proponent Responses

WEMP Workshop Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to WEMP or Rationale if Revision Not Made	WEMP Section
Section 5.12 Upland Breeding Birds ENR recommends that DDEC solicit commentary from ECCC on this section.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	As has been the practice historically, all regulators and communities are welcome to submit comments at any time. A revision for this comment was not required.	n/a
Section 5.12 Upland Breeding Birds P. 5-24-25 ENR recommends that although short-eared owl is a raptor, it is more appropriately mentioned in this section rather than the raptor section given the monitoring methods in this section are more applicable (i.e. SEOW is not a cliff-nester) for monitoring this species.	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	Section 5.10 identifies which raptor species have been observed in the study area, which includes short-eared owl. Section 5.10.2 indicates that regional monitoring of nests used by peregrine falcon and gyrfalcon although other species using nests are also monitored. Observations of short-eared owl have been reported with the North American Breeding Bird Survey results annual Ekati mine WEMP reports. A revision for this comment was not required.	n/a
Section 5.12 Upland Breeding Birds P. 5-25 Please provide a citation for the statement that "over a decade of sampling showed little effects from the Ekati Mine on upland breeding birds".	Letter	29-Aug-16	Andrea Pateneaude (GNWT)	A study at Ekati mine from 1996 to 2003 of upland breeding bird density and diversity found no adverse effects and was published in the journal Arctic (Smith et al. 2005). From 2002 to 2003, a study on habitat use and success found no adverse effects to Lapland longspurs, which was published in the Canadian Journal of Zoology (Male and Nol 2005). Appendix A of the 2010 Ekati mine WEMP report includes a 13 year (1996 to 2008) analysis of the breeding bird monitoring data and the results indicate no adverse effects to upland breeding bird density, diversity, richness, and evenness. These citations will be included in a future revision.	Section 5.12
The area that is reclaimed should also be reported along with the current mine footprint in the Annual WEMP Report	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Marc Casas (IEMA)	The area disturbed and reclaimed will be tabulated in future reports. A revision for this comment was not required.	n/a
It should be clarified when the wildlife study area was expanded (Map 2.1-1)	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Shawn McKay	Map 2.1-1 was updated to clarify when the wildlife study area was expanded.	Map 2.1-1
The recommendations given through engagement and actions or responses should be documented in the WEMP and CRMP.	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Marc Casas (IEMA)	A revision table summarizing engagement recommendations and actions or responses has been added as an Appendix to the WEMP and CRMP.	WEMP Appendix B and CRMP Attachment I.

APPENDIX C

CARIBOU ROAD MITIGATION PLAN

CARIBOU ROAD MITIGATION PLAN FOR THE JAY PROJECT

Prepared for: Dominion Diamond Ekati Corporation

Prepared by: Golder Associates Ltd.

December 2016

Table of Contents

Maps

Figures

Tables

Attachments

Abbreviations

Abbreviation	Definition
AQMMP	Air Quality Management and Monitoring Program
AQEMMP	Air Quality and Emissions Monitoring and Management Plan
CMP	Caribou Mitigation Plan
CRMP	Caribou Road Mitigation Plan
DAR	Developer's Assessment Report
Dominion Diamond	Dominion Diamond Ekati Corporation
Ekati mine	Ekati Diamond Mine
ENR-GNWT	Environment and Natural Resources, Government of the Northwest Territories
GNWT	Government of the Northwest Territories
IEMA	Independent Environmental Monitoring Agency
Project	Jay Project
RSA	regional study area
TCWR	Tibbitt to Contwoyto Winter Road
WEMP	Wildlife Effects Monitoring Plan
WRSA	waste rock storage area
ZOI	zone of influence

Units of Measure

Unit	Definition
%	percent
km	kilometre
km^2	square kilometre
km/h	kilometres per hour
m	metre

1 INTRODUCTION

1.1 Background

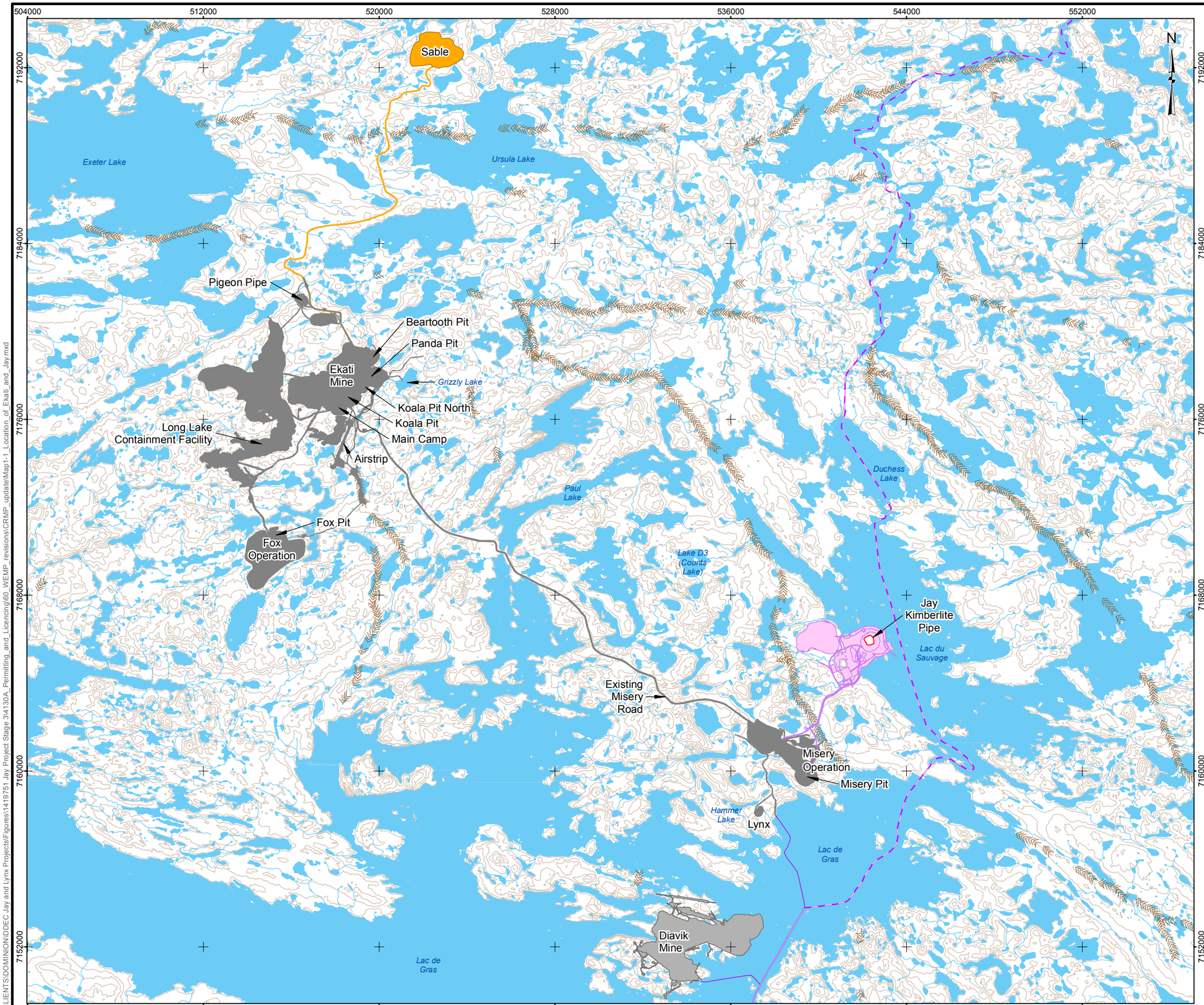
The Ekati Diamond Mine (Ekati mine), owned and operated by Dominion Diamond Ekati Corporation (Dominion Diamond), is located in the Slave Geological Province of the Northwest Territories, approximately 300 kilometres (km) northeast of Yellowknife (Map 1-1). Construction at the Ekati mine began in 1997 and production began in October 1998. Dominion Diamond is proposing to develop the Jay kimberlite pipe located beneath Lac du Sauvage. The Jay Project (Project) will be an extension of the Ekati mine, and is expected to extend the life of the mine by 13 years or more.

The Project is located in the southeastern portion of the Ekati mine claim block approximately 25 km from the main facilities and 7 km northeast of the Misery Pit (Map 1-1). The Project will also require a haul road, pipelines, and power lines. The following site roads will be constructed for the Project:

- a road from the Misery Road to the south abutment of Jay Dike referred to as the Jay Road, which will be approximately 5.1 km long. The Jay Road will connect the Project to the existing Misery Road and to the Ekati mine camp and processing plant, and will be the only road crossing the Lac du Sauvage esker;
- a road from the Jay Road to the north abutment of the Jay Dike and Jay waste rock storage area (WRSA), which will be approximately 3.2 km long; and,
- a road from the Jay Road to the Misery camp, which will branch off from the Jay Road just north of King Pond and will be approximately 1.9 km long.

The traffic volumes on the Misery and Jay roads associated with hauling kimberlite from the Project to the processing plant will depend on truck size and configuration. As is currently the case for the transport of Misery Pit kimberlite to the processing plant, long-haul trucks will be used, which are different from the short-haul trucks used in the open pits. From 1997 to 2015, the time between haul trucks on the Misery Road has ranged from 5.8 to 24.9 minutes (Table 1-1). The Developer's Assessment Report (DAR) conservatively assumed for the Jay Road an average of 56 round trips per day by long-haul trucks with a fleet of seven trucks making approximately eight trips each per day. Assuming the trucks are evenly spaced, there would be an average of 12 minutes between trucks, not including seasonal traffic from the Tibbitt to Contwoyto Winter Road (TCWR).

Other traffic will include the bulk explosives trucks, crew transport vehicles, road maintenance equipment, garbage trucks, low-bed trucks to transport larger equipment, water trucks, emergency vehicles, and light vehicles. Light vehicle traffic in the January to April session with all other larger trucks and vehicles is approximately 160 to 210 passes per day without the TCWR, and 290 to 340 passes per day with the TCWR, which is about one vehicle every 4 to 5 minutes. The final design of the Jay Road is not yet complete and is subject to further refinement based on ongoing data collection, regulatory and community engagement, and design iteration. More information regarding the traffic predicted for the Jay Road can be found in Appendix C: Traffic Associated with the Jay Project (Dominion Diamond 2015a).



LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- PROPOSED SABLE FOOTPRINT
- KIMBERLITE PIPE
- SABLE ALL-SEASON ROAD
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (10 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY

REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

4 0 4
SCALE 1:175,000 KILOMETRES

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
LOCATION OF EKATI MINE AND JAY PROJECT

Golder Associates

PROJECT 1546701.2070.10			FILE No.	
DESIGN	CW	17/03/16	SCALE AS SHOWN	REV 0
GIS	ANK	31/05/16	MAP 1-1	
CHECK	CD	31/05/16		
REVIEW	JV	31/05/16		

G:\CLIENTS\DOMINION\DDEC Jay and Lynx Projects\Figures\1419751 Jay Project Stage 3\4130A_Permitting_and_Licencing\60_WEMP_revisions\CRMP_update\Map1-1_Location_of_Ekati_and_Jay.mxd

Table 1-1 Historic Traffic Data for the Tibbitt to Contwoyto Winter Road and the Ekati Mine Misery Road, 1997 to 2015

Year	Tibbitt to Contwoyto Winter Road Statistics					Ekati Mine Statistics		
	Operating Period	Days	Total Tonnes Hauled (north bound)	Number of Truck Loads (north bound)	Number of Backhauls (south bound)	Ekati Number of Truck Loads (north bound)	Ekati Total Haul Loads on Misery Road	Minutes Between Haul on Misery Road
1997	Jan 21 – Apr 15[a]	84	100,000	3,500	—	3,500	7,000	17.3
1998	Jan 19 – Apr 4[a]	75	82,000	2,543	—	2,543	5,086	21.2
1999	Jan 28 – Mar 31[a]	62	57,000	1,844	—	1,844	3,688	24.2
2000	Feb 1 – Mar 22[b]	50	111,090	3,703	135	3,703	7,406	9.7
2001	Feb 4 – Mar 24 [b]	48	245,586	7,981	201	6,000[e]	12,000[e]	5.8
2002	Jan 26 – Apr 16[c]	80	256,915	7,735	433	6,000[e]	12,000[e]	9.6
2003	Feb 1 – Apr 2[c]	60	198,818	5,243	883	4,500[e]	9,000[e]	9.6
2004	Jan 28 – Mar 31[c]	63	179,144	5,091	165	4,000[e]	8,000[e]	11.3
2005	Jan 26 – Apr 5[c]	69	252,533	7,607	243	3,434	6,868[e]	14.5
2006	Feb 5 – Mar 26[c]	49	177,674	6,841	469	3,152	6,304[e]	11.2
2007	Jan 27 – Apr 9[c]	72	330,002	10,922	818	4,200[e]	8,400[e]	12.3
2008	Jan 29 – Mar 31[c]	62	245,585	7,484	890	2,231	4,462	20.0
2009	Feb 1 – Mar 22[c]	49	173,195	4,847	530	1,663	3,326	21.2
2010	Feb 4 – Mar 21[c]	45	120,020	3,508	429	1,460	2,920	22.2
2011	Jan 28 – Mar 31[c]	62	239,000	6,832	530	1,967	3,934	22.7
2012	Feb 1 – Mar 31[c]	59	210,188	6,551	648	2,272	4,544	18.7
2013	Jan 30 – Mar 31[d]	60	223,206	6,071	454	1,737	3,474	24.9
2014	Jan 31 – Apr 1	61	—	—	—	2,385	4,770	18.4
2015	Jan 31 – Apr 1	60	—	—	—	2,197	4,394	19.7

a) Source: TCWR Joint Venture (2009) combined with Mesher et al. (2008).

b) Source: TCWR Joint Venture (2013a), DAR Table 12.3-2.

c) Source: TCWR Joint Venture (2014), DAR Table 16.3-1.

d) Source: TCWR Joint Venture (2013b), DAR Table 12.3-2.

e) Specific traffic volume data for the Ekati operation between 1997 and 2004, and 2007 are not available. Therefore, assumed values are shown, based on an understanding of overall winter road statistics.

— = data not available.

Historically, Bathurst caribou have been observed annually in the area of the Ekati mine during the post-calving to fall-rut period (July until November), and the timing has varied by year and herd size. Caribou may also encounter the Ekati mine and the Project during the northern migration (May) to calving areas. It is during these times when caribou have the potential to interact with the Jay and Misery roads.

During the Project Technical Sessions in April 2015, Dominion Diamond made the commitment to provide a Caribou Road Mitigation Plan (CRMP) that gives further details on strategies to reduce the impacts from the Jay and Misery roads to caribou. A draft version of this Plan was submitted to the Mackenzie Valley Environmental Impact Review Board on May 8, 2015. Following a review period, Dominion Diamond hosted a workshop to discuss the CRMP on May 22, 2015 (Dominion Diamond 2015b). The suggestions made at this workshop were considered and incorporated into a subsequent version of the Plan. A second workshop was convened on June 25, 2015 to discuss further comments and suggestions for the revised version of the Plan. A third workshop was held to discuss the most recent version (published in May 2016) on September 13, 2016. Additional feedback on the Plan was also received during the environmental assessment review process, during the public hearings for the Jay Project DAR and submitted in writing following the most recent version. The recommendations received during engagement and the actions taken or responses from Dominion Diamond have been summarized in Attachment I.

Dominion Diamond has committed to further engagement with communities, the Independent Environmental Monitoring Agency (IEMA), and Government of the Northwest Territories (GNWT) to advancing the CRMP so that it can be implemented before construction of the Jay Project for the entire Ekati mine site. Based on the framework of adaptive management, it is important to note that the CRMP will likely evolve through time and should not be considered a ‘final’ plan.

1.2 Objectives

The CRMP describes the mitigation and monitoring for the Jay and Misery roads with respect to caribou. Although this plan is specifically for the Project, the CRMP will be included as an Appendix in the Wildlife Effects Monitoring Plan (WEMP; Dominion Diamond 2015c) and will apply to other roads at the Ekati mine, including the Misery Road and future Sable Road, upon approval of the Project.

The objectives of the CRMP are to:

- avoid and minimize (reduce) the risk of caribou and other wildlife mortalities from vehicle traffic;
- avoid and minimize the barrier effect of the Jay and Misery roads (and other Ekati mine roads) to caribou movement and migration; and,
- limit the effect of sensory disturbance from roads and traffic on caribou behaviour.

Although dust is caused by vehicles driving on roads, mitigation and monitoring of dust will not be addressed in the CRMP. Mitigation to control dust at the Ekati mine has included watering and applying dust suppressant to the roads, and monitoring is completed through the Air Quality Management and Monitoring Program (AQMMP). Further studies on the rate and spatial extent of dust deposition, triggers for adaptive management, and the effectiveness of mitigation methods to limit dust generation are part of the Air Quality and Emissions Monitoring and Management Plan (AQEMMP) for the Jay Project (Section 2.4, Dominion Diamond 2016). For example, as part of the Caribou Mitigation Plan (CMP) and AQEMMP, Dominion Diamond will expand the pilot study on determining the effectiveness of dust

suppressants along the Misery Road. If successful, the suppressant would be applied to all haul roads at the Ekati mine as an off-site offset for the Jay Project. Best practices will be shared with other operators, which if successfully used would also be considered as off-site offsetting. Information from the AQEMMP will be also used to help assess the potential drivers of detected changes in the zone of influence (ZOI) on caribou distribution and behaviour (WEMP; Sections 5.6.5 and 5.6.6).

2 CARIBOU PRESENCE AT EKATI MINE

Caribou in the Ekati mine area are typically from the Bathurst herd, and some seasonal patterns are evident in their behaviour and distribution. Bathurst caribou movements through the area surrounding the Ekati mine have historically occurred from July through October annually, but the timing has varied by year. Sensitivity of caribou to disturbance varies with life history and seasons. Caribou are likely most sensitive to development during the northern migration (May) when females are pregnant and need to get to the calving grounds. Similar sensitivity occurs during the initial post-calving period (June) after calves have been born and are the most vulnerable to environmental stressors (e.g., predators and weather) and highly dependent on the cow for protection and energy. Sensitivity to development likely decreases during the summer (July and August) and fall/rut period (September and October).

Results from aerial surveys indicate that Bathurst caribou tend to move through the Ekati mine area in pulses where large numbers of caribou are present for approximately two weeks (Figure 2-1). From 1998 to 2005, when the Bathurst herd size was likely greater than 100,000 individuals (Adamczewski et al. 2009), peak numbers of caribou were typically observed during July (Figure 2-2). Since then, peak caribou movements have occurred later from September to mid-October.

The first caribou arrivals of the year are typically cows on their way from the wintering grounds south of the treeline to the calving grounds near Bathurst Inlet. These caribou travel quickly, feed little, and have a clear directional movement northward regardless of lakes and most topographic features. Their presence in the Ekati mine regional study area (RSA) is typically confined to a few weeks in May. Bulls begin to arrive from the wintering grounds in July. The bulls typically move less, feed frequently, and are solitary or in small groups. Nursery groups (cows with calves) begin to arrive in July. They usually travel in groups and frequently stop for feeding, but development, large lakes, insect abundance, and other environmental factors influence their movement and behaviour. As the rut begins in late September, and as the caribou begin to leave the barren lands for the forest for winter, groups become mixed with cows and bulls. Caribou are not typically present in the Ekati RSA during winter.

Figure 2-1 Seasonal Abundance of Bathurst Caribou in the Ekati Mine Regional Study Area from Post-calving Aerial Surveys, 1998 to 2012

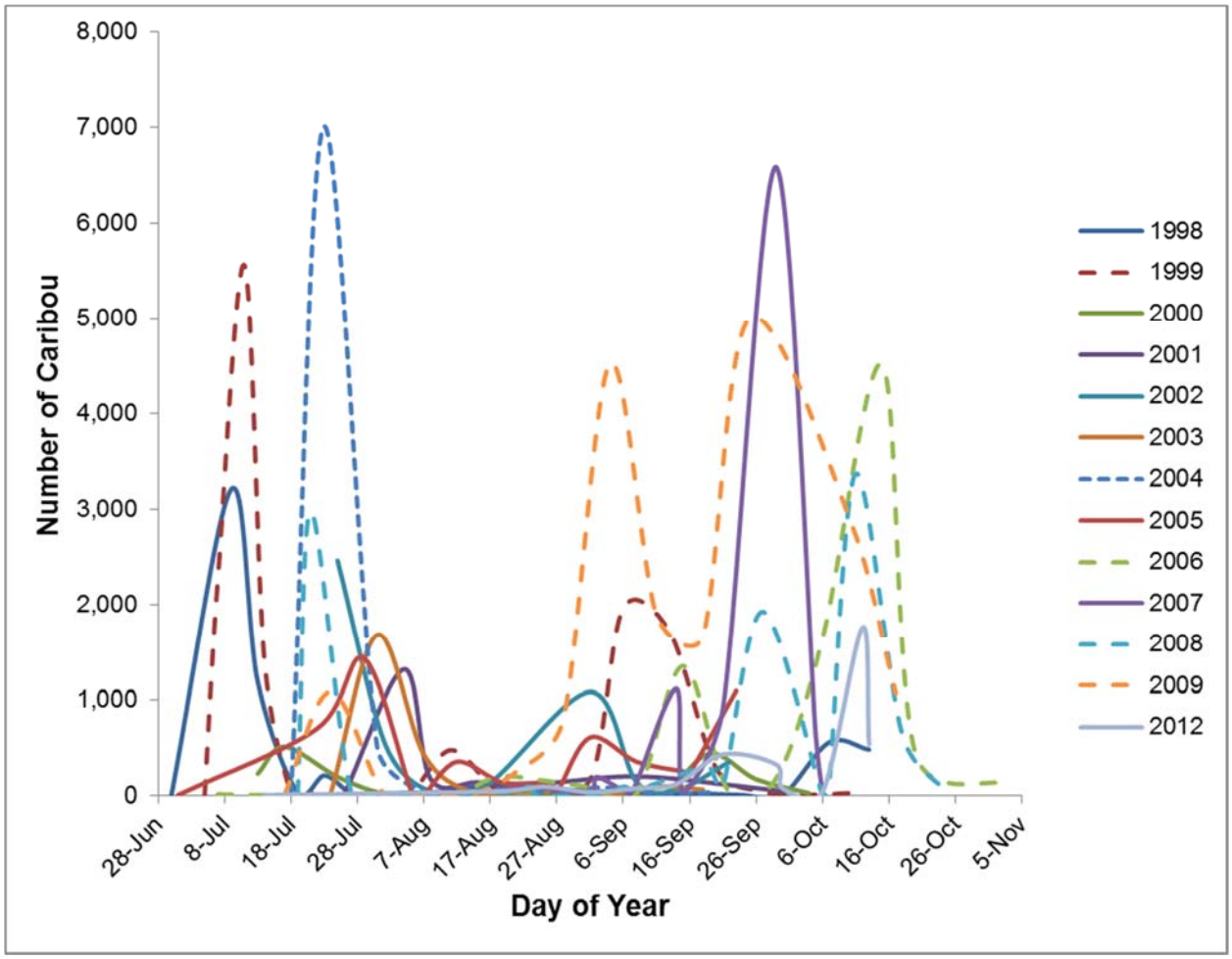
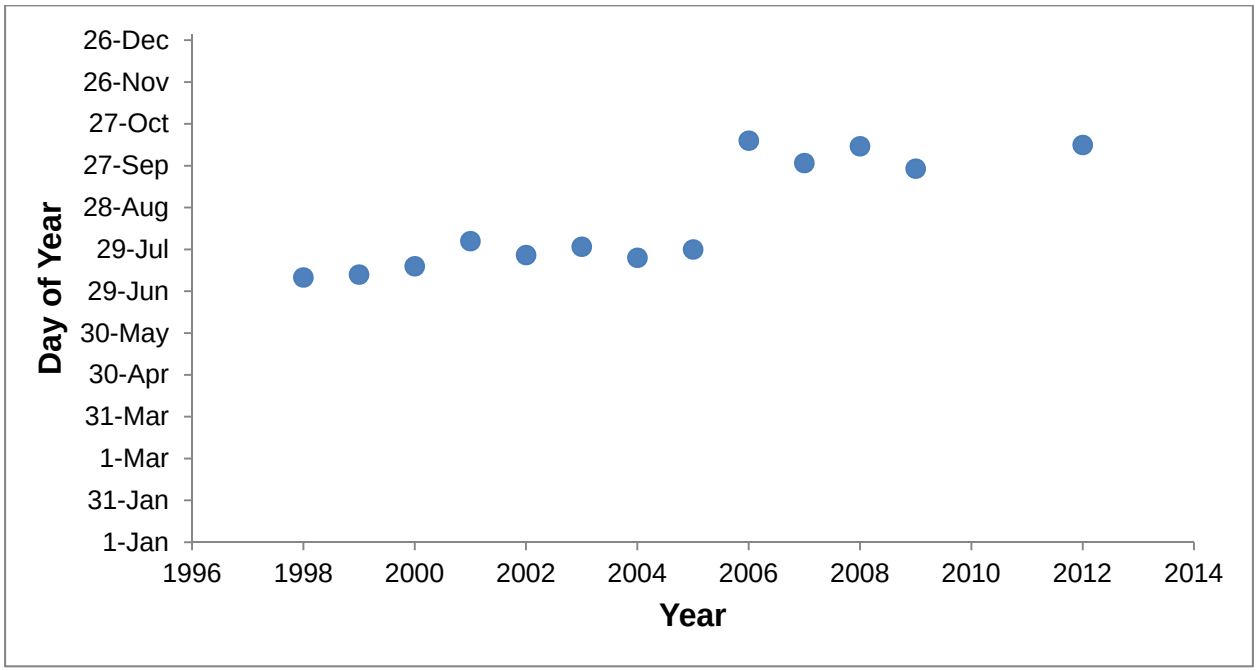
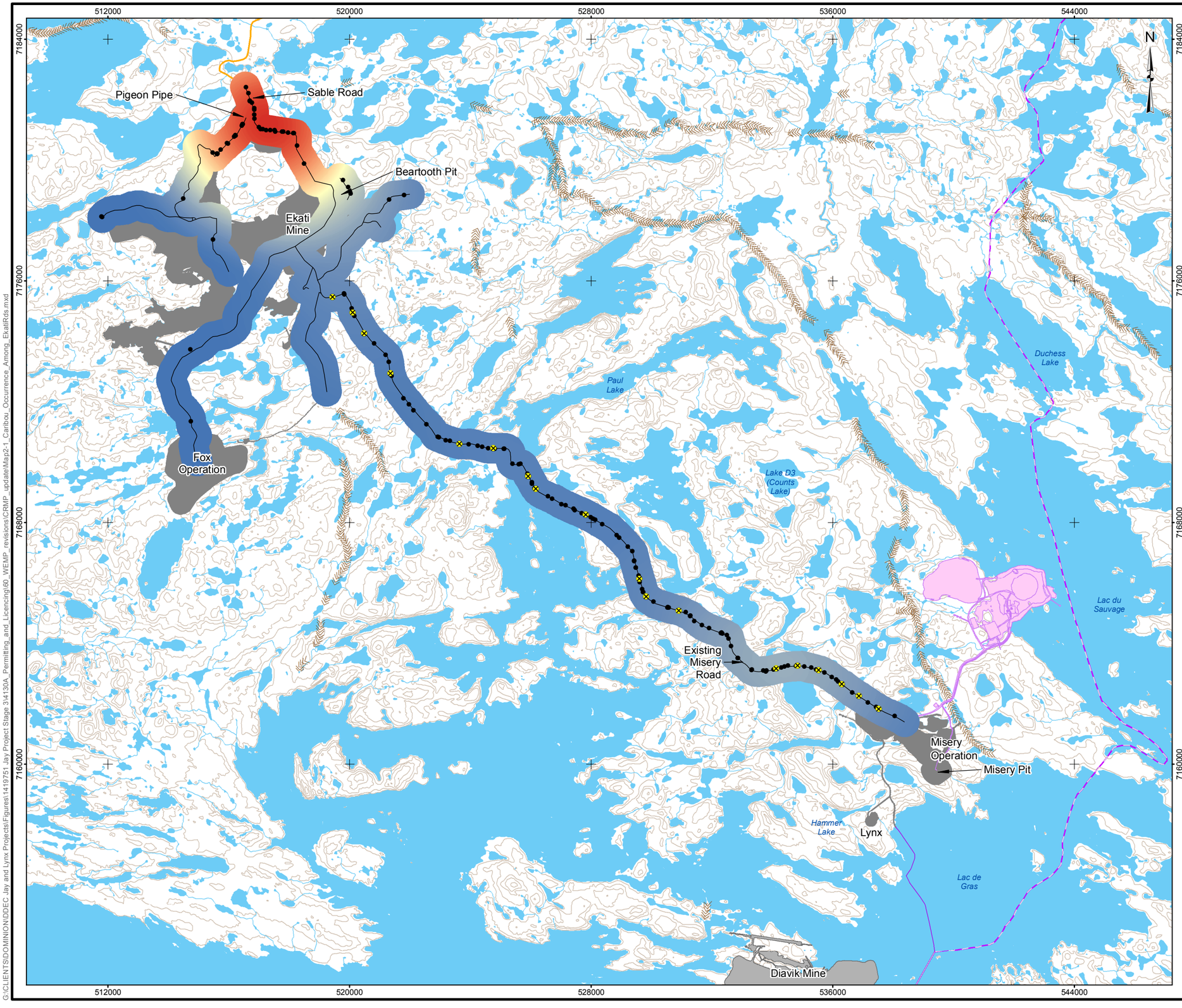


Figure 2-2 Dates of Annual Peak Abundance of Bathurst Caribou in the Ekati Mine Regional Study Area during Post-calving Aerial Surveys, 1998 to 2012



In addition to aerial survey monitoring, the Ekati mine has deployed remote cameras along mine roads to monitor caribou behaviour related to road design and traffic since 2011 (ERM Rescan 2014). Results from the camera data will also be used to inform which mine roads caribou frequently encounter, and more specifically, where on mine roads these encounters are likely to occur.

Data from mine road cameras (corrected for camera effort) from 2011 to 2013 (ERM Rescan 2014) indicate caribou most frequently encounter the existing Sable Road extension relative to other mine roads from March to November, annually (Map 2-1). Based on a 5 km search radius that considers cameras on multiple roads, caribou group densities ranged from 0.0 to 0.07 groups per square kilometre (km^2), with the highest density occurring approximately 1.7 km from the mine site on the Sable Road. A 500 metre (m) search radius was also used for each road to identify locations where caribou are likely to occur. Caribou density for Sable and Misery roads ranged from 0.0 to 1.9 and 0.0 to 0.4 caribou groups per km^2, respectively. While the Misery Road has lower group densities than the Sable Road, the camera results support the caribou crossing locations identified by Traditional Knowledge (TK) (Map 2-2). Results relative to each road will be used to guide the locations where road-specific monitoring and mitigation should be focused and most effective (Section 4).



LEGEND

- EKATI MINE FOOTPRINT
- DIAVIK MINE FOOTPRINT
- PROPOSED JAY FOOTPRINT
- SABLE ALL-SEASON ROAD
- WINTER ROAD
- TIBBITT TO CONTWOYTO WINTER ROAD
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- ELEVATION CONTOUR (10 m INTERVAL)
- ESKER
- WATERCOURSE
- WATERBODY
- CAMERA LOCATION
- MISERY ROAD CARIBOU CROSSING

CARIBOU GROUP DENSITY

MAXIMUM VALUE

MINIMUM VALUE

REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

3 0 3
SCALE 1:125,000 KILOMETRES

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
CARIBOU GROUP DENSITY AMONG EKATI MINE ROADS

Golder Associates

PROJECT 1419751.4130A.60			FILE No.	
DESIGN	DC	31/03/16	SCALE AS SHOWN	REV 0
GIS	ANK	29/04/16	MAP 2-1	
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REVIEW	JV	29/04/16		

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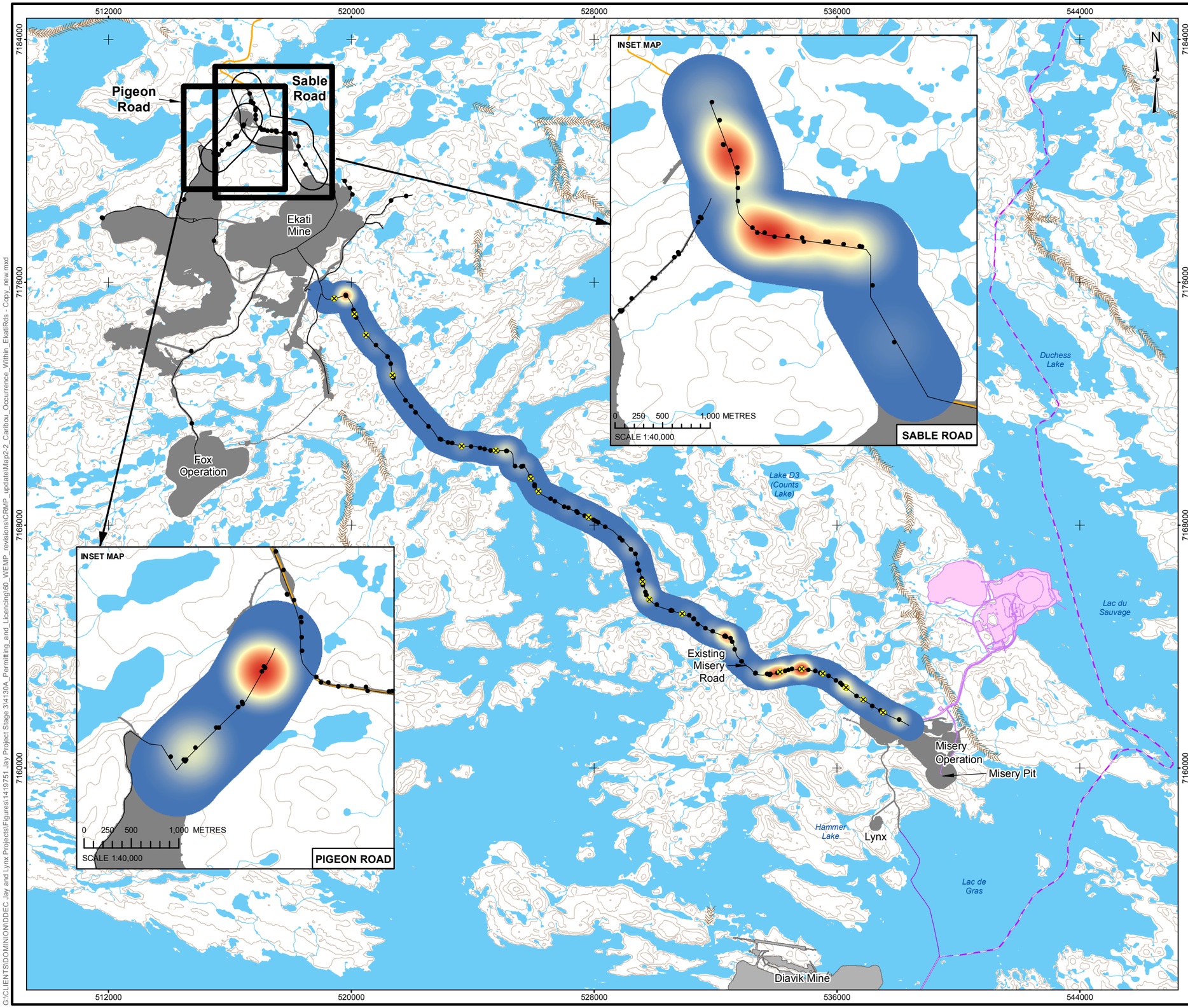

LEGEND

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- WATERCOURSE
- WATERBODY
- CAMERA LOCATION
- MISERY ROAD CARIBOU CROSSING

CARIBOU GROUP DENSITY

- MAXIMUM VALUE
- MINIMUM VALUE

REFERENCE

CANVEC © NATURAL RESOURCES CANADA, 2012
NATURAL RESOURCES CANADA, CENTRE FOR TOPOGRAPHIC INFORMATION, 2012
DATUM: NAD83 PROJECTION: UTM ZONE 12N

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SCALE 1:125,000 KILOMETRES

PROJECT
DOMINION DIAMOND™
JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE
CARIBOU GROUP DENSITY WITHIN EKATI MINE ROADS

Golder Associates

PROJECT 1419751.4130A.60			FILE No.	
DESIGN	DC	31/03/16	SCALE AS SHOWN	REV 0
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REVIEW	JV	29/04/16		

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3 COMMUNITY ENGAGEMENT AND TRADITIONAL KNOWLEDGE

Dominion Diamond's Community Engagement Plan has indicated that the Jay Road area is important for caribou movement. Increased traffic along the Misery and Jay roads, and associated power lines and pipelines that results in barriers to the movement of caribou and other wildlife the Ekati mine site is a key concern for Dominion Diamond and communities. Dominion Diamond's Community Engagement Plan will provide opportunities for communities to participate in mitigation and monitoring study designs and programs for the Jay Road, esker crossing, waste rock storage area, and other Ekati mine roads, and provide feedback on the results.

Because of the importance of the Lac du Sauvage esker for caribou movement as identified through community engagement, the portion of the Jay Road that cuts through the esker will be constructed as a caribou crossing. The pipelines will be covered with crushed rock at caribou crossings, except where there are valves or joints that require visual inspection for safe operation. Dominion Diamond will strategically construct the pipelines to reduce the number of joints or valves through the esker crossing. Most of the main section of the Jay Road will be constructed as a caribou crossing to enable caribou movement through the area (Section 4.1.1), which was identified as an important migration route by communities and baseline studies on historic trail mapping.

Dominion Diamond is committed to further integration of TK into the final design of the road. Once the road is constructed, it is expected that community members would participate in the monitoring of the effectiveness of road mitigation during visits to the Ekati mine or specifically for wildlife monitoring as described in Section 3 of the WEMP. The information from community monitoring would be used to increase road mitigation, if required, as part of adaptive management. Results from the community monitoring programs and changes resulting from adaptive management would be provided in the Ekati mine annual monitoring report.

4 MITIGATION AND MONITORING

Dominion Diamond's strategy for managing risks to caribou (and other wildlife) associated with the Jay and Misery roads is to increase mitigation and monitoring as caribou approach the Ekati mine (Figure 4-1). Four levels of mitigation and monitoring are proposed (Figure 4-2), and the intensity of mitigation and monitoring increases when specific action levels (triggers) are met (Table 4-1) including:

- Operational Level (Blue – continually);
- Level 1 (Yellow – low risk);
- Level 2 (Orange – medium risk); and,
- Level 3 (Red – high risk).

This three level approach for managing mitigation and monitoring (above the regular Operational Level) is similar to other Ekati mine operation plans (e.g., cold weather policy). This consistency will allow mine employees to understand the hierarchical structure of increasing and decreasing mitigation and monitoring in the CRMP. For example, at the Ekati mine, the Weather Advisory Procedure (PRO 1838) manages the risks associated with reduced visibility caused by adverse weather conditions, such as fog, low cloud, and blowing snow. When weather conditions have deteriorated to the point that it is difficult to determine the road edge, all non-essential vehicle traffic is restricted. When weather conditions worsen further and a whiteout occurs, all outside travel is prohibited. When visibility is reduced and caribou presence cannot be easily monitored from the ground, this procedure is in place to limit or prevent vehicle traffic in that area and avoid caribou-vehicle collisions.

Operational Level mitigation and monitoring will occur continually throughout the year and the life of the Ekati mine, and higher levels will be implemented when the associated action levels are met (Figure 4-2). For example, if Level 1 mitigation and monitoring is underway when Level 3 is triggered then there will be an immediate escalation from Level 1 to Level 3 mitigation and monitoring, and caribou observations will be compared continuously to the action levels. All mitigation from the previous lower level will be applied to the next higher level. Thus, escalation from Level 1 to Level 3 would include mitigation and monitoring in Level 2. The mitigation and monitoring for each level will continue until the trigger is no longer met. For example, the mitigation and monitoring for Level 1 will continue until caribou have moved out of the RSA, or the trigger for a higher level has been met.

Pregnant cows migrating to the calving grounds in the spring season and cows with calves during the early post-calving season are considered to be the most sensitive to mine-related impacts. The mitigation in the CRMP has been designed to provide the highest protection for caribou encountering the Ekati mine during these seasons. Most mitigations will be applied to all seasons in the same way so that caribou are given a high level of protection throughout the year. In addition, mitigation may be increased depending on the season and group composition of caribou approaching the Jay and Misery roads (Figure 4-1). The mitigations listed below are based on those that have been used at the Ekati mine over the past 18 years of mine operations. There has never been a caribou mine-related mortality resulting from a vehicle collision at the Ekati mine despite annual interaction of caribou with the mine site, particularly when the Bathurst herd was larger in size in the late 1990s. This result demonstrates that existing mitigation, such

as giving wildlife the right-of-way, signage, and road closures, is effective at avoiding caribou-vehicle collisions and limiting wildlife injury and mortalities.

Monitoring is expected to provide early detection of caribou approaching the Jay and Misery roads and to assist in managing appropriate levels of mitigation to protect caribou and other wildlife. The monitoring techniques discussed below are to be considered in sequence. Monitoring will be completed and assessed by the Environment Department and will be used to manage mitigation levels. Monitoring informs the Environment Department if action levels have been met and whether or not a change in mitigation and monitoring level is necessary through adaptive management (WEMP; Section 2.2).

Figure 4-1 Mitigation and Monitoring Intensity for Ekati Mine and Jay Project Roads

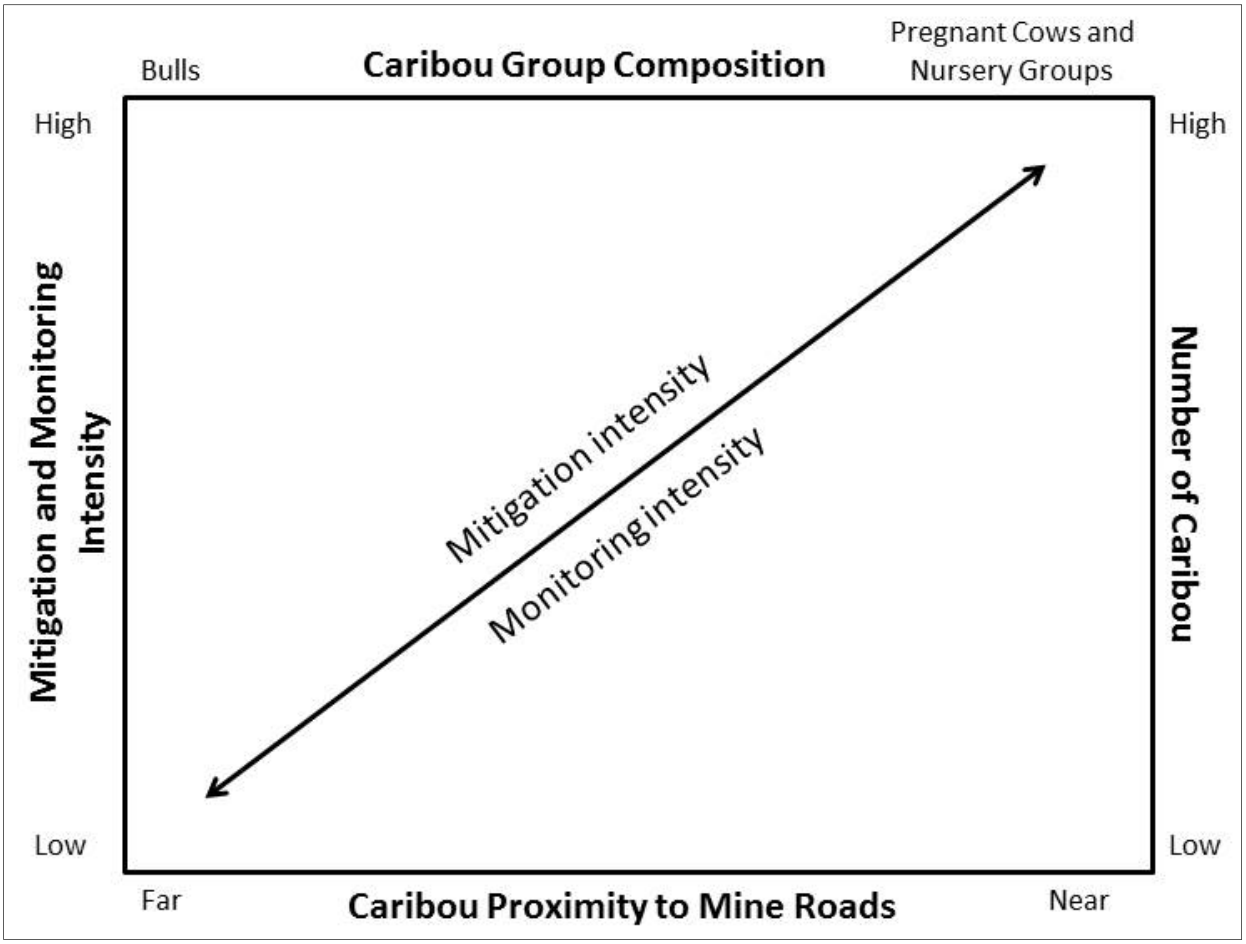


Figure 4-2 Decision Tree for Jay and Misery Roads Traffic Mitigation and Monitoring

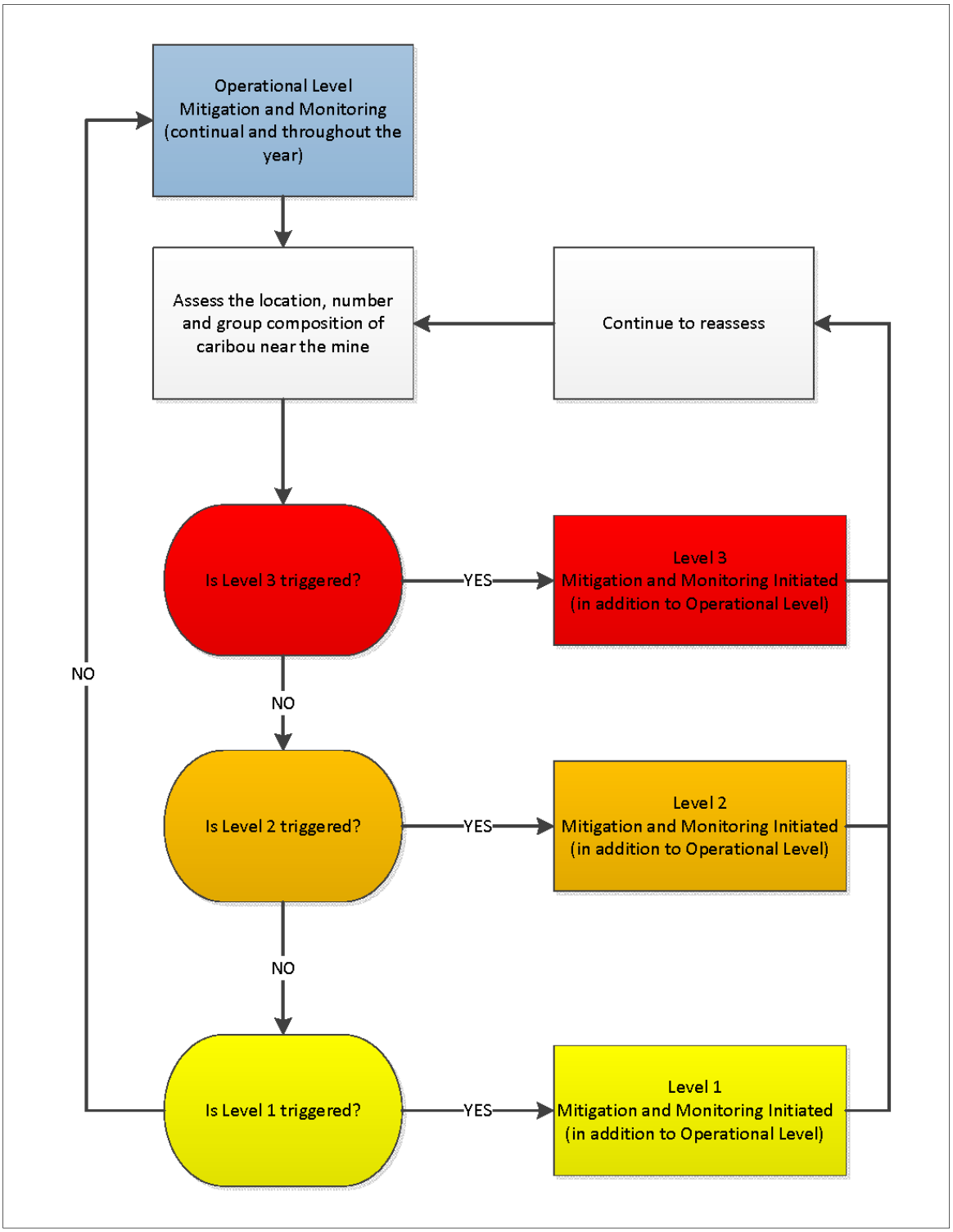


Table 4-1 Action Levels (Triggers) and Associated Caribou Road Mitigation and Monitoring for the Jay Project and Ekati Mine

Level (Alert)	Action Level (Triggers) to Initiate	Wildlife Road Mitigation	Caribou Monitoring
Operational (Blue)	• Continual and throughout the year	• Design road to incorporate caribou crossings • Employee education • Speed limits are posted • Wildlife have right-of-way on all roads • Observations of wildlife on roads will be communicated to the Environment Department and other drivers in the area • Wildlife carcasses on or near roads will be removed • Road snow berm height will be managed during winter	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and motion and infrared cameras at road and esker crossings • Weekly road surveys
1 (Yellow)	• One or more collared caribou or caribou observations within 30 km of the Ekati mine (i.e., RSA)	• Site-wide notifications of caribou approach to Ekati mine • Signage indicating caribou could be encountered (yellow alert)	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and motion and infrared cameras at road and esker crossings • Daily road surveys
2 (Orange)	• One or more collared caribou within 14 km of the Ekati mine • Caribou sightings are reported near the Misery or Jay roads	• Site-wide notifications of caribou approach to Ekati mine • Increased signage in areas where caribou might encounter the road • Signage indicating caribou are likely to be encountered (orange alert) • Speed limits will be decreased and posted	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and motion and infrared cameras at road and esker crossings • Use of thermal technology • Daily road surveys • Environment Technicians dispatched to monitor traffic and provide caribou safety
3 (Red)	• 0.25% of total cows in the Bathurst herd are within 200 m of the Jay or Misery roads during any season • One or more cow caribou are observed within 500 m of the Jay or Misery roads during the northern migration (May) • One or more caribou crossing or attempting to cross the road during any season	• Site-wide notifications of caribou approach to Ekati mine • Signage indicating caribou are highly likely to be encountered (red alert) • Short-term or long-term road closures	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and motion and infrared cameras at road and esker crossings • Daily road surveys • Environment Technicians dispatched to monitor traffic and provide caribou safety • Behavioural surveys (scan and focal sampling)

RSA = regional study area for the Ekati mine.

4.1 Operational Level (Blue)

This level of mitigation is the baseline for all higher levels, and is continuous throughout the year and life of the mine including when no collared caribou or caribou observations are recorded within the Ekati mine RSA. Many of the mitigations presented below have been applied to the Ekati mine since operations began in 1998 (BHP 2000).

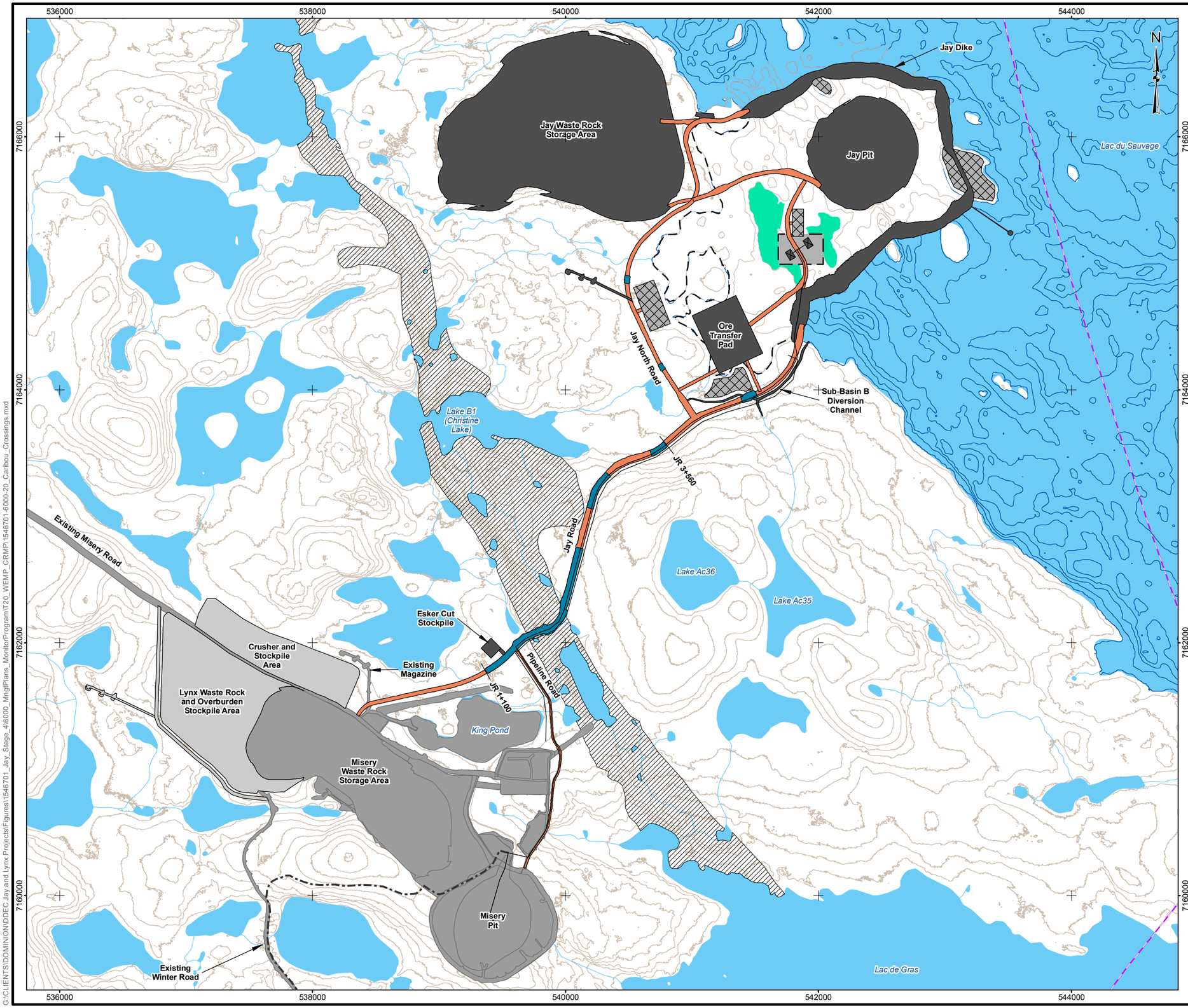
4.1.1 Mitigation

- *Design road to incorporate caribou crossings*

Dominion Diamond proposes to construct caribou crossings along the Jay Road that respect the importance of this area for caribou migration and movement as identified by community engagement and TK (Section 3). While the design of the Jay Road has not been finalized, the objective is to make the Jay Road as permeable to caribou movement as practicable (WEMP; Section 4.2.3). Caribou crossings will not be built in areas where raised safety berms are required, or at locations where there are necessary joints and valves in the pipelines that must be accessible (Dominion Diamond 2015d, Map 1-1).

The road design allows for approximately 1.8 km of caribou crossings over a total length of 2.5 km between JR1+100 (close to King Pond) and JR3+560, close to the intersection with the Jay North Road (i.e., 72 percent [%] of the road will be built with caribou crossings) (Map 4.1-1). This includes a 1.3 km stretch of road through the esker. The only two sections of the road that do not have caribou crossings (cumulatively 28% of its length) are those sections where berms are required for safety reasons, due to elevation of the road surface with respect to the adjacent ground. Given that the design accounts for the requirement to have safety berms at the intersection of the Jay and Jay North roads, this last section of the Jay Road near the intersection was not considered as available for caribou crossings. However, two additional caribou crossings will be added to the Jay North Road and one crossing will be added to the eastern section of the Jay Road towards the dike (Map 4.1-1). Caribou crossings will be designed so that the side slopes of the road are flatter and have finer crushed rock particles (6 inches or less). In the caribou crossing areas, the pipelines will also be covered with finer crushed rock. Valves and pipeline joints must be accessible and will not be covered.

Dominion Diamond is committed to further integration of TK in the construction of caribou crossings for the Jay Road, which would be incorporated into the final design of the road (Section 3). Once the road is constructed, the effectiveness of the caribou crossings will be monitored by the Environment Department and during community visits to the Ekati mine as part of adaptive management. Monitoring of the interactions between the Jay Road and caribou by communities may also be conducted. Results from this monitoring would be provided in the Ekati mine annual monitoring report.



LEGEND

- EKATI MINE FOOTPRINT (MISERY OPERATION)
- NORTHERN PORTION OF TIBBITT TO CONTWOYTO WINTER ROAD
- BATHYMETRY CONTOUR (5 m INTERVAL)
- ELEVATION CONTOUR (5 m INTERVAL)
- WATERCOURSE
- WATERBODY
- ESKER

JAY PROJECT FOOTPRINT

- CARIBOU CROSSING
- LAYDOWN AREA
- PROPOSED JAY PROJECT INFRASTRUCTURE
- PROPOSED JAY ROAD
- PUMPING SYSTEM AREA
- SUMP

LYNX PROJECT FOOTPRINT

- MISERY TO LYNX PIPELINE
- LYNX PROJECT INFRASTRUCTURE

NOTES

1. DESIGNS ARE CURRENTLY A WORK IN PROGRESS

REFERENCES

1. JAY PROJECT DETAILED DESIGN DIKE IFT DRAWING NO. 930-11-1004 ISSUED FOR TENDER ON JANUARY 15, 2016
2. JAY PROJECT DETAILED DESIGN CHANNEL IFT DRAWING NO. 940-11-4002 ISSUED FOR TENDER ON JANUARY 15, 2016
3. JAY PROJECT WASTE ROCK STORAGE AREA DESIGN REPORT DRAWING NO. 1419751-2030-40-03, DATED FEBRUARY 18, 2016
4. LIDAR AND BATHYMETRIC DATA OBTAINED FROM AURORA, 2013
5. WATER OBTAINED FROM CANVEC © NATURAL RESOURCES CANADA, 2012

DATUM: NAD83 PROJECTION: UTM ZONE 12N

500 0 500

SCALE 1:30,000 METRES

PROJECT

DOMINION DIAMOND™

JAY PROJECT
NORTHWEST TERRITORIES, CANADA

TITLE

CARIBOU CROSSINGS ALONG THE JAY ROAD AND JAY NORTH ROAD

Golder Associates

PROJECT 1546701.6000.20			FILE No.	
DESIGN	JV	30/03/16	SCALE AS SHOWN	REV 0
GIS	ANK	17/11/16		
CHECK	DC	17/11/16	MAP 4.1-1	
REVIEW	JV	17/11/16		

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- *Employee education*

The Environment Department will complete presentations to communicate the importance of mitigation (e.g., wildlife have the right-of-way and incidental sightings reporting) for the protection of caribou and information regarding caribou behaviour. Presentations will be made to the departments that use the Misery and Jay roads (i.e., Site services, Mine Operations, Logistics, Geology and Mine Technical Services, and Aviation) and distributed to other department managers to communicate the information to their employees. These presentations will be in addition to employee mine orientation training and driver training, and will be included as part of the Site Orientation for all new staff, contractors, and visitors.

- *Speed limits are posted*

Speed limits are 60 kilometres per hour (km/h) along haul roads and 20 km/h or 40 km/h on other roads. Driving slowly will give drivers more reaction time and reduces the distance required to stop. Haul truck traffic is monitored at site using Wenco.

- *Wildlife have the right-of-way on all roads*

All employees operating vehicles will be responsible for stopping for caribou and other wildlife on the Jay and Misery roads (and other Ekati mine roads). If a driver encounters wildlife or caribou on the road, they must report this to the Environment Department and Dispatch. This will allow the Environment Department to send Environment Technicians to the location to take any necessary actions, and for Dispatch to relay the message to other drivers.

Environment Technicians will proceed to the location that caribou are encountered any time a driver stops to give caribou the right-of-way. The time when the driver can resume driving will be at the discretion of the driver only until an Environment Technician arrives to take over traffic management. In situations where employees stop for wildlife and Environment Technicians are not present, drivers will use the following guidelines to determine when they can resume driving and at what speed (Table 4.1-1).

Table 4.1-1 Caribou Distance Thresholds and Speed Limits

Distance of Caribou from the Road	Speed Guideline
less than 100 m	driver to remain stopped
100 to 200 m	driver to proceed at 20 km/h
200 to 500 m	driver to proceed at 40 km/h
500 m or more	driver to proceed at 60 km/h

Employees must wait until caribou move more than 100 m from the road before vehicles can proceed at a reduced speed of 20 km/h to limit disturbing animals. This distance can be estimated accurately and quickly by drivers, and at this speed, drivers are expected to be able to safely come to a complete stop should caribou decide to change direction or behaviour. When the animal has moved more than 200 m from the road, the driver can increase his or her speed to 40 km/h. When the animal has moved more than 500 m from the road the driver can increase his or her speed to 60 km/h. It is important to note that these instructions are used to direct drivers actions until Environment personnel arrive to monitor caribou and direct the flow or stopping of traffic, which will depend partially on the current alert level (Table 4-1).

- *Observations of wildlife on roads will be communicated to the Environment Department and other drivers in the area*

This mitigation alerts other drivers and the Environment Department of wildlife presence, and is required by all employees operating a vehicle at all times. The Environment Department can respond according to the perceived threat to human or wildlife safety by issuing site-wide notifications, dispatching Environment Technicians to sections of the road, managing the movement of traffic, and/or closing roads. All incidental wildlife sightings are summarized in the Ekati mine annual monitoring report.

- *Wildlife carcasses on or near roads will be removed*

This mitigation is intended to reduce the presence of predators and scavengers near roads. It is expected that all employees will report wildlife carcasses to the Environment Department for removal. The Environment Department reports all wildlife mortalities at site to the Environment and Natural Resources (ENR) department of the GNWT and receives direction from ENR regarding disposal. Dominion Diamond will not chase any wildlife off a kill but will wait for wildlife to finish with the kill before moving the carcass. All wildlife mortalities that occur at the Ekati mine and details regarding carcass removal (e.g., distance carcass was moved from the road) will be provided in the Ekati mine annual monitoring report.

- *Road snow berm height will be managed during winter*

During winter, snow berms present along roads will be reduced to provide safe driving conditions, improve visibility and reduce the berms as obstacles for migrating caribou. Results from monitoring at the Misery Road during the spring migration of Bathurst caribou indicated that snow berm heights may influence movements of caribou (Rescan 2011). The results indicated that caribou crossed roads when berms were 0.5 m high or less and deflected when berms were at least 1.6 m high. Snow berms along the Misery and Jay roads will be maintained at a height less than 1.6 m, where practicable. However, the grader used to manage snow will likely clear snow closer to a height of 1 m.

4.1.2 Monitoring

Operational monitoring will include reviewing the locations of collared Bathurst caribou, incidental sightings of wildlife, and weekly road surveys, behavioural observations and motion and infrared camera traps at road and esker crossing, and the results will be documented in the Ekati mine annual monitoring report.

- *Collared caribou monitoring*

Monitoring the location of collared caribou cows is useful for predicting the overall movements of the Bathurst herd. Recent analyses completed for the Diavik Diamond Mine found a significant negative correlation between the number of caribou counted during aerial surveys and the mean distance of collared caribou locations from the study area during both migration periods (Golder 2011). This relationship indicates that when more caribou were observed during a survey, the mean distance of collar locations to the study area decreased (i.e., the collared animals were closer to the mine on average when higher numbers of caribou were counted during aerial surveys).

Through the CMP, Dominion Diamond is providing funding for 50 geo-fenced collars to provide Ekati-specific information on caribou movement. The location of collared caribou provided by ENR will be

monitored to determine the proximity of caribou relative to the Ekati mine. This monitoring will occur year-round and will be used to inform the Environment Department if a change in mitigation level is necessary.

- *Incidental wildlife sightings*

Ekati mine employees are required to report all incidental wildlife sightings to the Environment Department, which are recorded in an Incidental Wildlife Sightings log. Incidental wildlife sightings reported by site staff allows the Environment Department to understand areas where wildlife are present or of high use so that mitigation can be adaptively managed.

- *Behavioural Monitoring*

For all alert levels, the responses of caribou to crossings along the roads and at the esker will be monitored. Scan and focal sampling (Section 4.4.2) will occur at all alert levels, depending on the opportunity to collect data.

- *Camera Trapping*

Camera trapping refers to the use of remotely triggered cameras that automatically record images that move in front of them, up to a maximum distance (Rovero and Marshall 2009). Most cameras are triggered by a passive infrared sensor detecting a moving object warmer than the ambient temperature such as animals, people, and vehicles. Camera traps will be deployed at the esker crossing and other crossings along the Jay and Misery roads. The information will be used to determine the effectiveness of mitigation (e.g., slowing and stopping traffic) on limiting the barrier effect of roads to caribou movement, and provide feedback for adaptive management (WEMP; Section 2.2).

- *Weekly road surveys*

Road surveys will be completed by truck along the Jay and Misery roads to determine the location and numbers of caribou as they approach the Ekati mine. Environment personnel surveying the roads will allow for more proactive implementation of mitigation. The frequency of surveys will begin at one per week and will become more frequent as higher action levels are met.

4.2 Level 1 (Yellow)

This level of mitigation and monitoring is triggered when one or more caribou are observed within 30 km from the Ekati mine (i.e., within the Ekati RSA). Mitigation at this level is to provide a heightened awareness to Ekati mine employees that caribou may be encountered near or on the mine site.

4.2.1 Mitigation

- *Site-wide notifications of caribou approaching the Ekati mine*

Notifications are communicated through site-wide email, during morning safety meetings or department-specific radio channels by the Environment Department. Notification will include signage alerting drivers departing on the Jay and Misery roads that migrating caribou are approaching the Ekati mine.

- *Signage indicating caribou could be encountered (yellow alert)*

The Environment Department will post yellow (Level 1) alert signs for drivers that caribou could be encountered in the area. This provides drivers with reminders to be vigilant. Signs will be posted at entry points of the Jay and Misery roads. All drivers will be notified at the beginning of their shift the alert level the mine is currently at and provided with maps of any recent incidental caribou sightings. These maps will include recent observations and information of where caribou have historically been encountered along the road. A summary map of these data will be provided to all interested parties (e.g., communities and regulators) in the Ekati mine annual monitoring report.

4.2.2 Monitoring

Level 1 monitoring will include all of the monitoring in the Operational Level; however, the frequency of road surveys will be increased from weekly to daily surveys. The frequency of yellow alert level, and all observations from additional road surveys will be documented in the Ekati mine annual monitoring report.

4.3 Level 2 (Orange)

This level of mitigation occurs when one or more collared caribou or caribou observations occur within 14 km of the Ekati mine (i.e., within the predicted ZOI for changes in caribou distribution) or if caribou sightings are reported near the Misery or Jay roads. Mitigations are intended to reduce sensory disturbance from roads and traffic on approaching caribou (i.e., within 14 km of the mine), and the perception by caribou that roads and vehicles are a barrier to movement.

4.3.1 Mitigation

- *Signage indicating caribou are likely to be encountered (orange alert)*

The alert signs posted in Level 1 Mitigation will change from yellow (Level 1) to orange alert (Level 2). All drivers will be notified at the beginning of their shift the level the mine is currently at and provided with maps indicating areas of the road they are most likely to encounter caribou.

- *Increased signage in areas where caribou might encounter the road*

The Environment Department will post alert signs at key sections of the roads to warn drivers that caribou are approaching the mine. This will remind drivers to slow down if caribou are seen 100 m to 500 m from the road (speed reduction depends on the distance interval) or stop if and when required (Table 4.1-1). The location of the signs will be based on incidental caribou observations, camera trapping data (Section 2) and TK. Together these data will be used to update the map distributed to divers and the location of alert signs along roads. Focusing mitigation efforts near sections of the roads that have a high likelihood of caribou encounters is practical, particularly when visibility is restricted due to darkness and/or poor weather conditions (e.g., fog, blizzards), and monitoring of approaching animals at intermediate distances is difficult (Section 4.3.2).

- *Speed limits will be decreased and posted*

The maximum speed limit on portions of the Misery haul road is 60 km/h. Speed limits will be decreased to 40 km/h along sections of the Jay or Misery roads when caribou groups are observed 200 m to 500 m from the road (Table 4.1-1). When caribou are observed 100 m to 200 m of the road, the speed limit will be decreased to 20 km/h. Vehicles are to stop and remain stopped when caribou are within 100 m of the road. The length and section of the road, and duration of the speed limit decrease will

be determined by the Environment Department. Speed limits will apply to all vehicles. Wildlife will continue to have the right-of-way during speed limit reductions.

4.3.2 Monitoring

Level 2 monitoring will include all of the monitoring in Level 1, and additional monitoring listed below. The number of orange alert level, the road, frequency, duration and length of road segments of speed limit reductions will be documented in the annual monitoring report.

The detection of caribou approaching the Ekati mine at intermediate distances is technically challenging. Through the CRMP, Dominion Diamond is providing funding for 50 geo-fenced collars to provide Ekati-specific information on caribou movement, which is anticipated to provide a collar location every hour within 14 km of the mine. In addition to radio-collar monitoring, Dominion Diamond is also exploring a number of different options for detecting and monitoring caribou before caribou would be detected by specific road surveys or drivers. This includes scans for caribou using thermal imaging technology at high probability of encounter points along roads identified from incidental caribou observations, camera trapping data, and TK (Section 4.3.1). Thermal imaging technology will facilitate detection of caribou when visibility is reduced (e.g., darkness).

The GNWT (2015) also recognizes that the detection of approaching caribou is a logistical challenge for applying protective measures, and that pilot studies into technologies and approaches (e.g., unmanned aerial vehicles, large animal detection systems and on-the-land monitors) is a legitimate research direction. To fit within the objective of reducing the ZOI, these methods and approaches should result in no sensory disturbance on caribou. Funding from the Caribou Monitoring Strategies/Plan component of the CMP could be directed towards such pilot studies. Selection and implementation of techniques for detecting caribou approaching the Ekati mine at intermediate distances would involve engagement with communities, GNWT, and IEMA.

- *Environment Technicians dispatched to monitor traffic and provide caribou safety*

Environment Technicians will be dispatched to the location of any caribou observations along the roads to monitor and adaptively manage traffic to protect caribou. Technicians will also be present during speed limit reductions to monitor traffic and enforce compliance. Descriptions and photos of locations where caribou crossed or were deflected by roads will be used to provide feedback for adaptive management of mitigations.

4.4 Level 3 (Red)

This level of mitigation and monitoring will be triggered when 0.25% or more of total cows in the Bathurst herd are within 200 m of the Misery or Jay roads (i.e., the maximum stopping distance of a loaded haul truck travelling 60 km/h), or one or more caribou are crossing or attempting to cross the Misery or Jay roads. The trigger will be calculated based on the abundance estimates provided by ENR following photo census or calf recruitment (reconnaissance) surveys. The trigger for the number of total cows in the Bathurst herd will be set at the lowest number obtained for the most recent photo census survey or calf recruitment survey. The use of a percentage allows the absolute number of caribou representing the trigger to vary with herd size (i.e., this number is more conservative when the herd is at lower abundance). During the northern migration when cows are most sensitive to disturbance and caribou movement is more directional and predictable, short-term closures will occur when a single cow is within

500 m of the Misery or Jay roads and their direction of travel indicates they will encounter a road. Mitigations are intended to avoid and limit the following effects to caribou:

- risk of caribou mortalities from vehicles;
- the barrier to movement and migration from the Jay and Misery roads; and,
- sensory disturbance from roads and traffic on caribou behaviour (and associated adverse changes in energetics and reproduction).

4.4.1 Mitigation

- *Signage indicating caribou are highly likely to be encountered (red alert)*

The alert signs posted in Level 2 Mitigation will be change from orange (Level 2) to red alert (Level 3). All drivers will be notified at the beginning of their shift the level the mine is currently at and provided with maps of any recent incidental caribou sightings.

- *Short-term or long-term road closures*

A road closure will always be initiated in any season if the criterion of 0.25% of total cows in the Bathurst herd is within 200 m of the Jay or Misery roads (as determined by the lowest number between the most recent ENR photo census or calf recruitment survey). Road closures will further reduce sensory disturbance and maximize the time interval between vehicles. Short-term closures will involve closing sections of the road from one minute to six hours. Long-term closures will involve closing the entire Jay and/or Misery roads for at least six hours. Whether a long-term or short-term road closure is required will be determined by the Environment Department and will depend on the number, group composition and behaviour of caribou near the road.

Road closures will also occur at numbers lower than and distances further than the trigger based on the discretion of the Environment Department. This discretion includes but is not limited to the following:

- if the composition of caribou groups is primarily cows with calves;
- if lower numbers of caribou are within 200 m of the Misery or Jay roads;
- if caribou are exhibiting signs of sensory disturbance; and,
- it is anticipated that the caribou intend to cross the road.

During the northern migration (May), when caribou movement is directional, more predictable and cows are most sensitive to disturbance, short-term closures will occur when a single cow is within 500 m of the roads and their direction of travel indicates they could encounter a road (Table 4-1). Any additional mitigation efforts will focus on increasing the permeability of roads and infrastructure (proactive road closure). Road closures may be required during periods of darkness if road closures or speed limit reductions have been triggered throughout the day. This decision will be at the discretion of the Environment Department. Other caribou monitoring options (e.g., infrared cameras) will be considered during this time.

During the post calving to fall/rut period, caribou tend to be more sedentary, moving to find food, and avoid insects and predators. During this period, mitigation can be applied on a case-by-case basis. For example, mitigation will focus on limiting sensory disturbance (energetic cost) when caribou are observed feeding adjacent to roads. Mitigation would switch to road closure or other traffic modifications should it be anticipated that caribou intend to cross or use the road for other purposes.

Dominion Diamond will construct kimberlite stockpile areas so that the Jay Project can continue to operate throughout road closures. If a road closure is triggered for longer than the kimberlite stockpiles can sustain, the road will remain closed to protect caribou.

Dominion Diamond has proposed to use long-haul trucks (referred to as road trains) instead of individual haul trucks and in place of using pilot vehicles and convoys. A long-haul road train includes a single cab with three trailers in tow and a capacity of 216 tonnes. Use of a single cab produces less noise and lower emissions than a multi-truck convoy while carrying a similar load. Mitigation includes the use of road closures, which maximize the time interval between vehicles.

4.4.2 Monitoring

Level 3 monitoring will include all of the monitoring in Level 2, with the additional allocation of Environment staff so that behavioural monitoring and mitigation can be appropriately managed. The frequency of red alert level, and all survey data will be documented in the Ekati mine annual monitoring report.

- *Behavioural surveys (scan and focal sampling)*

Ground-based scan and focal sampling from the road will be initiated to document caribou response to stressors (e.g., haul trucks). Behavioural monitoring of caribou will allow the Environment Department to understand how caribou behaviour changes with distance to the road and in response to industrial stressors so that mitigation can be adaptively managed (e.g., modification to distance triggers for vehicle speed reductions and road closures). The allocation of additional Environment staff will increase the likelihood that monitors can complete behavioural surveys, while mitigation actions are still being actively managed. Environment staff will remain with observed caribou until the caribou are no longer visible from the road even if the behaviour monitoring has been completed.

4.5 Roles and Responsibilities

To limit road effects to caribou it is necessary to define all of the mine staff roles and responsibilities with respect to operating vehicles on the mine roads (Table 4.5-1).

Table 4.5-1 Ekati Mine Employee Caribou Road Mitigation Plan Roles and Responsibilities

Job Title	Responsibility
Superintendent Mining	• Ensure training is provided for site personnel • Hold all employees accountable for complying with all Environment commitments and policies • Incorporate CRMP components into the site Traffic Management Plan
Superintendent Environment	• Owner of the CRMP • Ensure resources are available to establish, implement, execute, and maintain mitigation and monitoring • Responsible for overseeing the review and update of the CRMP

Table 4.5-1 Ekati Mine Employee Caribou Road Mitigation Plan Roles and Responsibilities

Job Title	Responsibility
Wildlife Advisor	• Design monitoring programs, verify that monitoring and mitigations are planned and executed, review data, and adapt programs as required • Complete annual reporting and engagement • Provide expertise and support to operations teams • Responsible for implementing the CRMP, and completing the review and any updates
Environment Technician	• Understand procedures, execute the CRMP action levels and complete monitoring and mitigations as outlined
All Employees	• Report all wildlife and act in a manner that will protect all wildlife, except where it could affect personal safety • Obey all posted speed limits and rules of the road and give wildlife the right-of-way on all roads • Understand and follow CRMP procedures and act in accordance with Dominion Diamond's Environmental Standards and Policies

CRMP = Caribou Road Mitigation Plan.

5 REPORTING

In accordance with the principles of adaptive management, changes to the CRMP will likely occur as monitoring results are analyzed and assessed over time (WEMP; Section 2.2). Mitigation and monitoring efforts related to the CRMP will be documented and analyzed in the Ekati mine annual monitoring report and will include the following information:

- incidental sightings of caribou and other wildlife, and results of road surveys;
- number and duration of blue, yellow, orange, and red alert levels, and reasons for triggering change in alert levels;
- the location (road), frequency, duration, and length of road segments of speed limit reductions;
- the location (road), frequency, and duration of road closures; and,
- results from focal and scanning behavioural surveys.

During the October 16, 2015 workshop for the CMP, a request was made to provide interim reporting on the effectiveness of the CRMP following its initial implementation, and would be stand alone from the annual monitoring report. During the first year of implementation of the CRMP, interim reports would likely be available in January following the post-calving to fall/rut period. Subsequently presentation of the results from the CRMP will occur regularly in the annual monitoring report. If negative effects are detected (e.g., caribou-vehicle collisions, failed crossing attempts, inadequate signage), the actions available to Dominion Diamond include the following:

- increase monitoring effort;
- implement special studies to further understand the effects; and/or,
- implement additional mitigation to further reduce the effects.

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DOMINION DIAMOND

ATTACHMENT I

REVIEWER RECOMMENDATIONS AND PROPONENT RESPONSES

December 2016

Table I-1: Caribou Road Mitigation Plan Reviewer Recommendations and Proponent Responses

CRMP Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
Wildlife Road Mitigation Plan should be changed to Caribou Road Mitigation Plan.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Chuck Hubert (MVEIRB)	Now titled Caribou Road Mitigation Plan (CRMP).	Entire document
The CRMP should be incorporated into the WEMP.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Chuck Hubert (MVEIRB)	Incorporated into the WEMP as an Appendix.	Entire document
An objective that is related to sensory disturbance should be added.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	A sensory disturbance objective was added.	Section 1.2
Non-caribou mitigation should be removed and kept in the WEMP.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	Non-caribou mitigation was removed from the CRMP and will be addressed in the WEMP.	Entire document
The colour green should not be used to represent Mitigation Level 1.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Anne Gunn (Technical Advisor, MVEIRB)	Operation Level Mitigation and Monitoring was changed to Blue in the CRMP Decision Tree diagram.	Figure 4-2 and Section 4.1
The plan should have a diagram that shows how all the management plans are linked together	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kevin O'Reilly (IEMA)	A diagram showing linkage between management plans was reviewed at the September 13, 2016 WEMP and CRMP workshop. Dominion is currently revising this diagram, which will be incorporated into the WEMP in a future revision. A revision for this comment was not required.	n/a
The roles and responsibilities of who will be making the decisions about each aspect of the plan should be clarified.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	Roles and Responsibilities section was added to the CRMP.	Section 4.5
The signage system should reflect presence of caribou instead of the likelihood of caribou. The most effective traffic management signs are those that give immediate feedback.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kevin O'Reilly (IEMA)	The intent of signage is to make drivers more vigilant of the potential for caribou to be present and to reduce risk of caribou-vehicle interaction. A revision for this comment was not required.	n/a
A map of the road with features such as stockpile locations should be included in the next version.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Chuck Hubert (MVEIRB)	Map 4.1-1 has been updated with Project features and will continue to be updated as new information is available.	Section 4.1.1
Drivers should be educated about caribou.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	Employee education is included in the mitigation for Operational Level (blue). This includes presentations to communicate the importance of mitigation for the protection of caribou and information regarding caribou behaviour and is in addition to employee mine orientation and driver training.	Section 4.1.1
There are a lot of distances threshold that need to be justified.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	Included basis of distance thresholds.	Section 4.1.1
There should be a better explanation of how this mitigation relates to the WEMP.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kate Mansfield (MVEIRB)	This has been clarified in the objectives of the CRMP. The CRMP will be included as an Appendix to the WEMP.	Section 1.2
Snow berms should be maintained at 0.5 - 1 m (based on wildlife monitoring at Ekati) and should not be above 1 m in height.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	Snow berms along the Misery and Jay roads will be maintained at a height less than 1.6 m where practicable. The grader used to manage snow will likely clear snow closer to a 1 m height. Text was added to clarify this.	Section 4.1.1
Mitigation levels 2 and 3 should be combined.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kim Poole (IEMA)	There is now an Operational Level and three additional levels beyond what will be completed at all times of the year.	Section 4
There should not be a distinction between the mitigation and monitoring sections. They should be combined under each of the Levels.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Kevin O'Reilly (IEMA)	The mitigation and monitoring sections have been combined and organized by level.	Section 4
The trigger numbers for caribou to trigger road closure seem very high. With the herd in its current state, the trigger should be adjusted to represent 1% of the current population.	Jay Project Wildlife Road Mitigation Plan Workshop	22-May-15	Mark d'Entremont	Trigger was changed to 0.25% of the herd but may be closed at lower levels. How this trigger will be determined was also added to the report.	Table 4-1, Section 4.4
A map with the current caribou crossing identified should be added to this plan.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Kevin O'Reilly (IEMA)	A map of the most up-to-date caribou crossing designs for the Jay Road has been added to the CRMP.	Map 4.1-1
More information regarding the traffic numbers on the Jay Road should be added to this plan.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Kim Poole (IEMA)	Traffic information was added and reference was made to Appendix C: Traffic Associated with the Jay Project.	Section 1.1
Drivers should be provided with maps showing where caribou have been sighted.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Peter Unger (LKDFN)	This was added to Level 1 (Yellow) mitigation.	Section 4.2.1

CRMP Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
There is no reference to dust management in this plan and it should be included.	Jay Project Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	25-Jun-15	Anne Gunn (Technical Advisor, MVEIRB)	Reference was made to the Air Quality and Emissions Management and Monitoring Plan (AQEMMP).	Section 1.2
The CRMP states that "(given 56 round trips per day by long-haul trucks) there would be an average of 12 minutes between trucks" (pg. 1-1). This statement does not consider the other traffic (bulk explosives trucks, crew transport vehicles, road maintenance equipment, garbage trucks, low-bed trucks to transport larger equipment, water trucks, emergency vehicles, and light vehicles). Therefore, the non-winter season road truck traffic should be about 160-210 passages (7-9 minute spacing if even distribution). DDEC should clearly provide information on all vehicles and vehicle spacing.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Dominion Diamond provided traffic information including seasonal traffic, vehicle type, spacing and number of round trips in Appendix C, April 2015. A revision for this comment was not required.	n/a
The CRMP states "caribou are likely most sensitive to development during the northern migration (May) when females are pregnant and need to get to the calving grounds" (pg 2-1) Depending on how you define "most sensitive", this statement is likely not true. During migration caribou movement through an area is rapid and directional, and displacement from migration is likely less that would occur when caribou are more sedentary during the summer and fall, and when cows with calves are present during the early postcalving season. This is similar reasoning to why the zone of influence monitoring dropped the northern migration (Handley 2010). DDEC should revise this statement or provide supporting references.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	While post-calving has been identified as a period of sensitivity for caribou exposed to development disturbance, disturbance effects may have a more pronounced effect on caribou recruitment if pregnant cows cannot reach calving grounds to give birth with other females in the herd. The proposed trigger is designed for adaptive management of road mitigation and the protection of caribou. The objective of aerial surveys is to monitor indirect effects of development on caribou distribution and abundance, and the spring survey was discontinued because results were deemed not adequate to detect effects (caribou moved too quickly through the study area). A revision for this comment was not required.	n/a
This is an interesting and informative figure depicting relative distribution/density of caribou sightings from camera data. However, since the Fox road has only 2 cameras on it at widely spaced intervals, how could density be calculated along this road? This comment also refers to other roads on the map with few to no cameras. DDEC should clarify in the methods how roads with few to no camera are assigned relative caribou densities.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Methods describing that a search radius were used to generate caribou group density distributions for Mine roads was provided on CRMP page 2-3. The approach used is appropriate to evaluate likely places where caribou may interact with roads to inform where mitigation may be most effective to protect caribou.	Section 2
The CRMP states that "Once the road is constructed, the effectiveness of the caribou crossings will be monitored by the Environment Department" (pg 4-5), but provides no details on how effectiveness (better termed permeability) will be measured. DDEC should clarify in the methods effectiveness of the caribou crossings will be determined.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Approach is to assume that caribou on roads or at edge of roads intend to cross, which is reasonable. Mitigation will be applied under this assumption and whether caribou cross when mitigation is applied will be monitored (e.g., installing caribou crossings, and reducing vehicle speeds, and stopping vehicles as caribou approach road). A revision for this comment was not required. Dominion Diamond will provide additional detail on methods for determining crossing success and mitigation effectiveness in future documentation. A revision for this comment was not required.	n/a
The CRMP states that "Snow berms along the Misery and Jay roads will be maintained at a height less than 1.6 m, where practicable." (pg 4-8). However, since results indicated that caribou crossed roads when berms were 0.5 m high or less and deflected when berms were at least 1.6 m high, why just aim for the 100% deflection level at 1.6 m? DDEC should modify their snow bank criteria to encourage caribou crossings during the snow period.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Snow berms along the Misery and Jay roads will be maintained at a height less than 1.6 m where practicable. The grader used to manage snow will likely clear snow closer to a 1 m height. Text was added to clarify this.	Section 4.1.1
At the Operational level and Levels 1 and 2 there remains a large gap between collar monitoring (with no indication how frequently ENR will be able to provide collar locations to DDEC and how dated those locations will be) and road monitoring, which is effective only out to hundreds of metres, perhaps 600-800 m at most (pg 4-8). Mid-distance monitoring, admittedly technically challenging, is not adequately covered, but this uncertainty should be compensated for by application of more protective mitigation. DDEC should consider a temporal consideration to the collar data for triggering levels. For example, if collared caribou are moving towards the mine and are 35 km away but the location data is 2-3 days old, then there is an increased likelihood that the animals would be <30 or <14 km from site, which would trigger a higher level of mitigation and monitoring beyond waiting for the next (dated) set of collar data.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	A 30 km trigger is consistent with the regional study area boundary, which is larger than predicted indirect effects. A revision for this comment was not required. Dominion Diamond will consider a review seasonal movement rates to determine an appropriate distance threshold. A revision for this comment was not required.	n/a
Monitoring (pg 4-10) will be increased from weekly to bi-weekly, but this is totally inadequate for meaningful monitoring by Environment staff when caribou collars are known to be within 30 km of the mine. This should be changed to daily at a minimum (as was proposed in the June 2015 version of the CRMP).	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Road surveys at Level 1 were changed from bi-weekly to daily.	Table 4-1, Section 4.2.2

CRMP Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
DDEC should establish at minimum daily road monitoring by Environment staff when caribou are triggered to Level 1.					
"Mitigations are intended to reduce sensory disturbance from roads and traffic on approaching caribou (i.e., within 14 km of the mine), and the perception that roads and vehicles are a barrier to movement." Why is the word "perception" given here? Mitigation is intended to reduce real potential impacts to caribou attempting to cross Ekati roads, not to deal with the perception of these impacts. DDEC should reword this section, for example ", and to reduce the semi- permeable barrier effect of the roads and vehicles to movement".	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Dominion Diamond has revised the text to clarify this is in reference to the perception of roads as barriers by caribou and not perception about effects by people.	Section 4.3
This section (pg 4-10) mentions actions will be taken when "caribou nursery groups" are observed at 200-500 m but only when "caribou" are observed at 100-200 m. The reason for the differentiation between nursery groups and all caribou in this sentence is unclear. Given that drivers may be making their own decisions without Environment staff present, and all truck drivers may not be experienced at caribou classification, we suggest that the reference to nursery groups be removed. DDEC should remove the reference to nursery groups in this section.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Reference to nursery groups was removed so the trigger applies to all caribou as suggested by IEMA.	Section 4.3.1
Thirty cows (0.25% of the current approx. 12,000 cow estimate) within 200 m of a road are required to trigger Level 3 outside of the northern migration, but only 1 cow within 500 m of a road is required for northern migration. Given that caribou can cover hundreds of metres in minutes and that cow-calf pairs during post-calving are highly sensitive to disturbance, the reason for the disparity between these 2 triggers is unclear. The focus on this section appears to be on stopping distance and injury/mortality, rather than reductions in sensory disturbance. DDEC should propose enhanced mitigation when 0.25% of the cows are is within 500 m of the road outside of the northern migration.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	While post-calving has been identified as a period of sensitivity for caribou exposed to development disturbance, disturbance effects may have a more pronounced effect on caribou recruitment if pregnant cows cannot reach calving grounds to give birth with other females in the herd. The proposed trigger is designed for adaptive management of road mitigation and the protection of caribou. The objective of aerial surveys is to monitor indirect effects of development on caribou distribution and abundance, and the spring survey was discontinued because results were deemed not adequate to detect effects (caribou moved too quickly through the study area). A revision for this comment was not required.	n/a
While letting leaders pass is an essential idea repeated many times over the years by Elders, in practice it will be difficult to ensure this occurs when the caribou are not rapidly migrating. The solution may be to ensure predictable breaks in the traffic which will reduce sensory disturbance and allow or encourage those caribou who are trying to cross the road to actually make their move. There are no details on methods to convoy vehicles to allow more breaks in traffic when short or long-term road closures are not imposed. Systematic breaks in traffic or convoying are a means to safeguard caribou and provide a predictable ore flow and rate of mill feed. When more than 10 caribou are known to be present within 500 m of the road alignments, regularly scheduled breaks in all traffic for 20 minutes every 2 hours may be effective. Similarly, when caribou are detected stopping times should be considered to provide an opportunity for caribou to cross, as suggested in the following table (from Agency response to Undertaking #9): Table 1. Agency Proposal for caribou distance thresholds, criteria for resuming traffic speed limits and duration of the stop. **Distance of Caribou from the Road** / **Calving, Post-calving and Fall (<10 adults in a nursery group)** / **Calving, Post-calving and Fall (≥10 adults)** / **Northern (spring) migration (any group size)** Less than 200 m / Driver to remain stopped for 30 minutes, then may proceed at 20 km/hr if behaviour is unchanged and caribou are not moving towards the road / Driver to remain stopped until caribou are greater than 500 m from the road / Driver to remain stopped/short-term closure	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Dominion Diamond provided traffic information including seasonal traffic, vehicle type, spacing and number of round trips in Appendix C, April 2015. A revision for this comment was not required.	n/a

CRMP Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
<table><tr><td>200-500 m</td><td>Driver to remain stopped for 10 minutes, then may proceed at 20 km/hr if behaviour is unchanged</td><td>Driver to remain stopped until caribou are greater than 500 m from the road</td><td>Driver to remain stopped/short-term closure</td></tr><tr><td>In sight and greater than 500 m</td><td>Driver to proceed at 30 km/hr</td><td>Driver to proceed at 30 km/hr</td><td>Driver to proceed at 40 km/hr</td></tr></table> DDEC should provide details on convoying and breaks in traffic, and consider instituting stopping times to reduce sensory disturbance.					
DDEC should consider implementing heightened detection monitoring of caribou along the Jay (and possibly Sable) eskers, with halts in traffic when triggered.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Dominion Diamond will include monitoring along key eskers for heightened detection of caribou, which will be determined with input from community engagement. Changes to traffic patterns will follow the triggers outlined in the CRMP. A revision for this comment was not required.	n/a
The CRMP states “If negative effects are detected (e.g., caribou-vehicle collisions, failed crossing attempts, inadequate signage)…” (pg 5-1). Firstly, inadequate signage is not a negative effect on caribou. Secondly, there is no indication in the document how the proportion of failed crossing attempts will be determined. DDEC should clarify how the proportion of failed crossing attempts will be determined.	Letter	05-Jul-16	Jaida Ohokannoak (IEMA)	Approach is to assume that caribou on roads or at edge of roads intend to cross, which is reasonable. Mitigation will be applied under this assumption and whether caribou cross when mitigation is applied will be monitored (e.g., installing caribou crossings, and reducing vehicle speeds, and stopping vehicles as caribou approach road). A revision for this comment was not required. Dominion Diamond will provide additional detail on methods for determining crossing success and mitigation effectiveness in future documentation. A revision for this comment was not required.	n/a
Recommendations on the adequacy of the CRMP in Addressing the Requirements of Measure 6-1. Pertains to a, b, c, f, g, h, j, k, l, m, and n.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	See individual responses below.	
a) Measure 6-1 states that Dominion will "Use convoys or other methods to maximize interval between disturbances from vehicles."	Dominion has not identified how this will be completed in the CRMP.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion Diamond proposed to use long-haul trucks (referred to as road trains) instead of individual haul trucks. A long-haul road train includes a single cab with three trailers in tow and a capacity of 216 tonnes. Use of a single cab produces less noise and lower emissions than a multi-truck convoy. Mitigation includes the use of road closures, which maximize the time interval between vehicles. Text was revised to clarify this.	Section 4.4.1
b) Use real-time caribou collar information and other detection systems to enable early detection as trigger for management action	Page 4-4. Dominion identifies that collar information will be used to detect at 30km for Yellow level, 14km for Orange level, and states that geofencing will provide more frequent locations on approaching caribou. However, given that upload frequencies occur every 4 days though most of the year, with daily uploads during the period of 4 days, with daily uploads in March, May30- Jun 16 and October 14-Nov-1. by the time data is available, caribou may have moved closer to the site. ENR recommends extending the early detection trigger distances for moving from Blue to Orange and from Orange to Red when basing the decision on collar monitoring. ENR requires information on detection systems to be installed or tested that will be used for early detection (see comments in row ‘h’).	Letter	08-Jul-16	Andrea Patenaude (GNWT)	The decision to move between mitigation and monitoring levels is based on a number of criteria and does not only rely on collar monitoring. Incidental sightings, past behavioural observations, and road surveys will also be used to determine if a Level change should be made. Dominion Diamond will consider a movement analysis of collar caribou data to guide appropriate trigger distance.	Section 4
c) Construct caribou crossing features along a minimum 70% of the length of the Jay road	Page 4-5. Further information is required. 1.8km of caribou crossing represents only 35% of the 5.1 km Jay Road. Please clarify why Dominion used a road length of only 2.5km as the denominator to calculate the reported 72% value of the length of road covered by caribou crossings. Furthermore, King Pond is not identified in Map 4.1.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion committed to having 70% of the Jay Road as caribou crossing, which was defined by the length of raod between JR1+100 and JR3+560 locations. These locations were not included in the CRMP Map 4.1-1 but were referenced on page 4-5 and specified in the MVEIRB Record of Decision on Page 120. Map 4.1-1 has since been revised to show locations JR1+100 and JR3+560 and King Pond.	Map 4.1-1
f) Describe minimum size of the kimberlite stockpiles t Jay Pit and Misery Pit necessary to enable extended closures of the Jay	ENR requires that Dominion include information about the size of the stockpiles it will use to support operation during road closures or to include a reference to the location of the appropriate information in the CRMP.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion Diamond has made the commitment previously that the duration of road closures to allow caribou to cross Mine roads will not depend on the size of the kimberlite stockpile. In other words, once the stockpile is depleted, roads will remain closed as long as necessary to allow caribou to cross roads. Therefore, there is no minimum size required for the kimberlite stockpile for road closures to be implemented.	n/a

CRMP Recommendation		Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
road?					A revision for this comment was not required.	
g) Indicate how long road management responses will be applied	Page 4-1 states "The mitigation and monitoring for each level will continue until the trigger is no longer met. For example, the mitigation and monitoring for Level 1 will continue until caribou have moved out of the RSA, or the trigger for a higher level has been met" This describes how it will be decided when to escalate mitigation, but information on when mitigations will be de-escalated at each-level is missing. ENR recommends that Dominion add information regarding how it will be decided when drivers can proceed. ENR notes the description on pg-4-7 discusses how right of way situations will be handled by a driver until environmental technicians arrive. ENR recommends adding in minimum wait times for drivers that provide caribou with the opportunity to pass, rather than relying on the discretion of the driver. ENR also requires that information on the criteria that will be used to determine when road closures will cease be incorporated into the CRMP.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	The spatial triggers for different levels of mitigation define when mitigation will begin and end. Minimum times are not used because mitigation will be continued until no longer required for the protection of caribou. A revision for this comment was not required.	n/a
h) Method for monitoring approaching caribou at intermediate distances beyond the line of sight from road, Including at night and poor visibility.	Page 4-11 describes use of thermal imaging technology as a possible method to enhance detection from the road during night, but from the wording, it is unclear if it will be used or what factors would be considered in determining whether it will be adopted. ENR recommends that Dominion clarify its intent to use this technology. Dominion also makes reference to other technologies that can be used to monitor approaching caribou at intermediate distances, but does not describe which products, how it is evaluating them and what process it intends to use to select one. While there is discussion of potential pilot studies into such technologies through the COMP, it would make sense for DDEC discuss the approach is it using to identify how it will meet this portion of the measure. ENR recommends that time at the upcoming CRMP workshop be allocated to initiate engagement on methods for detecting caribou intermediate distances and at minimum, further description of the products, evaluation criteria and process for section be presented in the CRMP in advance of construction with finalization in future versions of the CRMP.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion Diamond will use established technologies that will allow caribou to be monitored or detected at night including satellite telemetry and thermal imaging equipment. Thermal imaging will be used at road locations where caribou have a high chance of encounter based on monitoring results and Traditional Knowledge (Section 4.3.2). The effectiveness of all monitoring methods will be evaluated through adaptive management. A revision for this comment was not required. Dominion reviewed the results of recent and frequent communication with the Department of Environment and Natural Resources (ENR) about collared caribou approaching the Ekati study area at the September 13, 2016 WEMP and CRMP workshop. Participants acknowledged this approach can be effective but will require an agreement to ensure it takes place in the future. Dominion has requested more frequent collar notifications from ENR. A revision for this comment was not required.	Section 4.3.2
j) Use TK in designing the CRMP, Jay road, esker crossing and WRSA & monitoring or caribou responses	Page 4-5 mention that further integration of TK in construction of caribou crossings will be incorporated into the final design of the road, but it is unclear how this will be achieved given timelines for construction of the road.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion completed a series of community engagement activities specific to the Jay Project, including site visits to the Lac du Sauvage esker to determine where the Jay Road should cross the esker, as part of the Jay Road design process. Past community engagement by Ekati mine for other Mine roads has also facilitated design and location of caribou crossings, which will also be included in the final design of the Jay Road.	n/a
k) Describe specific monitoring and mitigation related to road during construction, operations and closure phases	With the exception of the design of the road, the CRMP appears to apply primarily to operations. ENR requires that Dominion provide further information on how the monitoring and mitigation approaches described in the CRMP will be applied during construction and closure.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	As referenced in the title of the CRMP, the CRMP was specifically developed for the Jay Project, which includes all development phases (construction, operation, closure and post-closure). The CRMP will also be applied to all Ekati mine roads. A revision for this comment was not required.	n/a
l) How will habitat disturbance be minimized?	ENR requires Dominion to include information in the CRMP about the means it is using to avoid and minimize habitat disturbance.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Section 4.2.1 of the WEMP describes habitat loss mitigation and monitoring for the Ekati mine, including the Jay Project. The WEMP is consistent with the GNWT's draft guidelines on development of WWHPP and WEMP. A revision for this comment was not required.	n/a
m) Response framework that links monitoring results to change in mitigation.	Page 4-5. Dominion states that "Once the road is constructed, the effectiveness of the caribou crossings will be monitored by the Environment Department." ENR requires that Dominion provide further detail on how this monitoring will occur, either in the CRMP or by referencing	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Approach is to assume that caribou on roads or at edge of roads intend to cross, which is reasonable. A revision for this comment was not required.	n/a

CRMP Recommendation		Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
	the appropriate section of the WEMP and how results will inform management. Page 4-13. It is unclear exactly how the behaviour monitoring will be used to feed into mitigation responses. It is unclear whether the information is going to be used in a more immediate manner (i.e. surveys identify that X % are responding to passing traffic and therefore we will slow down/stop traffic immediately or more like results of the behaviour monitoring studies will identify conditions/stimuli which are generating the biggest visual responded and we will develop additional protocol to deal with those situation. ENR requires that further detail be given on how behaviour monitoring results will be incorporated into mitigation. ENR requires DDEC to identify within the CRMP how caribou avoidance of the road will be monitored and managed (either by providing further information or referencing the applicable section of the WEMP). Page 5-1 Dominion states that "If negative effects are detected (e.g. caribou-vehicle collisions, filed crossing attempts, inadequate signage (?)), the actions available to Dominion include increased monitoring, special studies to understand the effect and additional mitigation." There does not appear to be a method identified in the CRMP to detect failed crossing attempts. ENR requires that further information be given in the CRMP, or reference to the appropriate section in the WEMP on how permeability of the road will be monitored and managed.					
n) Specify contingency measures if caribou do not cross road at Jay esker.	ENR requires Dominion to identify contingency measures that it will use if it is determined that caribou do not cross the Jay Road at the esker.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Mitigation will be applied under this assumption and whether caribou cross when mitigation is applied will be monitored (e.g., installing caribou crossings, and reducing vehicle speeds, and stopping vehicles as caribou approach road). A revision for this comment was not required.	n/a
ENR appreciates that DDEC has included traffic level predictions and information for both haul traffic and light vehicle traffic categories for both the regular and non-ice-road season; however, it would be helpful to have the light vehicle traffic information for the non-ice road season, as well as the total traffic passes.		Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion Diamond will provide additional detail on methods for determining crossing success and mitigation effectiveness in future documentation. A revision for this comment was not required.	n/a
ENR notes with interest the additional analysis shown in Maps 2-1 & 2-2 of the highest caribou densities among the roads and within locations along each road. ENR recommends that this information be used to enhance mitigation along Sable Road as well. For example, can caribou crossings be added to the hotspots on Sable? How come the data only goes partway up the Sable road? It is not clear if all or a subset of the caribou crossing locations along the Misery Road were chosen by TK. There are some higher density areas along Misery road with no caribou crossings in close proximity. Can caribou crossings be added?		Letter	08-Jul-16	Andrea Patenaude (GNWT)	Sable Road is currently under construction and maps of the CRMP show the Sable Road alignment. Caribou crossing locations will be added to Sable Road through community engagement. Sable is within the existing scope of WEMP monitoring. Caribou crossings may be added in the future at locations supported by monitoring results. A revision for this comment is not required.	n/a
Page 4-1, end of paragraph 3. "The mitigation and monitoring for each level will continue until the trigger is no longer met. For example, the mitigation and monitoring for Level 1 will continue until caribou have moved out of the RSA, or the trigger for a higher level has been met" This seems contradictory to the previous statement that " All mitigation from the previous lower level will be applied to the next higher level." Map 4.1- King Pond is not labelled so it is unclear where the 70% calculation starts. Page 4-5 Noting the two additional caribou crossings on the Jay North road and one along eastern part of the Road near the dyke, are those included in your calculation of total caribou crossing features along a minimum of 70% of the Jay road? How did DDEC choose the locations of the additional caribou crossing locations along that road? The ring		Letter	08-Jul-16	Andrea Patenaude (GNWT)	Mitigation applied at lower levels is continued at higher levels. Map 4.1-1 was revised to show locations JR1+100 and JR3+560 and King Pond.	Map 4.1-1

CRMP Recommendation	Venue	Date	Participant and Organization that Suggested Recommendation	Revision to CRMP or Rationale if Revision Not Made	CRMP Section
seems to encircle work areas where it might be better to discourage caribou presence. What was the rationale for including caribou crossings here? Re: TK incorporation. When is final design to be finalized? Page 4-8, re snow berm height. Given that 1.6m was the value that was associated with high deflection rates, it would make sense to aim for something smaller. ENR recommends 1 m. Page 4-9. “Camera traps will be deployed at the esker crossing and other crossings along the Jay and Misery Road.” More information about study design is requested. What do you mean by “other crossings”? It might make sense to put cameras at both the caribou crossings, and the density hotspots identified in Section 2, as well as some low density areas as controls.					
Page 4-12 Re: objective that the mitigations introduced in the red level are meant to avoid sensory disturbance does not seem to be supported by the trigger distances. The mitigations seem to be intended to limit sensory disturbance when caribou are close to the road, but not approaching the road. Since impacts to reproduction and energetics via avoidance of the road, which at this point does not seem to be captured by monitoring, this seems to be only a partial approach. Page 4-12 Re: short and long term closures. It is not clear why it is necessary to distinguished between short and long term closures. Presumably you don’t know how long the closure would be in effect until the caribou have left the area. It would make more sense to describe the criteria by which a decision to reopen the road might occur. See comment in Row “g” above.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Mitigation identified for the Jay Road is expected to limit effects to caribou from traffic. The DAR demonstrated that avoidance of the Misery, Jay or Sable roads would not result in a significant effect to caribou energetics and fecundity. Roads will remain closed as long as necessary for the protection of caribou. Reference to short and long term road closure are necessary for planning by Mine managers. This was reviewed at the September 16, 2016 WEMP and CRMP workshop. A revision for this comment was not required.	n/a
ENR recommends that DDEC include a description of how it is monitoring traffic levels in the CRMP.	Letter	08-Jul-16	Andrea Patenaude (GNWT)	Dominion uses Wenco to monitor traffic. Text describing Wenco has been included.	Section 4.1.1
The North Slave Métis Alliance agreed with the suggestions made by IEMA in their July 5, 2016 letter to Dominion Diamond.	Letter	08-Jul-16	Shin Shiga (NSMA)	See responses to IEMA recommendations.	n/a
The arrangement for collar notifications between Dominion and the GNWT needs to be formalized and referenced in the WEMP.	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Kim Poole (IEMA)	Dominion reviewed the results of recent and frequent communication with the Department of Environment and Natural Resources (ENR) about collared caribou approaching the Ekati study area at the September 13, 2016 WEMP and CRMP workshop. Participants acknowledged this approach can be effective but will require an agreement to ensure it takes place in the future. Dominion has requested more frequent collar notifications from ENR. A revision for this comment is not required.	n/a
There should be markers along the road so that drivers are aware of what 100 m from the road looks like.	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Shawn McKay	Dominion will consider the use of distance markers. A revision for this comment is not required.	n/a
Frequency of road surveys in Level 1 (Yellow) should be increased (from bi-weekly to daily).	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Kim Poole (IEMA)	Road surveys at Level 1 were changed from bi-weekly to daily.	Table 4-1, Section 4.2.2
The recommendations given through engagement and actions or responses should be documented in the WEMP and CRMP.	Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan Workshop	13-Sep-16	Marc Casas (IEMA)	A revision table summarizing engagement recommendations and actions or responses has been added as an Appendix to the WEMP and CRMP.	WEMP Appendix B and CRMP Attachment I.

APPENDIX D

SUMMARY OF CHANGES TO WILDLIFE MONITORING

Table of Contents

Tables

D1 SUMMARY OF CHANGES TO WILDLIFE MONITORING, 1997 TO 2014

Wildlife monitoring at the Ekati Diamond Mine (Ekati mine) has changed for all wildlife valued ecosystem components (VECs) since monitoring began in 1997. Most of the changes to monitoring programs resulted from improved understanding of Mine-related effects, or as part of the adaptive management. These changes were implemented to provide more accurate, complete, and relevant information on wildlife VECs. Changes were also implemented in response to comments from communities, the Independent Environmental Monitoring Agency, Government of Northwest Territories Department of Environment and Natural Resources, Environment Canada, and other people interested in the Ekati mine. For example, when it was found that the monitoring for grizzly bear sign within the wildlife study area was not providing effective data to address objectives, a collaborative, regional hair snagging program was implemented. Table C-1 provides a summary of changes to the wildlife monitoring field programs by VEC, from 1997 to 2014. All information was gathered from the Ekati Mine Wildlife Effects Monitoring Program reports.

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
All	1997	Change VECs	Caribou, grizzly bear, wolves, foxes, wolverines, migratory birds, breeding birds (including waterfowl), raptors, special vegetation/habitats (eskers, riparian zones, wetlands, and cliffs)	Focused on wildlife species or areas of study that were previously identified as VECs during the Environmental Impact Assessment
		Study area	Approximately 1,600 km^2	Concentrate on the potential effects of construction activities, plus ongoing exploration activities and sufficient size to allow adequate warning of caribou movements
		Waste management	Landfill monitoring	Determine the potential for the landfill site to attract wildlife which may result in problem animal situations
		Incident reporting	Reporting required	NA
	1998	Change VECs	No furbearers, small mammals, or special habitats	VECs are caribou, grizzly bear, wolf, wolverine, upland breeding birds, loons, and raptors based on Wildlife Effects Monitoring Plan workshop
	2000	Wildlife Effects Monitoring Plan implemented	Approved monitoring plan implemented	Required by the Environmental Agreement
		Traffic monitoring	Roads with 20 km/h and 40 km/h (previously only roads 40 km/h) monitored	Speed limits 20 km/h most likely to be exceeded, and therefore, highest potential for collisions with wildlife
		Deterrent	Rock berms around pits and facilities, skirting placed around buildings	Direct wildlife away from landfill and pits
	2001	Waste management	Waste sorting and monitored for misdirected waste, chain link fence around food waste storage (incinerator), Misery incinerator placed in shipping container	Minimize wildlife attractants
	2002	Waste management	Landfill redesigned; enclosed with large berm with one entrance, waste covered more frequently	Minimize wildlife attractants
			Rope and flagging tape placed over the landfarm	Bird mortalities resulted from contact with oil-contaminated water
		Incident reporting	Development of formal procedure	Provide details of incidents to government, regulatory agencies, and other stakeholders; also allows consultation with GNWT

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
			Change to include any interesting or unusual wildlife-mine interactions	Provide additional data to help improve adaptive management
	2003	Dust suppression	Monitoring the relative use of dust-suppressant treated and untreated roads by wildlife	To confirm that chemical dust suppressants do not attract or deter wildlife animals. Study completed in 2005.
		Deterrent	Ropes with flagging tape on landfill berm	Direct wildlife away from landfill
	2004	Dust suppression	Use of motion sensor cameras and sand track plates to compare wildlife use of treated and untreated roads	To confirm that chemical dust suppressants do not attract or deter wildlife animals. One year study.
		Waste management	Colour coding waste bins and updating waste bin labelling	Improve tracking and recording of waste streams
	2005	Deterrent	Skirting placed around buildings	To reduce access to shelter and attractants
	2006	Waste management	Site departments are required to remove attractants if found, garbage covered with rock on a more frequent basis	To reduce wildlife attractants
		Incident reporting	Record caribou sightings as well as carnivores (previously only carnivores)	Provide additional information for adaptive management
		Study area	Expanded to approximately 2,800 km^2	Response to estimates of the caribou zone of influence
	2011	Deterrent	Erected chain link fence around Misery Camp	To reduce access to shelter and attractants
	2014	Power line surveys	Wildlife surveys at the Misery Road power line construction sites	Monitor presence of wildlife during construction and any need for mitigation
Caribou	1997	Behavioural studies	Monitoring of caribou behaviour in relation to disturbances such as aircraft and vehicle traffic and compared with control sites	Determine the effect of mining activity on caribou behaviour
		Deterrent	Semicircular arrangement of wooden stakes formed into crosses with lengths of yellow and silver metallic tape at Panda Pit; rope fence with red and pink flagging tape around the airstrip	Based on design from GNWT, which was derived from traditional knowledge
		Aerial surveys	Aerial surveys through the spring, summer, and fall using both irregular ‘spaghetti’ methods and transect lines	Determine the effect of the Ekati mine site on relative abundance and seasonal movements of caribou

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
	1998	Deterrent	Rope fence around airstrip; increased height, and number of strands from one to two strands	Modified based on results of monitoring and traditional knowledge - the deterrent method used at the pit was not successful in deterring caribou from approaching the pit area. Caribou were observed moving freely between the crossbar structures without appearing to notice them. Some employees who worked at the pit felt that the metallic tape used actually attracted caribou rather than made them wary.
		Aerial surveys	Use of aerial survey transects only; spaghetti survey discontinued	Determine the effect of the mine site on relative abundance and seasonal movements of caribou, using a standardized approach
		Snow track surveys	Identify caribou interaction with site roads	Determine the effect of roads on caribou movement
	1999	Aerial surveys	Reduced width from 1 km to 600 m on either side of helicopter (30% coverage)	Reduced survey width to improve accuracy and detection rate
	2000	Deterrent	Electric fence with 4 strands and rope fence around airstrip	Modified based on results of monitoring and consultation with stakeholders
		Behavioural studies	Focal surveys discontinued to focus efforts on group behaviour using scan sampling	To streamline monitoring efforts
	2001	Deterrent	Increased number of strands in electric fence around airstrip from 4 to 6	Reduce possibility of caribou entering airstrip
		Road surveys	Started to recorded caribou distribution within 200 m of roads	To estimate likelihood of vehicle collisions
		Snow track surveys	Identify caribou crossing locations on site roads	Identify locations for ramps to facilitate movement across roads
	2002	Deterrent	Increased number of strands in electric fence around airstrip from 6 to 8	Reduce possibility of caribou entering airstrip
	2003	Aerial surveys	Reduce survey effort in early June and early July; survey only every second transect during period when caribou were primarily at calving grounds	Reducing survey effort when few caribou are present
		Road surveys	Identify caribou crossing locations on Misery Road	Determine locations for ramps to enhance movement across roads
		Deterrent	Use inokhoks to deflect caribou away from open pits and towards road crossings and rock berms constructed around open pits	To guide wildlife away from open pits and high traffic areas towards crossing locations

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
	2004	Aerial surveys	Recorded distance to individuals from transect lines	Used to correct for undetected animals
		Deterrent	Used inokhoks along roads	To guide wildlife away from high traffic areas, based on recommendations from communities
		LLCF surveys	Recorded injuries	Provide additional data to help BHP Billiton manage wildlife
			Record if used as movement corridor and caribou group size, composition, and behaviour	Provide additional data to help BHP Billiton manage wildlife
	2006	Deterrent	Inokhoks placed near airstrip by Elders from Kugluktuk	To deter caribou from the hazardous areas
		Aerial surveys	Aerial study area expanded to encompass a larger study area; spacing between the transect lines was changed from 4 km to 8 km	Based on findings that suggested a larger scale investigation was needed to assess caribou distribution relative to mine development
	2007	Aerial surveys	No surveys completed during northern migration	Reducing survey effort when few caribou are present
		Deterrent	Inokhoks placed at intervals around Beartooth Pit and Fox Pit by Elders from Kugluktuk	To deter caribou from the hazardous areas
	2009	Behavioural studies	Increase survey effort farther from the 2 mine sites; completed in conjunction with the Diavik Mine; Diavik focused on greater than 14 km from mines; Ekati mine focused on less than 14 km from mines	Sharing of monitoring effort between Ekati and Diavik
		Aerial surveys	Increased study area south of the Diavik Mine	Based on recommendations from IEMA
		Deterrent	Painted the tops of fence posts around airstrip a bright colour to provide a greater contrast; initiated a comprehensive fence surveillance program and removed the remainder of the rope fence	In response to the mortalities associated with the fences
	2010	Aerial surveys	Surveys suspended	Very few caribou in the study area; re-allocation of funding
		Deterrent	Erected heavy-weight orange barrier fence around airstrip and Pigeon test pit	In response to 3 mortalities in 2009
		Behavioural studies	Focal surveys re-introduced	Focal studies provide information on activity budget
	2011	Remote cameras	50 motion sensor cameras - primarily on Misery Road	Monitor interaction of wildlife with Ekati mine infrastructure

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
		Deterrent	Planning to extend the height of the airport fence to a height above a caribou's line of sight in order to prevent caribou from jumping over it	NA
	2012	Remote cameras	Camera monitoring expanded to 90 motion sensor cameras	To monitor wildlife activity around the Ekati mine site, including roads and other infrastructure
	2013	Remote cameras	90 motion sensor cameras deployed	Monitor interaction of wildlife with Ekati mine infrastructure
Wolverine	1997	Aerial surveys	Previously documented wolverine den sites flown over as soon as possible in spring	Wolverine dens are constructed in snow; therefore, can only be found while snow cover is still present
		Den surveys	All potential den sites that were located during aerial surveys or opportunistically during other field work were documented for later assessment on the ground	Assess recent occupancy and characteristics of den sites
	2001	Relocation program	Relocation program ineffective	Some relocated animals were later destroyed
	2003	Snow track survey	New survey method using multiple 4 km transects	Provide more reliable estimate of relative annual abundance and activity of wolverine; focus on preferred habitat (identified from discussions with communities and in consultation with GNWT)
		Incidental sightings	Formally recorded	Identify potential risks associated with human – wolverine interactions
	2004	Snow track survey	Went back to original study design	Too much effort for 50, 4 km transects
	2005	Relocation program	New relocation program initiated	NA
		Snow track survey	Survey discontinued	NA
		DNA study	Study initiated on a multi-year cycle	To monitor wolverine density, abundance, and movement on a regional scale
	2006	Deterrent	Monitoring program for skirting initiated	To see if skirting was successful in restricting wildlife access
	2008	Snow track survey	Resumed snow track surveys; used helicopter because staff not trained on snowmobiles	NA
	2009	Snow track survey	Discontinued surveys	After consultation with GNWT ENR and IEMA

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
Birds	1997	Upland breeding bird surveys	Breeding bird monitoring in fixed plots both near the mine and in control areas	Monitor distribution, species abundance, species richness, and productivity that may be affected by increasing development of the mine
	2001	Loon surveys	New survey method (double-observer, flushing birds along shores), survey of control lakes discontinued	Maximize information gathered, based on recommendation from CWS
	2002	Loon surveys	Removed from the monitoring program	Agreement that not enough loons are naturally present in the study area to provide effective monitoring and meet objective
	2003	Upland breeding bird surveys	Standardized method introduced: North American Breeding Bird Survey	Contribution to international monitoring program
	2009	Upland breeding bird surveys	Discontinued North American Breeding Bird Survey	In 2006, IEMA suggested to do surveys every second year; surveys discontinued based on consultation with communities, IEMA, GNWT ENR, and CWS
Wolf	1997	Den surveys	Previously documented wolf den sites flown over as soon as possible in spring; active wolf den sites were revisited several times through the summer and fall	Monitor distribution of carnivore den sites that may be affected by increasing development of the Ekati mine and to obtain information on number of pups and to document pup survival
		Den surveys	All major esker systems were surveyed for additional dens	To identify new dens
	2001	Den surveys	Discontinued	The number of new wolf dens discovered along esker systems was negligible
		Incidental sightings	Formally recorded	Identify potential risks associated with human – wolf interactions
	2004	Den surveys	Full aerial survey completed by GNWT to record any wolf observations and den sites	Improve regional wolf tracking and monitor potential influence of mining operations on the distribution of wolves and their breeding; cooperation with GNWT
		Satellite collar	Increased sample of collared wolves from four dens within the Ekati study area; data collected by GNWT and shared with Ekati	Improve tracking of wolf breeding activity
	2006	Den surveys	Partial survey only	NA
	2009	Den surveys	Complete den surveys re-commenced	NA

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
	2013	Den surveys	Partial survey only	Only intended to be a survey of collar locations to confirm active den location. Productivity was then monitored at each location
	2014	Den surveys	Complete den surveys re-commenced	Loss of collars required a more extensive survey to attempt to identify active den locations. Productivity was then monitored
Raptors	1997	Raptor surveys	Raptor nest sites surveyed	Monitor distribution, species abundance, species richness, and productivity that may be affected by increasing development of the mine
	2002	Nesting on Ekati mine infrastructure	Monitoring for raptors nesting on infrastructure and in open pits	Protection of raptors nesting on mine infrastructure
	2003	Deterrent	Unused nests in pits were removed to deter nesting activity in unsafe areas such as pits	Discourage nesting activity in hazardous areas
	2004	Nesting on Ekati mine infrastructure	Formal monitoring and reporting program	Provide information for adaptive management and to improve early nest attempt deterrence
	2006	Nesting on Ekati mine infrastructure	Monitoring initiated at Fox Fuel Farm and power poles along Long Lake Road	Protection of raptors nesting on Mine infrastructure
	2010	Raptor surveys	Patterns of occupancy and productivity relative to Mine removed from WEMP; monitoring every 5 years to contribute to the Canadian Peregrine Falcon Survey	Negligible effects observed so discontinued; contribute to international monitoring
	2012	Deterrent	Nesting activity in pit deterred by clearing nest material, using mesh netting, bear bangers, screamers, propane cannons, and call playbacks	To minimize conflicts with Misery Pit development
Fox	1997	Aerial surveys	Previously documented fox den sites flown over as soon as possible in spring	To document den occupancy and productivity
		Den surveys	Incidental den monitoring	Monitor distribution of carnivore den sites that may be affected by increasing development of the mine
	2004	Incident reporting	Fox incidents formally recorded	To provide information for adaptive management
Grizzly Bear	1997	Den surveys	Previously documented grizzly den sites flown over as soon as possible in spring	Monitor distribution of carnivore den sites that may be affected by increasing development of the Mine and contribute to regional studies
	1999	Den surveys	Surveyed several different habitats instead of only eskers using aerial survey; ground-based habitat surveys	Low number of dens found during aerial surveys of eskers; focus on seasonal preferred habitats

Table D-1 Changes to Wildlife Monitoring at Ekati Mine, 1997 to 2014 by Valued Ecosystem Component

Valued Component	Year Implemented	Monitoring/ Mitigation Program	Changes	Objective/Reason for Change
	2000	Activity surveys	Ground-based surveys for grizzly bear sign focused on wetlands (June) and willow-riparian/birch-seep (August)	To document annual changes in grizzly bear activity
	2009	Activity surveys	Discontinued activity surveys	Due to safety issues and improvements to study design (DNA hair snagging suggested)
	2010	Deterrent	Increased use	Record high of 62 out of 70 recorded grizzly bear occurrences required the use of deterrents
		DNA survey	Pilot study/field trial	Replace the bear sign survey to determine if population has changed around the Mine
	2011	DNA survey	Second and more detailed field trial	Replace the bear sign survey to determine if population has changed around the Mine
	2012	DNA surveys	Initiated in collaboration with other diamond mines in region	Transition to broad-scale regional monitoring initiatives

BHP Billiton = BHP Billiton Canada Inc.; CWS = Canadian Wildlife Service; DNA = deoxyribonucleic acid; GNWT = Government of Northwest Territories; GNWT ENR = Government of Northwest Territories, Environment and Natural Resources; IEMA = Independent Environmental Monitoring Agency; LLCF = Long Lake Containment Facility; VEC = valued ecosystem component; m = metre; km = kilometre; km^2 = square kilometre; km/h = kilometres per hour;% = percent; NA = not available; WEMP = Wildlife Effects Monitoring Plan.

APPENDIX E

HIERARCHICAL MITIGATION APPLIED TO THE JAY PROJECT FOR CARIBOU AND WILDLIFE

Table E-1 Hierarchical Mitigation applied to the Jay Project for Caribou and Wildlife

Project Component / Activity	Effects Pathway	Mitigation	Hierarchical Classification	How Mitigation Can be Managed	Pathway Assessment
Project Infrastructure and Footprint • access roads • power lines • surface infrastructure and support facilities • open pit • waste rock storage areas • accommodations • dikes	Direct loss and fragmentation of habitat from the Project footprint causes changes in caribou and wildlife abundance and distribution	• The Project maximizes the use of the existing infrastructure to reduce the environmental footprint to the extent practical.	Avoid	Applied at maximum level	Primary for caribou and wildlife
		• The new access roads will be as narrow as feasible, while maintaining safe construction and operation practices.	Avoid	Applied at maximum level	
		• Only one access road crosses the Lac du Sauvage esker.	Avoid	Applied at maximum level	
		• The Jay WRSA is set back 200 m from the Lac du Sauvage esker.	Avoid	Applied at maximum level	
		• Kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations through various types of road closures.	Avoid	Applied at maximum level	Primary for caribou
		• Footprints of the WRSAs and other structures will be optimized to limit surface disturbance to the extent practical.	Avoid	Applied at maximum level	Primary for caribou
		• The Jay power line will parallel the haul road to avoid additional fragmentation and reduce the environmental footprint as much as possible.	Avoid	Applied at maximum level	Primary for caribou Secondary for wildlife
		• A pipe bench will be constructed to accommodate the pipelines, which will follow existing and proposed road alignments to the extent practical, to minimize the Project footprint.	Avoid	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Soil disturbance will be limited to only those areas required for construction and operation of the Project.	Avoid	Used as required	Primary for caribou Secondary for wildlife
		• Siting and construction of the Project will be planned to avoid environmentally sensitive areas (e.g., critical wildlife habitat, listed plants and wildlife species, and wetlands) to the extent practical. For example, Jay Road alternative 3 intersects the fewest number of grid cells with historical caribou trails.	Avoid	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Design of the Jay Project minimizes the construction of new buildings, roads, pads, or excavations, which will reduce the area directly disturbed for infrastructure.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• The existing Misery and Lynx pits will be used for dewatering and minewater management, limiting the requirement for additional areas to be altered for minewater management.	Avoid	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Management practices already in place at the Ekati mine will be implemented to control erosion and sediment.	Minimize	Management practices will be reviewed and altered through Adaptive Management	Primary for caribou Secondary for wildlife
		• The existing Ekati Mine Interim Closure and Reclamation Plan identifies how and where land will be reclaimed and will be amended to include the Project.	Reclaim	Applied at maximum level	Primary for caribou Secondary for wildlife
	Physical hazards (open pit, blasting, buildings, WRSAs) may result in increased risk of injury or mortality to individual animals	• Site environmental technicians will investigate all wildlife incidents and mortalities, report to government, and recommend follow-up actions to reduce future incidents or mortalities.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Wildlife are deterred (e.g., skirting, fencing) or removed (e.g., herding, noise making devices) from areas of risk.	Avoid/Minimize	Used as required	
		• Mitigation is currently in place to minimize human-wildlife interactions, including awareness training.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Pit wall monitoring procedures for raptor nests implemented at the Ekati mine will include the Jay Project. Nesting will be prevented, when possible, in active mining areas by interrupting nest-building activities. Blasting operations may be modified where necessary to protect active nests with eggs/chicks.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Birds showing nesting activity in areas of critical risk will be actively deterred by removing or covering inactive nests with nets.	Minimize	Used as required	
		• Animals will be deterred from entering the diked area where most fly rock will occur (until pit is too deep for escape of fly rock) and animals will be removed from active blast zones, when necessary, using herding and noise making devices or other deterrents to safely remove animals.	Avoid	Used as required	
Project Infrastructure and Footprint • access roads • power lines • surface infrastructure and support facilities • open pit • waste rock storage areas • accommodations • dikes • exposed lakebed sediments	Physical hazards leading to increased risk of injury or mortality to individual caribou and wildlife	• The current, effective practices and mitigations for safety of wildlife on roads, airstrip, and other areas of the mine will be continued and expanded as necessary to include the Jay Project. These practices include reporting of wildlife sightings by all employees, removing wildlife from or preventing their access to hazardous areas, and control of encounters by Environment staff.	Minimize	Monitoring can be intensified or reduced through Adaptive Management	Secondary
	The Misery and Jay power lines may cause increased risk of injury or mortality to birds	• The power line will incorporate perching deterrents on poles including cone-shaped pole caps and cross arm perch preventers to prevent large birds from perching and nesting on poles or on dangerous areas around phase conductors.	Minimize	Applied at maximum level	Secondary
		• Bird deterrents (e.g., spinning reflectors) will be installed on the power line in areas of concern (e.g., near waterbodies known to represent staging areas) and identified through monitoring of bird activity along the power line.	Minimize	Applied at maximum level	

Table E-1 Hierarchical Mitigation applied to the Jay Project for Caribou and Wildlife

Project Component / Activity	Effects Pathway	Mitigation	Hierarchical Classification	How Mitigation Can be Managed	Pathway Assessment
	Site preparation and construction may result in the destruction of nests, eggs, and individuals of migratory birds (incidental take)	• If vegetation clearing is required, activities will be managed to avoid mortalities and comply with the *Species at Risk Act* and the *Migratory Birds Convention Act*.	Avoid	Used as required	Secondary
	Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the construction of diked area of Lac du Sauvage alters riparian habitat and caribou distribution	• During construction of dike, silt curtains, and other sediment and turbidity mitigation will be used as appropriate.	Minimize	Applied at maximum level	
General Construction and Operation Activities • mining of the kimberlite pipes • operation of surface infrastructure and support facilities • vehicle traffic along the access road	Air and dust emissions and subsequent deposition can change the quantity or quality of plant forage and alter caribou and wildlife distribution and behaviour	• Regular maintenance of equipment will continue at the Ekati mine.	Minimize	Managed in accordance with manufacturer guidelines	Secondary
		• Dust suppression will be applied, consistent with current practices, to haul roads, the airstrip, and other high traffic areas.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Speed limits will continue to be applied to limit fugitive dust.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Salvaged soil material stockpiles or exposed soils will be seeded or protected by berms, to reduce wind erosion.	Minimize	Used as required	
	Ingestion of water, soil, and vegetation, or inhalation of air that has been chemically altered by air emissions or dust deposition may affect caribou and wildlife health	• Wildlife are deterred (e.g., skirting, fencing) or removed (e.g., herding, noise making devices) from areas of risk.	Avoid/Minimize		No Linkage
		• The small, intermittent water ponds at the contaminated snow containment facility and landfarm are covered with flagging to prevent bird landings.	Minimize	Used as required	
	Sensory disturbance (lights, smells, noise, dust, viewscape) and barriers to movement causes changes to caribou movement and behaviour, and changes to energetics and reproduction. Will also cause changes in wildlife habitat quality, movement and behaviour	• Use of existing surface facilities will avoid disturbing some areas and limit the quantity of new sensory disturbances.	Avoid/Minimize	Applied at maximum level	Primary
		• Only one access road crosses the Lac du Sauvage esker.	Minimize	Applied at maximum level	
		• The Jay WRSA is set back 200 m from the Lac du Sauvage esker.	Minimize	Applied at maximum level	
		• Kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations through various types of road closures.	Avoid	Applied at maximum level	
		• The current, effective practices and mitigations (e.g., wildlife right-of-way, signage, low speed limits) for safety of wildlife on roads, the airstrip, and other areas of the mine will be continued and expanded as necessary to include the Jay Project. These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• A minimum flying altitude of 600 m above ground level (except during takeoff and landing, and during field work) will be maintained for cargo, passenger aircraft, and helicopters outside of the Project site.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Environmental training will be provided for personnel.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• The WEMP implemented at the Ekati mine will include the Jay Project.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Wildlife always have the right-of-way.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Vehicles encountering wildlife on roads will communicate the presence of wildlife on the roads to the Environment Department and others in the area.	Minimize	Applied at maximum level	Primary for caribou Secondary for wildlife
		• Modified traffic patterns and road closures will be used as necessary to protect caribou and people.	Avoid/Minimize	Can be intensified or reduced through monitoring and Adaptive Management	Primary for caribou Secondary for wildlife
General Construction and Operation Activities • mining of the kimberlite pipe • operation of surface infrastructure and support facilities • vehicle traffic along the access road	Increased traffic on the Misery Road and Jay Road and the above-ground power line along these roads, may create barriers to caribou movement, change migration routes, and reduce population connectivity	• Only one access road crosses the Lac du Sauvage esker.	Minimize	Applied at maximum level	Primary
		• Animal crossing locations will be built along roads to reduce barrier effects. The number of location of crossings will consider historical caribou trails and recommendations of communities.	Minimizes	Can be intensified or reduced through monitoring and Adaptive Management	
		• Spatially and temporally staged monitoring of the Bathurst caribou herd will be used to track migratory movements via (i) satellite radio collars and (ii) road surveys (i.e., advanced information on approaching caribou). Results will be used to manage traffic patterns when caribou are in close proximity of roads including closure.	Avoid/Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations through various types of road closures.	Avoid/Minimize	Applied at maximum level	

Table E-1 Hierarchical Mitigation applied to the Jay Project for Caribou and Wildlife

Project Component / Activity	Effects Pathway	Mitigation	Hierarchical Classification	How Mitigation Can be Managed	Pathway Assessment
		• The current, effective practices and mitigations (e.g., wildlife right-of-way, signage, low speed limits) for safety of wildlife on roads, the airstrip, and other areas of the mine will be continued and expanded as necessary to include the Jay Project. These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff.	Minimize	Used as required	
		• Modified traffic patterns and road closures will be used as necessary to protect caribou and people.	Avoid/Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
	Collisions between caribou or wildlife and vehicles or aircraft causes injury or mortality of animals	• Current mitigation includes deterring and removing wildlife from the airstrip.	Minimize	Used as required	Secondary
		• Speed limits are in place.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Wildlife always have the right-of-way.	Minimize	Applied at maximum level	
		• Drivers have standard safety training and are provided with awareness training.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Appropriate signage is in place to identify areas of high wildlife use.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Vehicles encountering wildlife on roads are required to stop and communicate the presence of wildlife on the roads to the Environment Department and others in the area.	Minimize	Used as required	
		• Vehicles are restricted to designated roads and prepared work areas (recreational use of off-road vehicles is prohibited).	Minimize	Applied at maximum level	
		• The current, effective practices and mitigations (e.g., wildlife right-of-way, signage, low speed limits) for safety of wildlife on roads, the airstrip, and other areas of the mine will be continued and expanded as necessary to include the Jay Project. These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff. There have been no incidents of caribou mortality caused by vehicle collisions at the Ekati mine.	Minimize	Monitoring can be intensified or reduced through Adaptive Management	
		• Modified traffic patterns and road closures will be used as necessary to protect caribou and people.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
General Construction and Operation Activities • mining of the kimberlite pipes • operation of surface infrastructure and support facilities • storage of industrial, domestic, hazardous, and contaminated waste • vehicle traffic along the access road	Attractants at site (food, shelter) leading to problem wildlife or disruption to predator-prey relationships, or increases in predator densities and predation on caribou	• Apply the Waste Management Plan, Landfill Management Plan, and Incinerator Management Plan to manage waste and prevent or reduced wildlife access to attractants (e.g., food waste).	Minimize	Monitoring can be intensified or reduced through Adaptive Management	Secondary
		• The WEMP is implemented at the Ekati mine and will be amended to incorporate the Jay Project; wildlife activity will be monitored at waste management areas.	Minimize	Monitoring can be intensified or reduced through Adaptive Management	
		• The efficiency of the waste management program will be reviewed regularly and improved through adaptive management where practical.	Minimize	Monitoring can be intensified or reduced through Adaptive Management	
		• Separate bins will be located throughout the accommodations complex, shops, and other facilities on-site for immediate sorting of domestic wastes.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Food wastes will be collected in specific bins before transport directly to the incinerator storage area for incineration.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Littering and the feeding of wildlife is prohibited.	Avoid	Applied at maximum level	
		• Raised, heated buildings will be skirted to prevent wildlife access to shelter.	Avoid	Applied at maximum level	
		• Education and reinforcement about proper waste management practices and issues surrounding wildlife habituation is provided to all workers and visitors to the site.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Incinerator is enclosed and camp waste will be burned regularly.	Minimize	Applied at maximum level	
		• Landfill sites and waste storage areas will be inspected.	Minimize	Monitoring can be intensified or reduced through Adaptive Management	
		• A chain-link fence is maintained around Misery Camp to prevent wildlife from entering.	Avoid	Can be intensified or reduced through monitoring and Adaptive Management	
		• Wildlife are prevented (e.g., skirting, fencing) or removed (e.g., herding, noise making devices) from areas of risk.	Avoid/Minimize	Used as required	
General Construction and Operation Activities • operation of surface infrastructure and support facilities • vehicle traffic along the access road	Increased traffic on the Misery Road and Jay Road, and the above-ground power line along these roads, may create barriers to carnivore and caribou movement, which may affect carnivore population connectivity, abundance, and distribution	• Only one access road crosses the Lac du Sauvage esker.	Minimize	Applied at maximum level	Primary
		• Crossing locations will be built along roads to reduce barrier effects. The number of location of crossings will consider historical caribou trails and recommendations of communities.	Minimizes	Can be intensified or reduced through monitoring and Adaptive Management	
		• Spatially and temporally staged monitoring of Bathurst caribou herd to track migratory movements via (i) satellite radio collars, and (ii) road surveys (i.e., advanced information on approaching caribou).	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations through various types of road closures.	Minimize	Applied at maximum level	Secondary

Table E-1 Hierarchical Mitigation applied to the Jay Project for Caribou and Wildlife

Project Component / Activity	Effects Pathway	Mitigation	Hierarchical Classification	How Mitigation Can be Managed	Pathway Assessment
		• The current, effective practices and mitigations for safety of wildlife on roads, airstrip and other areas of the mine will be continued and expanded as necessary to include the Jay Project. These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff.	Minimize	Applied at maximum level	
		• Modified traffic patterns and road closures will be used as necessary to protect caribou and people.	Avoid/Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
Site Water Management • dewatering of diked area of Lac du Sauvage • diversions	Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the dewatering of diked area of Lac du Sauvage leading to change in riparian habitat and caribou and wildlife distribution	• Where practical, natural drainage patterns will be unaltered to reduce the use of ditches or diversion berms.	Minimize	Applied at maximum level	No Linkage
		• The Sub-Basin B Diversion Channel design will include caribou crossing locations.	Minimize	Applied at maximum level	
		• Culverts will be installed along site access roads, as necessary, to maintain drainage.	Avoid	Applied at maximum level	
		• The road route alignment will minimize stream crossings and limit disturbance to sensitive habitat as feasible.	Minimize	Applied at maximum level	
		• The Sub-Basin B Diversion Channel will be designed to manage flows and minimize potential for erosion and bank instability.	Minimize	Applied at maximum level	
	Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels may alter water quality (e.g., suspended sediments, metals, and nutrients) and affect the quality of riparian habitat	• The Sub-Basin B Diversion Channel will be designed to manage flows and minimize potential for erosion and bank instability.	Minimize	Applied at maximum level	No Linkage
		• Dewatering and operational discharges will be monitored for downstream erosion and actions will be taken to prevent erosion in downstream lakes and channels	Avoid	Applied at maximum level	
		• Standard erosion and sediment control measures (e.g., silt curtains, runoff management) will also be used during construction around areas to be disturbed, where appropriate.	Minimize	Applied at maximum level	
	Nets set for the fish-out of the diked area of Lac du Sauvage before dewatering may increase risk of injury or mortality to loons and other diving bird species	• Lessons learned from previous fish-outs will be taken to reduce risk of mortalities of loons from nets based on experience at the Ekati mine and other recent northern fish-out projects.	Minimize	Applied at maximum level	Secondary
	Injury or mortality to animals from being trapped in exposed lakebed sediments	• By design, the dewatered portion of Lac du Sauvage will be contained within the Jay Dike, which restrict access to animals.	Avoid	Applied at maximum level	No Linkage
Waste Rock Management	Ingestion of seepage and surface runoff from WRSAs and kimberlite stockpiles, or ingestion of water, soil, and vegetation that has been chemically altered by seepage and surface runoff may affect caribou and wildlife health	• Metasediment rock mined from the Jay open pit will be encapsulated within a thermally protective cover layer of granite such that metasediment is frozen into permafrost; this method continues the approach that was successfully established at the Ekati mine for the Misery WRSA.	Minimize	Applied at maximum level	No Linkage
		• Mine rock used to construct the dikes will be non-potentially acid generating (non-PAG).	Avoid	Applied at maximum level	
	Surface runoff and seepage from the WRSAs and kimberlite stockpiles may change habitat quality	• The WRSA will include a basal layer of non-potentially acid generating (non-PAG) granite that enhances permafrost aggradation and physically separates potentially reactive materials from direct contact with the naturally low pH of natural tundra runoff.	Avoid	Applied at maximum level	No Linkage
General Closure and Decommissioning Activities • back-flooding of Jay Pit • seepage	Changes in surface flows (e.g., isolation and diversion, altered drainage patterns) and water levels from the back-flooding of diked area of Lac du Sauvage alters riparian habitat and caribou distribution	• The existing Ekati Mine Interim Closure and Reclamation Plan will be expanded to include the Jay Project.	Reclaim	Used as required	No Linkage
		• Dike breaching and re-flooding of the dewatered area will be done in a controlled manner so water levels will be equalized on both sides of the dike, and back-flooding will be managed to avoid adverse effects in source waterbodies and downstream.	Avoid	Applied at maximum level	
		• The Sub-Basin B Diversion Channel will be reclaimed at closure so that water flows through the natural drainage pattern to Lac du Sauvage.	Reclaim	Used as required	
		• The road route alignment will minimize stream crossings and limit disturbance to sensitive habitat as feasible.	Minimize	Applied at maximum level	
		• During excavation of dike breaches, silt curtains, and other sediment and turbidity mitigation will be used as appropriate.	Minimize	Applied at maximum level	
		• Reclamation of shoreline and shallow areas within the diked area will include localized repair of erosion and revegetation with aquatic and riparian plants, as necessary.	Reclaim	Used as required	

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Project Component / Activity	Effects Pathway	Mitigation	Hierarchical Classification	How Mitigation Can be Managed	Pathway Assessment
	Ingestion of seepage and surface runoff from WRSAs after closure, or ingestion of water, soil, and vegetation that has been chemically altered by long-term seepage and surface runoff may affect caribou health	• Following established Ekati mine WRSA practices, PAG metasediment rock will be encapsulated within a thermally protective cover layer of granite to facilitate and maintain permafrost development.	Avoid	Applied at maximum level	No Linkage
Accidents and Malfunctions	Ingestion of soil, vegetation, or water that has been altered by chemical spills (i.e., fuels, petroleum products, reagents, pipelines) on site affecting caribou and wildlife health	• The existing Spill Contingency Plan in place for the Ekati mine and will be expanded to include the Jay Project.	Minimize	Applied at maximum level	No Linkage
		• Regular equipment maintenance (e.g., regular checks for leaks) will continue.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Drip trays and/or absorbent pads are used during servicing and refuelling.	Avoid	Applied at maximum level	
		• All hazardous substances are stored and handled on site in accordance with applicable regulations.	Minimize	Applied at maximum level	
		• Fuel is stored at a central bulk fuel farm at the Ekati main camp, and at satellite fuel farms located at Misery, Fox, and Koala North. Fuel tanks are contained within berms.	Minimize	Applied at maximum level	
		• The Project will follow existing standard policies in the event of a spill; spill response training is provided and updated.	Minimize	Can be intensified or reduced through monitoring and Adaptive Management	
		• Soil and snow affected by hydrocarbon spills will continue to be handled in accordance with the existing Hydrocarbon-Impacted Materials Management Plan, and will be remediated in the landfarm or shipped off-site.	Reclaim	Used as required	
		• Mine water management in the Wastewater and Processed Kimberlite Management Plan will include the pipelines used for ongoing water management of the Jay Pit.	Minimize	Applied at maximum level	
		• Mine water and fine processed kimberlite slurry pipelines will be monitored and inspected throughout construction, operations, and closure to identify areas requiring maintenance and prevent leaks.	Minimize	Applied at maximum level	
		• Any leaks or spills identified along the pipelines will be addressed immediately, and clean-up, if required, will be implemented following the existing Spill Contingency Plan.	Minimize	Applied at maximum level	

WRSA = Waste Rock Storage Area; PAG = potentially acid generating; non-PAG = non-potentially acid generating; m = metre; WEMP = Wildlife Effects Monitoring Plan.

APPENDIX F

STANDARD OPERATING PROCEDURES AND DATASHEETS

Note: The standard operating procedures and datasheets will be included in future revisions of the Wildlife Effects Monitoring Plan