ARCTIC CANADIAN DIAMOND COMPANY

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March 10, 2023

Dr. Brett Elkin
Assistant Deputy Minister
Environment and Natural Resources
Government of the Northwest Territories

RE: Submission of the Ekati Diamond Mine Updated Wildlife Management and Monitoring Plan

Arctic Canadian Diamond Company Ltd., (Arctic Canadian) is pleased to provide Environment and Natural Resources (ENR) with a copy of the updated Wildlife Management and Monitoring Plan (WMMP) for the Ekati Diamond Mine for review.

Per the agreed upon process outlined below, Arctic Canadian has uploaded final responses to stakeholder comments to the Wek'èezhìı Land and Water Board via their Online Review System and updated the WMMP accordingly:

- Arctic Canadian received draft stakeholder comments on December 19, 2022;
- Arctic Canadian hosted a workshop on February 3, 2023;
- Arctic Canadian received final stakeholder comments on February 17, 2023; and
- Arctic Canadian would provide final comment responses and submission of the WMMP to ENR by March 10, 2023.

Arctic Canadian is grateful for the stakeholder feedback received during the workshop on February 3, as well as the follow-up workshop on February 10, 2023 (i.e., to cover material not discussed in the previous workshop due to time constraints). Arctic Canadian feels general agreement on major concerns have been achieved for ENR to make a determination on the WMMP (i.e., Arctic Canadian does not think that an additional round of comments/responses is necessary).

Please contact the undersigned at Tommy.Thorsteinsson@arcticcanadian.ca or Harry O'Keefe at Harry.O'Keefe@arcticcanadian.ca if you have any questions or concerns.

Sincerely,

Tommy Thorsteinsson
Wildlife Advisor
Record #:HSE RCD ENV 1,824;
Date: 10-Mar-2023
Template # EKA TEM 1852.13

ARCTIC CANADIAN DIAMOND COMPANY

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Ekati Diamond Mine

Wildlife Management and Monitoring Plan

March 2023

Executive Summary

The Ekati Diamond Mine is located in the Northwest Territories, approximately 200 kilometres (km) south of the Arctic Circle and 300 km northeast of Yellowknife. Construction of the Ekati Diamond Mine began in 1997 and the mine officially went into production in October 1998 as the first diamond mine in Canada. It has one open pit (Sable) and one underground mine (Misery Underground) in active mine development and production. Mining in seven open pits and three underground developments have been completed. Development at the Point Lake site began in late 2021, and will include the Point Lake Open Pit, a short access road and adjacent utility pad, a waste rock storage area and seepage collection sump, and an overburden stockpile.

This document, the Ekati Diamond Mine Wildlife Management and Monitoring Plan (WMMP), replaces the previous Wildlife Effects Monitoring Plan (WEMP; Golder Associates 2017a) and incorporates revisions based on engagement and feedback from regulators including the Government of the Northwest Territories Environment and Natural Resources department (GWNT ENR), the Independent Environmental Monitoring Agency, Indigenous governments and organizations. It includes mitigation and monitoring previously contained separately within the Caribou Road Mitigation Plan (CRMP; Golder Associates 2017b) and serves to meet Arctic Canadian's obligations under the Environmental Agreement and federal and territorial Acts and regulations.

Wildlife Valued Ecosystem Components (VECs) include barren-ground caribou (*Rangifer tarandus groenlandicus*), grizzly bears (*Ursus arctos*), wolves (*Canis lupus),* wolverine (*Gulo gulo*), and raptors. Other non-VEC species such as fox and migratory birds are also included in mitigation and monitoring activities. Wildlife mitigation and monitoring has been implemented since the first WEMP was established in 1997 to address the potential impacts and key environmental risks for wildlife of: habitat alteration and loss; injury or mortality due to wildlife-vehicle, wildlife-aircraft and human-wildlife interactions; attraction and increased human-wildlife interactions and increased predator numbers; disturbance from noise, human presence, vehicles, and aircrafts; effects on health (toxins, metals etc.); changes in caribou migration routes and population decline; caribou interactions with linear features (roads and power lines); caribou interactions with mine activities and infrastructure (other than roads); and habituation of carnivores and migratory bird interactions with mine activities and infrastructure.

Mitigation is implemented following the mitigation hierarchy of avoid, minimize, reclaim, and offset. Examples of avoidance include avoiding sensitive landscape features such as eskers and caribou crossings through infrastructure design and input from Traditional Knowledge holders. Temporal avoidance is also used to avoid incidental take of birds by conducting ground clearing activities outside of the migratory bird breeding and nesting period. Many mitigation activities are implemented to minimize risks to wildlife such as reduced vehicle speeds, giving wildlife right-of-way on roads, constructing caribou crossings along roads and pipelines, managing waste to minimize attractants, deterring wildlife when needed to reduce human-wildlife conflicts, and implementing other related management plans. Reclamation activities are implemented following the Interim Closure and Reclamation Plan (2018).

Monitoring includes determining habitat loss based on infrastructure footprint size; determining the effectiveness of waste management; documenting wildlife incidents and mortalities; recording incidental observations of mammals and birds; monitoring caribou along linear features, at the Long Lake Containment Facility, through behavioural surveys, and analysis of data from camera traps and satellite collars; and monitoring associated with the CRMP, and pit nesting raptor deterrence.

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Acronyms and Abbreviations

AEMP	Aquatic Effects Monitoring Program
AQEMMP	Air Quality and Emission Monitoring and Management Plan
Arctic Canadian	Arctic Canadian Diamond Company Ltd.
°C	degrees Celcius
cm	centimetre
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
DDEC	Dominion Diamond Ekati Corporation
DDMI	Diavik Diamond Mines Inc.
Diavik Mine	Diavik Diamond Mine
DKFN	Deninu K'ue First Nation
DNA	deoxyribonucleic acid
EA	Environmental Assessment
ELC	Ecological Land Classification
EIR	Environmental Impact Review
EIS	Environmental Impact Statement
ENR	Environment and Natural Resources, Government of the Northwest Territories
FRMC	Fort Resolution Métis Council
GIS	Geographical Information Service
GNWT	Government of the Northwest Territories
ICRP	Interim Closure and Reclamation Plan
IEMA	Independent Environmental Monitoring Agency
KIA	Kitikmeot Inuit Association
km	kilometre
km/h	kilometre per hour
km^2	square kilometre
LLCF	Long Lake Containment Facility
LKDFN	Łutselk'e Dene First Nation
m	metre

mm	millimetre
NABBS	North American Breeding Bird Survey
NSMA	North Slave Métis Alliance
NWT	Northwest Territories
PM	particulate matter
RSA	regional study area
QA	quality assurance
QC	quality control
s	second
SARA	*Species at Risk Act*
spp.	multiple species
TCWR	Tibbitt to Contwoyto Winter Road
TK	Traditional Knowledge
VEC	valued ecosystem component
WEMP	Wildlife Effects Monitoring Plan
WMMP	Wildlife Management and Monitoring Plan
WLWB	Wek'èezhìı Land and Water Board
WROMP	Waste Rock and Ore Storage Management Plan
WRRB	Wek’èezhìı Renewable Resources Board
WRSA	waste rock storage area
YKDFN	Yellowknives Dene First Nation
ZOI	Zone of Influence
%	percent
>	greater than
<	less than

1.0 Introduction

The Ekati Diamond Mine is located in the Northwest Territories, approximately 200 kilometres (km) south of the Arctic Circle and 300 km northeast of Yellowknife (Figure 1-1). The mine is situated within the Lac de Gras watershed at the headwaters of the Coppermine River drainage basin, which flows north to the Arctic Ocean (Figure 1-1). The Ekati Diamond Mine is located 100 km north of the tree line on the Arctic tundra in a semi-arid environment. Construction of the Ekati mine began in 1997 and officially went into production in October 1998 as the first diamond mine in Canada.

1.1 Background

In 1994, baseline wildlife studies were first undertaken as part of an Environmental Impact Assessment for the proposed Ekati 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) and updated in 2017 with mitigation for the Jay Project including the Caribou Road Mitigation Plan (CRMP; Golder Associates 2017b). Through adaptive management and input from Indigenous communities, the Independent Environmental Monitoring Agency (IEMA) and government these plans have evolved into the Wildlife Management and Monitoring Plan (WMMP) presented in this document.

The Environmental Agreement focused on environmental matters that are supplementary to the statutory terms and conditions addressed under legislation, regulations, leases, and permits. Article VI of the Environmental 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 Environmental 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 Ekati Diamond Mine does not significantly adversely affect the receiving and surrounding environment. The Environmental 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.

Figure 1-1: Location of the Ekati Diamond Mine, Northwest Territories

The Wildlife Effects Monitoring Program is a requirement of the Environmental Agreement (Articles V and VII) and the *Wildlife Act* (subsection 95 [1988]) for the Ekati Diamond Mine. The Wildlife Effects Monitoring Program is guided by the WMMP. The WMMP is based on the predicted effects to wildlife identified in the initial Environmental Impact Statement (EIS; BHP Billiton 1995), the Environmental Assessment Report for the Sable, Pigeon, and Beartooth Kimberlite Pipes (BHP and Dia Met 2000), the Developer's Assessment Report (DAR; DDC 2014) for the Jay Project, and the Point Lake Project Description (Arctic Canadian 2021b). Although the Jay Project has been canceled, the wildlife monitoring and mitigation initiatives for the area (i.e., the CRMP) have been adopted and implemented site wide and will be also applied to the Point Lake Project. The WMMP is a living document that is reviewed every five years and updated as needed. On June 1st, 2017 Arctic Canadian received conditional approval for the Wildlife Effects Monitoring Plan, including the Caribou Road Mitigation Plan (GNWT 2017). Final approval was received in July, 2018. Through a stakeholder workshop in December 2021 and subsequent comment and response cycles, the Point Lake WEMP Addendum (Arctic Canadian 2021a) was finalized in 2022 with post-dewatering monitoring initiatives intended for integration into this WMMP.

1.2 Purpose and Objectives

The Wildlife Effects Monitoring Program has been conducted since 1997. This document, now referred to as the Wildlife Management and Monitoring Plan (WMMP) is an update to the 2017 WEMP (Golder Associates 2017a). There are eight main components of the WMMP intended to evaluate the environmental impact predictions and potential effects on VECs, and to address key residual environmental risks to wildlife as identified in the Environmental Impact Report (EIR; (DDEC 2019), the pathways identified in the Jay Project DAR (DDC 2014), and potential impacts of the Point Lake Project (Arctic Canadian 2021b):

1. Monitoring caribou;
2. Monitoring carnivores, including grizzly bears, wolves, wolverine, and foxes;
3. Monitoring raptors and migratory birds;
4. Monitoring interactions between wildlife and traffic, and assessing success of mitigation efforts;
5. Monitoring wildlife mortalities and incidents and assessing the effectiveness of mitigation efforts;
6. Monitoring potential wildlife attractants and assessing the effectiveness of waste management efforts;
7. Inspecting buildings (i.e., accommodation skirting) and fencing structures at the Ekati Diamond Mine's Main Camp and Misery Camp for evidence of interaction with or disturbance by wildlife; and
8. Monitoring wildlife interactions with the Long Lake Containment Facility.

Knowledge of the effects of mining on wildlife from the monitoring undertaken to date at the Ekati Diamond Mine and other diamond mines in the NWT is considered in the WMMP, as are the requirements of the Wildlife Management and Monitoring Plan: Process and Guidelines (GNWT 2021) and the Annotated Table of Contents: Wildlife Management and Monitoring Plans (GNWT 2019). This document is also intended to engage interested parties and solicit feedback on these changes, including updates to monitoring programs requested by the Government of Northwest Territories Environment and Natural Resources Department (GNWT ENR).

The specific wildlife monitoring program objectives of the WMMP are summarized below in Table 1.2-1. All of the objectives for the WMMP are linked to adaptive management. The WMMP has been developed with input from community representatives and government and will remain a living document that Arctic Canadian will adjust based on adaptive management (Section 8).

Table 1.2-1: Specific Wildlife Monitoring Program Objectives

Monitoring Program		Objectives
Direct wildlife habitat loss		• Determine the amount of direct habitat loss due to ongoing development and operations of the Ekati Diamond Mine.
Waste management	Landfill monitoring Waste bin monitoring	• Monitor the misdirection of wildlife attractants and hazardous wastes at the landfill to avoid and minimize possible wildlife incidents at these locations; • Evaluate the effectiveness of waste management protocols for reducing misdirected waste at the landfill; • Identify problem areas where improvements may be required; and • Manage potential wildlife attractants, wildlife activity, and habituation to the landfill.
All wildlife	Mortalities Incidents Vehicle and aircraft interactions	• Document and mitigate potential effects of mine activities on wildlife; • Reduce risk to both wildlife and people; • Document, minimize, and mitigate potential effects of mine activities and infrastructure on wildlife; • Monitor if any wildlife are killed or injured as a result of vehicle and aircraft interactions; and • Evaluate whether preventative measures are sufficient to minimize risks of wildlife injury and mortality.
Caribou	Incidental observations	• Identify the composition of caribou groups moving through the Ekati Diamond Mine area; • Document the annual timing of caribou use of the Ekati Diamond Mine area to compare temporal trends in migration patterns; and • Track any trends in the number of caribou moving through the Ekati Diamond Mine area over years.
	Road surveys	• Determine the location, numbers, and proximity of caribou relative to the mine site roads.
	Telemetry (Zone of Influence)	• Provide advance warning of caribou approaching the study area to inform monitoring and mitigation; • Identify potential effects, investigate drivers, and evaluate effectiveness of mitigations; • Document the presence and annual timing of caribou movements relative to the Ekati Diamond Mine; and • Compare temporal trends and spatial variability in migration patterns relative to the Ekati Diamond Mine.
	Historical Zone of Influence monitoring	In 2021, Arctic Canadian produced a technical report that used an innovative analytical approach to test the theory that caribou occurrence is strongly determined by the distribution of higher quality habitat (ERM 2021a). Overall, the analyses indicated that the occurrence of caribou on the landscape can reasonably be explained by the percent of land cover classes (i.e., habitat quality) alone. The models produced in the study predict that the area north and within approximately 8 km of Lac de Gras should have very low caribou abundance because the survey cells had low percent cover of heath tundra and high percent cover of rocky terrain such as heath boulder and heath bedrock. Arctic Canadian is focused on garnering stakeholder consensus to define the objectives and methods for the telemetry analysis which will provide a more comprehensive investigation of caribou behavioural changes with increasing proximity to the mine. The telemetry analysis replaces previous methodological approaches including zone of influence monitoring.
	Behaviour	• Determine if caribou behaviour changes with distance from the mines or in response to various potential stressors; and • Behaviour is a component of the telemetry project; therefore the future of this objective will be based on the results of that project.
	Camera trapping	• Determine the level of caribou (and other wildlife) activity and traffic along active haul roads at the Ekati Diamond Mine; • Determine caribou (and other wildlife) responses to roads (i.e., crossing or deflecting); • Determine caribou (and other wildlife) activity at other mine infrastructure; and • The future objectives of this monitoring program will consider the results of the telemetry project and be designed so that results from both programs can be integrated and evaluated holistically.

Monitoring Program		Objectives
Caribou *(cont'd*	Long Lake Containment Facility (LLCF)	• 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; • Identify the presence and composition of incidental bear observations in the study area; and • Document and determine the cause of direct mine-related mortality of bears should they occur.
	Hair snagging study	From 2012 to 2017, Ekati and Diavik Diamond Mines collaborated on a Regional Grizzly Bear DNA study as part of their wildlife monitoring programs (ERM 2018a). The regional DNA study suggested that the central barrens of the Northwest Territories are productive for grizzly bears. Grizzly bear numbers appear to be stable to increasing since estimates for the Slave Geological Province were last obtained in the late 1990s (3.5/1,000 km^2; McLoughlin and Messier 2002). These results provided evidence in support of the conclusion that the Ekati and Diavik Diamond Mines, which have been constructed since the last grizzly bear survey in the late 1990s, have not had a negative impact on the regional population of grizzly bears in the Slave Geological Province. This study is now completed and based on the results of the research, grizzly bear monitoring now is specific to incidental observations and documenting incidents as there wasn't evidence of regional impacts.
Wolf	Incidental observations	• Avoid and minimize wolf-human interactions; • Identify the presence and composition of incidental wolf observations in the study area; and • Document and determine the cause of direct mine-related mortality of wolves should they occur.
	Den occupancy and productivity	Regional wolf monitoring including den occupancy and productivity surveys were coordinated by the GNWT ENR and over the years operators of the mine have collaborated in support of the wolf monitoring initiatives. Den monitoring is no longer an active component of the WMMP. Wolf monitoring is specific to incidental observations and incidents as previous studies did not indicate impacts were occurring at a regional scale.
Wolverine	Incidental observations	• Avoid and minimize wolverine-human interactions; • Identify the presence and composition of incidental wolverine observations in the study area; and • Document and determine the cause of direct mine-related mortality of wolverines should they occur.
	Hair snagging study	In 2015, the mine participated in the wolverine DNA program conducted by GNWT ENR. Nineteen individual wolverines were identified from the samples collected in the Ekati Diamond Mine study area in 2015 (Efford and Boulanger 2018). The 2015 density was calculated as 3.88 wolverines per 1,000 km2 (95% confidence interval: 2.60 – 5.79); the overall population trend in the Ekati Diamond Mine study area from 2005 to 2015 was λ = 0.982 (95% confidence interval: 0.931 – 1.035). Efford and Boulanger (2018, p.15) assessed the finding as providing no evidence for population decline in the Ekati Diamond Mine study area. This study is now completed and wolverine monitoring is specific to incidental observations and documenting incidents as the previous research did not indicate regional impacts.
Raptors	Incidental observations	• Avoid and minimize raptor-human interactions; • Document the presence of breeding raptors at the Ekati Diamond Mine; • Document sightings of uncommon raptors or species of conservation concern in the area; and • Document and determine the cause of direct mine-related mortality of raptors should they occur.
	Pit wall nest monitoring	• Determine if pit walls or other mine infrastructure are utilized as nesting sites for raptors; • Determine nest success (occupancy and productivity) of raptor nests; and • Document effectiveness of nest deterrent efforts that may be employed.

Monitoring Program		Objectives
Raptors *(cont'd)*	Regional falcon surveys	Regional ENR falcon surveys (last conducted by ENR in 2010 on an annual cycle) were not conducted between 2012 and 2014, as per recommendations received from technical and community workshops held on June 28th, 2010 and October 5th to 6th, 2010, respectively. The surveys were repeated in 2015 and results were presented in the 2015 WEMP report (ERM 2016). Regional falcon surveys are no longer an active component of the WMMP as impacts are not occurring at that scale. As such, monitoring is specific to incidental observations and pit wall nest monitoring and deterrence when needed.
Fox	Incidental observations	• Avoid and minimize fox-human interactions; • Identify the presence and composition of incidental fox observations in the study area; • Document and determine the cause of direct mine-related mortality of foxes should they occur; and • Document abnormal behaviour in foxes to identify possible cases of rabies.
Migratory birds	Incidental observations	• Document the presence of migratory birds at the Ekati Diamond Mine; • Document sightings of uncommon birds or species of conservation concern in the area; and • Document and determine the cause of direct mine-related mortality of migratory birds should they occur.
	North American breeding bird surveys	A study conducted at the Ekati Diamond Mine suggests that migratory bird species that prefer open-disturbed habitat may be attracted to mine infrastructure, while other species may avoid developments (e.g., Smith et al. 2005). However, since changes in behaviour were localized and similar to predicted effects this survey is no longer an active component of the WMMP. As such, monitoring is specific to incidental observations and documenting incidents.
Rare or uncommon species	Incidental observations	Document presence of rare or uncommon species at the Ekati Diamond Mine.

2.0 Project Description

2.1 Ekati Diamond Mine

The Ekati Diamond Mine started production in October 1998 and as of 2022, has been in production for 24 years. The mine site spreads over several watersheds. The main mine site, within the Koala Watershed, includes: the process plant, the Long Lake Containment Facility (LLCF), three waste rock storage areas (WRSA), the main employee camp (Main Camp), an airstrip, and haul truck roads. The Main Camp has accommodations for approximately 700 people. The King-Cujo Watershed includes Misery Pit, Lynx Pit, WRSAs, Kind Pond Settling Facility, a crusher pad, Lac du Sauvage Road and a small employee camp (Misery Camp). The area is linked to the Main Camp by the Misery Road (Figure 2.1-1). The Carrie Pond watershed includes a portion of Misery Pit, a WRSA, and Desperation Sump. The Pigeon-Fay and Upper Exeter Watersheds contain the Pigeon Pit and Pigeon Stream Diversion. The Horseshoe Watershed contains Sable Pit, WRSAs, and the Two Rock Sedimentation Pond. The Point Lake Watershed contains the site of the Point Lake development (Figure 2.1-2). A short access road to the future Point Lake Open Pit and a utility pad were constructed in late 2021.

The Point Lake development involves the construction and operation of a satellite open pit, the Point Lake Open Pit, in close proximity to the existing Misery site. The Point Lake development requires the dewatering and fish-out of Point Lake and will also require an associated waste rock storage area (WRSA) with seepage collection sump, and an overburden stockpile. The dewatering of Point Lake began in July 2022 is expected to be completed in 2023. Once dewatering is completed, mining activity will begin.

The Ekati Diamond Mine currently has one open pit (Sable) and one underground mine (Misery Underground) in active mine development and production (Figure 2.1-1). Mining production in Pigeon Pit was concluded in April 2022. Seven open pits, Panda, Koala, Misery, Koala North, Beartooth, Fox, and Pigeon have completed development and production and are now closed. Three underground operations, Koala, Koala North and Panda have also completed development and production and are now closed. Beartooth, Panda and Koala pits have all become containment facilities for fine processed kimberlite.

During normal operation, the site is accessible by Arctic Canadian charter plane from Calgary and Yellowknife. A winter road provides truck access for materials and supplies. The current mine life is anticipated to be until 2028. Mine life could be extended if innovative technologies allow for further extraction of resources from Sable, Fox, and Point Lake kimberlites.

2.2 The Ekati Diamond Mine Wildlife Study Area

Wildlife monitoring around the Ekati Diamond Mine is conducted in a study area of 2,800 km^2 (Figure 2.2-1). The predominant vegetation type within the study area is heath tundra. The study area is characterized by several large eskers that provide travel routes for barren-ground caribou (*Rangifer tarandus groenlandicus)* and denning habitat for wolves (*Canis lupus*) and grizzly bears (*Ursus arctos)*. Numerous grass and sedge wetland areas provide food for grizzly bears in the spring and breeding habitat for migrating shorebirds, waterfowl, and some songbird species. Rocky cliffs and outcrops near lakes provide nesting areas for falcons and hawks. Other species known to inhabit the study area throughout the year include wolverine (*Gulo gulo*), arctic ground squirrel (*Spermophilus parryii*), arctic fox (*Alopex lagopus*), red fox (*Vulpes vulpes*), lemmings (numerous species), arctic hare (*Lepus arcticus*), ptarmigan (*Lagopus* sp.), and occasionally muskox (*Ovibos moschatus*) and moose (*Alces alces*).

Figure 2.1-1: The Ekati Diamond Mine Site Map

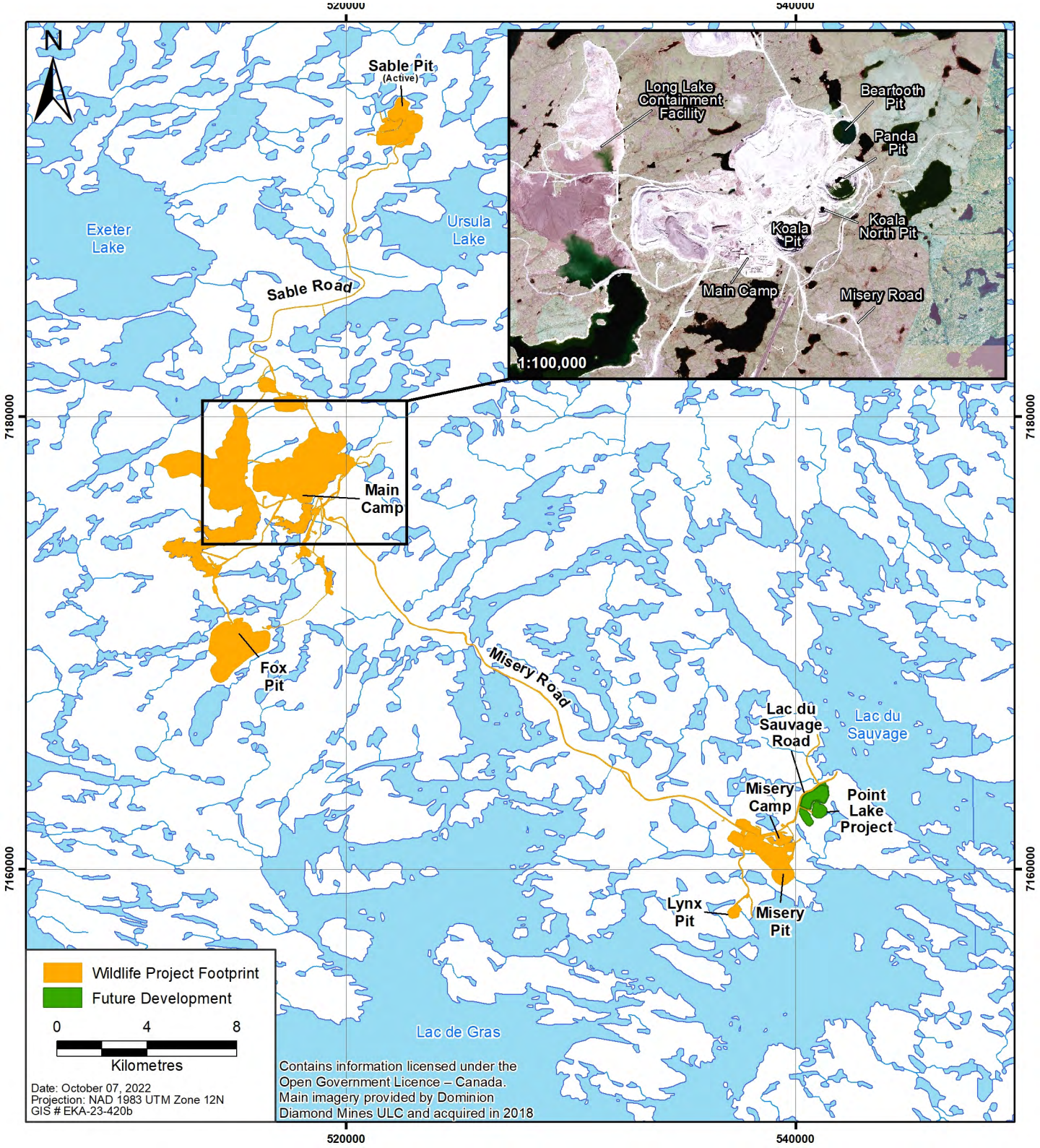


Figure 2.1-2: Point Lake Project Infrastructure

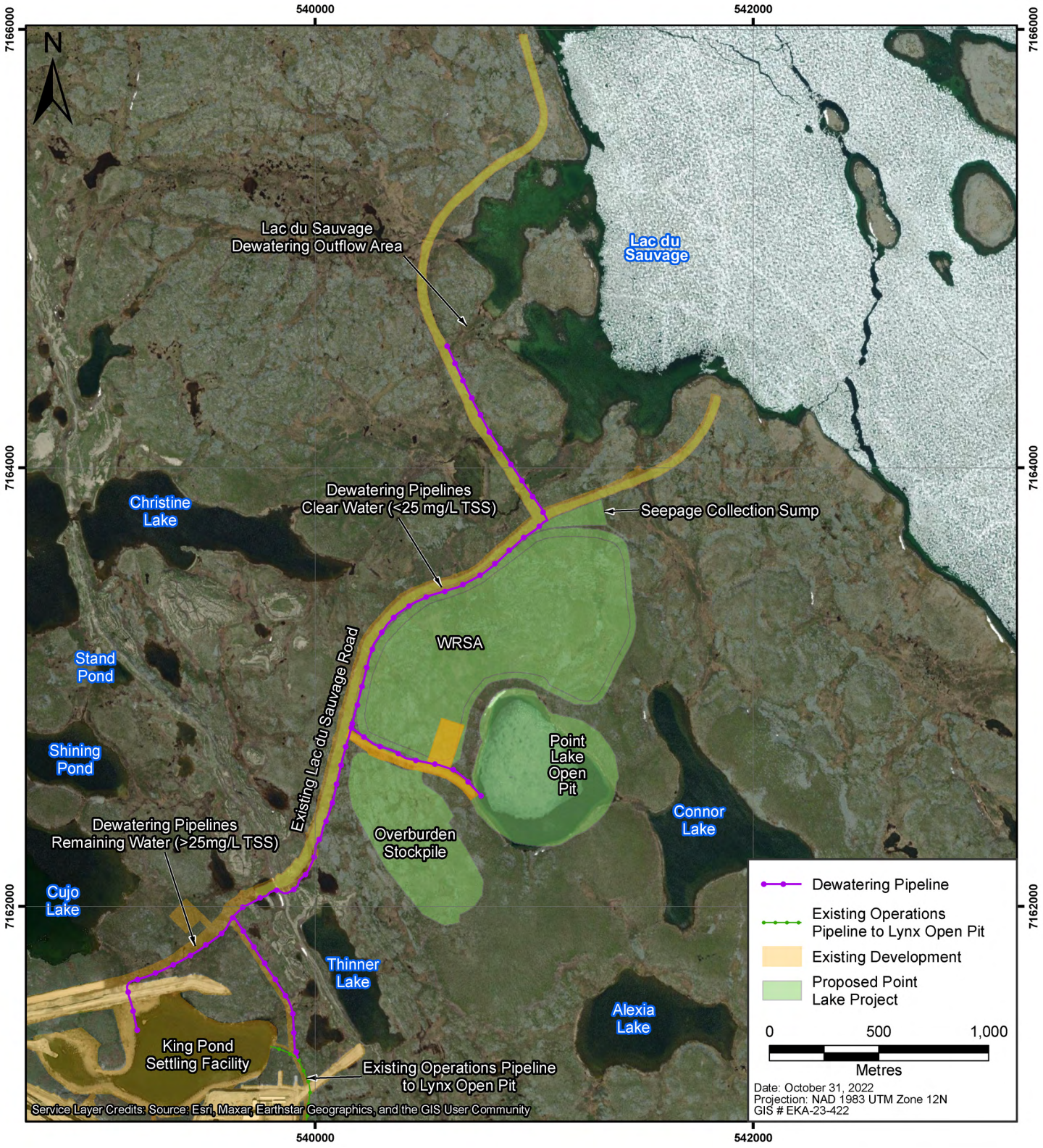
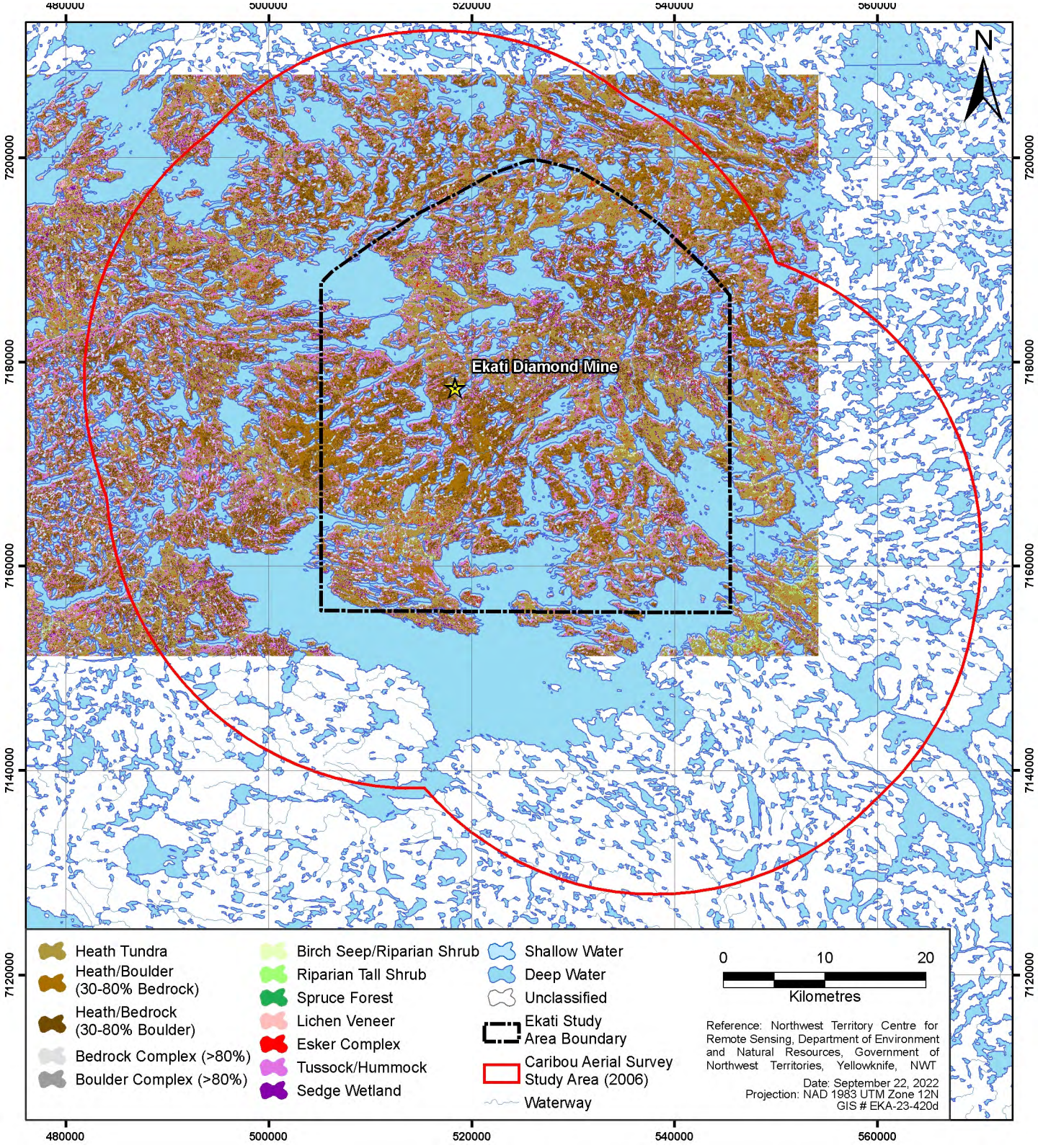


Figure 2.2-1: Ekati Diamond Mine Wildlife Study Area



3.0 Plan Context and Engagement

3.1 Concordance

The WMMP serves to meet Arctic Canadian's obligations to a range of authorities. This includes various Acts and regulations relevant to wildlife in the NWT (Table 3.1-1). The WMMP also serves to meet the requirements of the Wildlife Management and Monitoring Plan: Process and Guidelines (GNWT 2021) and the Annotated Table of Contents: Wildlife Management and Monitoring Plans (GNWT 2019). The sections of the WMMP that pertain to the NWT Acts and regulations, and the guidelines for wildlife and wildlife habitat protection and monitoring have been identified in Table 3.1-1.

Table 3.1-1: Concordance of Legislation/Regulation Requirements and Wildlife Management and Monitoring Plan

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WMMP	Responsible Regulatory Agency
Environmental Agreement	• 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.	Entire document	GNWT
Migratory Birds Convention Act (1994), Migratory Bird Regulations (2022)	The *Migratory Bird Convention Act*: • Protects migratory birds, their nests and eggs anywhere they are found in Canada, including ocean waters. • Prohibits the dumping of substances harmful to birds in waters or areas frequented by them. The Migratory Bird Regulations prohibit activities which: • Capture, kill, take, injure, or harass a migratory bird or attempt to do so. • Destroy, take, or disturb an egg. • Damage, destroy, remove, or disturb a nest, nest shelter, eider duck shelter or duck box, unless the following exceptions apply: o The nest does not contain a live migratory bird or viable egg; and o The nest was not built by a species that is listed in schedule 1 of MBR 2022.	Section 5.1	CWS
NWT *Wildlife Act* (2013)	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

Legislation/ Regulation/ Agreement	Requirement	Corresponding Section in WMMP	Responsible Regulatory Agency
Species at Risk Act (2002) *Species at Risk (NWT) Act* (2009)	Arctic Canadian will adhere to requirements of all applicable Regulations or Recovery Plans that may be developed over the duration of the mine.	Section 4.1 Focal Species and Habitats	CWS GNWT
NWT *Wildlife Act* (2013)	Wildlife Management and Monitoring Plan: Process and Guidelines (GNWT 2021) a. A description of the impacts of the development on wildlife and wildlife habitat b. A description of how those impacts will be mitigated c. A description of mitigation monitoring d. A description of project-specific wildlife effects monitoring e. A description of how the WMMP will contribute to regional-scale wildlife monitoring and/or cumulative effects research, assessment of management Annotated Table of Contents: Wildlife Management and Monitoring Plans (GNWT 2019) 1. Executive Summary 2. Introduction 3. Development Project Description a. Overview b. Map 4. Context a. Concordance table b. Engagement c. Associated plans 5. Potential Impacts a. Wildlife species and habitat b. Potential impacts 6. Wildlife and Wildlife Habitat Mitigation 7. Monitoring 8. Support for Research or Cumulative Effects Assessment, Monitoring or Management Initiatives 9. Adaptive Management 10. Reporting Protocols 11. Roles and Responsibilities 12. Literature Cited 13. Glossary 14. Appendices	WMMP: Process and Guidelines (GNWT 2021) a. Section 4 Potential Impacts b. Section 5 Mitigation c. Section 6 Monitoring d. Section 6 Monitoring e. Section 5.4.1.1 Annotated TOC: WMMPs (GNWT 2019) 1. Executive Summary 2. Section 1 Introduction 3. Section 2 Project Description a. Section 2.1 b. Figures 2.1-1 and 2.1-2 4. Section 3 Plan Context and Engagement a. Table 3.1-1 b. Section 3.2 Engagement and Incorporation of TK c. Section 3.3 Related Documents 5. Section 4 Potential Impacts a. Section 4.1 Focal Species and Habitats b. Section 4.2 Potential Impacts and Key Environmental Risks to Wildlife 6. Section 5 Mitigation 7. Section 6 Monitoring 8. Section 5.4.1.1 9. Section 8 Adaptive Management 10. Section 9 Reporting Protocols 11. Section 10 Roles and Responsibilities 12. Section 11 References 13. Acronyms and Abbreviations 14. Appendices	GNWT

3.2 Engagement and Incorporation of Traditional Knowledge

As part of their commitment to the environment, Arctic Canadian 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 WMMP 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 monitoring program is refined as a result of previous information collected and input from government and non-government agencies, Indigenous 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 WMMP will continue to evolve as Arctic Canadian explores further options to improve the program through community and regulatory workshops, community assistant participation, and site visits.

Arctic Canadian is responsible for engagement with Indigenous people. In taking ownership of the Ekati Diamond Mine, Arctic Canadian is responsible for respecting existing Impact-Benefit Agreements, and abiding by the Environmental Agreement. As well, Arctic Canadian has committed to work with communities so that TK is incorporated into the day-to-day operation of the Ekati Diamond Mine where appropriate. Arctic Canadian is committed to engaging with communities to explain changes to the WMMP, to listen to comments, respond to questions, and consider suggestions to improve the wildlife monitoring programs. Arctic Canadian continues to seek recommendations for improvements from the technical and community workshops to incorporate into future versions of the WMMP.

The Yellowknives Dene First Nation (YKDFN), Kitikmeot Inuit Association (KIA), Łutselk'e Dene First Nation (LKDFN), Deninu K'ue First Nation (DKFN), Fort Resolution Métis Council (FRMC), North Slave Métis Alliance (NSMA) and Tłı̨chǫ were invited to a workshop at the Ekati Diamond Mine as part of the 2018 Ekati Diamond Mine Community Caribou Engagement Program. Representatives from FRMC, DKFN, Hamlet of Kugluktuk, KIA, LKDFN, IEMA, and the Tłı̨chǫ Government were present for the workshop held on September 11 and 12, 2018. During Day 1 of this meeting caribou crossings were discussed in detail and included a site visit to view the existing Sable and Lac du Sauvage (formerly Jay Road) caribou crossings. Day 2 focused on TK research into zone of influence.

To expand on caribou monitoring programs in 2019, Arctic Canadian continued its commitment to engagement. Arctic Canadian hosted a site-tour with the KIA on October 24th, 2019 that was focused on the Sable Road caribou crossings and receiving feedback and recommendations for these crossings. Arctic Canadian also supported the following TK Community Based Projects in 2019: Tłı̨chǫ – Boots on the Ground Caribou Monitoring, Łutselk'e Dene First Nation – Moccasins on the Ground Caribou Monitoring, and Yellowknives Dene First Nation – Dene on-the-land Caribou Monitoring Programs.

Mitigation measures, including caribou crossing ramps along the Misery, Sable, and Lac du Sauvage roads, constructed of compacted fine crushed rock particle using 6 to 8 inch minus fill, are designed to enable wildlife to cross these linear features, minimizing the likelihood of habitat fragmentation. Information derived from TK and community engagement sessions have facilitated the design and location of caribou crossing ramps along these roads. Engagement with communities and TK holders helped to optimize the configuration of the WRSA and overburden stockpile at the Point Lake site to minimize potential effects to caribou movement to the extent possible.

Members of the YKDFN, KIA, LKDFN, DKFN, FRMC, NSMA and Tłı̨chǫ communities had a site tour of the Point Lake area during the summer of 2022. Information about the Point Lake development was shared including the current status of the project with an emphasis on caribou mitigation and monitoring, and a tour of the Point Lake area to obtain TK and community feedback.

3.2.1 Engagement and Traditional Knowledge for the Caribou Road Mitigation Plan

Arctic Canadian's community engagement program has indicated that the Lac du Sauvage Road area is important for caribou movement. Increased traffic along the Misery, Sable and Lac du Sauvage roads that may result in barriers to the movement of caribou and other wildlife at the Ekati Diamond Mine site is a key concern for Arctic Canadian and communities.

The Caribou Road Mitigation Plan (CRMP) applies to all roads at the Ekati Diamond Mine and provides an effective framework to guide additional mitigation actions to address any barrier effects. The CRMP actions included the incorporation of Traditional Knowledge, monitoring of mitigation effectiveness, and adaptive management to refine mitigation actions through time. During the development of the CRMP Arctic Canadian 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. Community engagement for other Ekati Diamond Mine roads has facilitated design and location of caribou crossings.

3.3 Related Documents

Because the Ekati Diamond has been operating for 24 years, multiple environmental monitoring programs and management plans are in place, and have been effectively improved over time through adaptive management. The key Ekati Diamond Mine monitoring programs and management plans are briefly described below (Table 3.3-1).

Table 3.3-1: Selected Management Plans for the Ekati Diamond Mine

Management Plan	Description
Aquatic Effects Monitoring Program (AEMP) Design Plan	The AEMP Design Plan describes the monitoring that is carried out in the aquatic Receiving Environment with a focus on detecting change and assessing its magnitude and extent to determine whether observed changes may be mine-related.
Spill Contingency Plan, Version 15.1	The Spill Contingency Plan ensures immediate and effective handling of a major environmental emergency, and minimizes danger to personnel, property and the environment.
Waste Management Plan, Version 8.1	The objective of the Waste Management Plan is to maintain a safe and healthy workplace at the Ekati Diamond Mine and ensure that potential adverse effects to the environment and wildlife are minimized through sound waste management practices. Arctic Canadian staff, contractors and stakeholders are provided clear direction on how waste from the Ekati Diamond Mine is managed through each of the waste streams to final disposal.
Waste Rock and Ore Storage Management Plan, Version 11.1	The Waste Rock and Ore Storage Management Plan (WROMP) describes the environmental characteristics of waste rock and kimberlite, and the design approach that is used at the Ekati Diamond Mine to mitigate environmental risks from waste rock and kimberlite ore.
Wastewater and Processed Kimberlite Management Plan, Version 9.0	The objective of the wastewater and processed kimberlite management systems is to prevent significant adverse environmental effects from occurring in the downstream Receiving Environment as a result of Minewater Discharge, and to ensure the disposal of processed kimberlite does not result in significant adverse environmental effects.
Interim Closure and Reclamation Plan (ICRP), Version 3.0	Reclamation of the Ekati Diamond Mine site is described in the ICRP. This plan is an integrated and all-inclusive plan as required under the Water Licence and Environmental Agreement. The ICRP considers each area of the mine separately: open pits, underground mines, waste rock storage areas, processed kimberlite containment areas, water management infrastructure, and buildings and infrastructure. It includes a reclamation objective of focusing on local native vegetation communities which will allow reestablishment of wildlife habitat.
Air Quality Monitoring Plan	The AQMP includes monitoring methodologies and monitoring locations and addresses air quality monitoring and management using an adaptive approach to managing air quality.
Engagement Plan, Version 4.1	This plan is used as a basis for engagement for ongoing operations and for projects conducted at the Ekati Diamond Mine site.

4.0 Potential Impacts

4.1 Focal Species and Habitats

4.1.1 Valued Ecosystem Components

Valued Ecosystem Components (VECs) represent physical, biological, cultural, social and economic properties of the environment that are considered by society to be important. VECs also include species of conservation concern. For the purposes of the WMMP, wildlife species may be considered of conservation concern as a result of their federal or provincial status. Federal status includes those listed on Schedule 1 of the *Species at Risk Act* (*SARA*; 2002, Government of Canada 2022) and by COSEWIC (Committee on the Status of the Endangered Wildlife in Canada; Government of Canada 2022). Territorial status includes those listed on the *NWT Species at Risk Act* (2009) or by the Canada Wild Species Working Group (CESCC 2016). Wildlife VECs selected for the WMMP and the rationale for their selection are provided in Table 4.1-1.

Table 4.1-1: Wildlife Valued Ecosystem Components

Valued Ecosystem Component	Rationale
Barren-ground caribou	Barren-ground caribou (*Rangifer tarandus groenlandicus*) are seasonal migrants to the area, are a biologically and culturally important component in the Arctic, and are a species of conservation concern (federally designated as "*Threatened*" by COSEWIC, not listed on SARA Schedule 1 [Government of Canada 2022]). On July 11, 2018 barren-ground caribou were listed as "*Threatened*" under the *Species at Risk (NWT) Act*.
Grizzly bear	Grizzly bears (western population; *Ursus arctos*) are a species of conservation concern (federally designated as "*Special Concern*" by COSEWIC and SARA Schedule 1, and listed as "*Vulnerable*" in the Northwest Territories [CESCC 2016]). Arctic Canadian monitors grizzly bears near infrastructure.
Wolf	Wolves (*Canis lupus*) are "*Secure*" in the Northwest Territories (CESCC 2016) and are not listed federally, but Arctic Canadian monitors wolves near infrastructure.
Wolverine	Wolverine (*Gulo gulo*) are a species of conservation concern (federally designated as "*Special Concern*" by COSEWIC and SARA Schedule 1, and listed as "*Vulnerable*" in the Northwest Territories [CESCC 2016]). Arctic Canadian monitors wolverines near infrastructure.
Raptors	Two species of raptors are species of conservation concern: Peregrine falcon (*Falco peregrinus anatum/tundrius*; federally designated as "*Not-at-Risk*" by COSEWIC, listed as "*Special Concern*" on *SARA* Schedule 1, listed as "*Vulnerable*" in the Northwest Territories [CESCC 2016]) and short-eared owl (*Asio flammeus*; federally designated as "*Threatened*" by COSEWIC, listed as "*Special Concern*" on *SARA* Schedule 1, listed as "*Vulnerable*" in the Northwest Territories [CESCC 2016]). The peregrine falcon and other raptor species nest on cliffs in the Ekati Diamond Mine regional study area while the short-eared owl nests on the ground. Arctic Canadian monitors cliff-nesting raptor use of pit walls for breeding.

The red-necked phalarope (*Phalaropus lobatus*) and rusty blackbird (*Euphagus carolinus*) are both listed as "*Special Concern*" by COSEWIC and on *SARA* Schedule 1 (Government of Canada 2022). Harris's sparrow (*Zonotrichia querula*) is listed as "*Special Concern*" by COSEWIC but does not have a status under *SARA* Schedule 1. Lesser yellowlegs (*Tringa flavipes*) is listed as "*Threatened*" by COSEWIC but does not have a status under *SARA* Schedule 1. Barn swallow (*Hirundo rustica*) and bank swallow (*Riparia riparia*) are both listed as "*Threatened*" by COSEWIC and on *SARA* Schedule 1. Red-necked phalarope, rusty blackbird, and lesser yellowlegs are also listed as "*Vulnerable*" in the NWT. Based on these rankings, these are considered species of concern at the Ekati Diamond Mine for purposes of the WMMP.

Other non-VEC wildlife species, such as fox, are monitored because they interact with the mine regularly. Incidental observations of other wildlife species during monitoring, such as moose and muskox are also be recorded. Following the principles of adaptive management, the VECs and monitoring objectives may be periodically reviewed and changed as necessary.

4.1.1.1 Caribou

Barren-ground caribou are a biologically and culturally important species in the Arctic. Caribou not only sustain wild predator populations such as wolves, grizzly bear, and wolverine, but also provide a critical resource for human populations living in the North, particularly Indigenous communities. Hunting, disease, predation, industrial activities, and environmental variability can affect caribou numbers. Potential effects from industrial activities occurring within the species range have been monitored for management of caribou for more than 20 years. To date, the effects of industrial activities on caribou population declines have not been conclusively determined. As a result of recent population declines, barren-ground caribou were assessed as "*Threatened*" by COSEWIC in November 2016, but are not currently listed in Schedule 1 of *SARA* (Government of Canada 2022). On July 11th, 2018, barren-ground caribou were listed as "*Threatened*" under the *Species at Risk (NWT) Act* (2009).

Information from satellite collared adult female caribou collected by ENR and TK indicates that two barren-ground caribou herds, the Bathurst herd, and to a lesser extent the Beverly/Ahiak herd (formerly known as the Ahiak herd), have historically overlapped the area of the Ekati Diamond Mine wildlife study area (Figure 4.1-1). The historical distribution of these herds in Figure 4.1-1 represents the larger ranges occupied when populations were larger. The most southwestern portion of the Beverly/Ahiak herd range overlapped with the Ekati Diamond Mine in recent winters, when Beverly/Ahiak caribou appeared to assume a broader wintering range.

Annual aerial surveys of the caribou calving-ground surveys have indicated the Bathurst caribou herd declined from approximately 472,000 animals in 1986 (GNWT ENR 2012) to 31,982 animals in 2009 (Nishi et al. 2010). A population survey conducted in June 2012 indicated the herd had stabilized between 2009 and 2012 at about 34,690 animals (GNWT ENR 2013). In 2015, the Bathurst population was estimated to have declined further to 19,769 individuals (Boulanger et al. 2017) and by 2019 the herd had further declined to 8,207 animals (Adamczewski 2019). The most recent publicly available estimate of population is from 2021, at which time the herd was estimated at 6,240 animals (GNWT ENR 2023). Both TK and scientific studies indicate that caribou herd size cycles relatively regularly with climate patterns (GNWT ENR 2005; GNWT ENR 2006); however, the current Bathurst herd population estimate is low compared to its historical minimum population size.

Bathurst caribou use of the land can be broadly classified into two groups: 1) migrations (spring and fall) when the animals are moving quickly across the landscape, and 2) resident periods (calving, post-calving, summer, and winter) when the daily movement rate of caribou is lower than during migrations and the herd tends to occupy a distinct area of the landscape (Table 4.1-1).

During the winter, Bathurst herd caribou were historically found south of the treeline in the NWT, though the winter range has recently included areas north of the tree line (i.e., in each winter since 2015/2016; Figure 4.1-2). Bathurst caribou remain on the wintering grounds until mid-April when they begin their migration north to the calving grounds. In most years the winter range did not overlap with the Ekati Diamond Mine but the winter range has overlapped the Ekati Diamond Mine from 2018 to 2020 (Figure 4.1-2). During the spring migration, Bathurst caribou migrate over a large area (275,000 km^2) from their wintering area to the calving grounds in a relatively short period of time (Figure 4.1-2 and Figure 4.1-3). Movement corridors varied depending on the distribution of caribou on the wintering grounds. Spring migration tracks of collared caribou have passed through or near the Ekati Diamond Mine, although in most years, migration routes of collared caribou occur to the west of the Ekati Diamond Mine.

Figure 4.1-1: Annual Ranges of the Bathurst and Beverly/Ahiak Caribou Herds

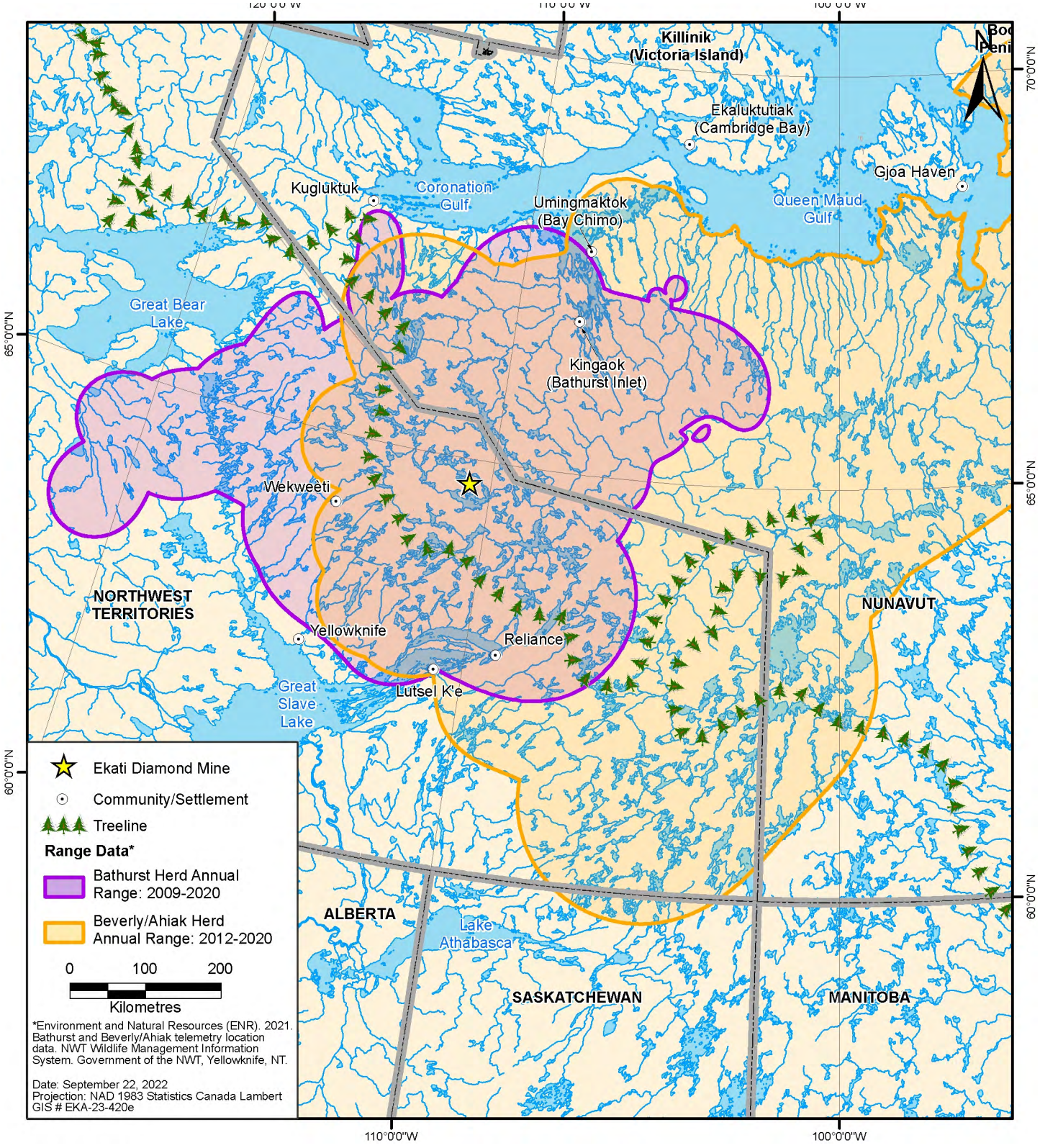


Figure 4.1-2a: Distribution of Satellite-collared Bathurst Caribou during Winter, 1996 to 2019/2020 (50% Kernel UD)

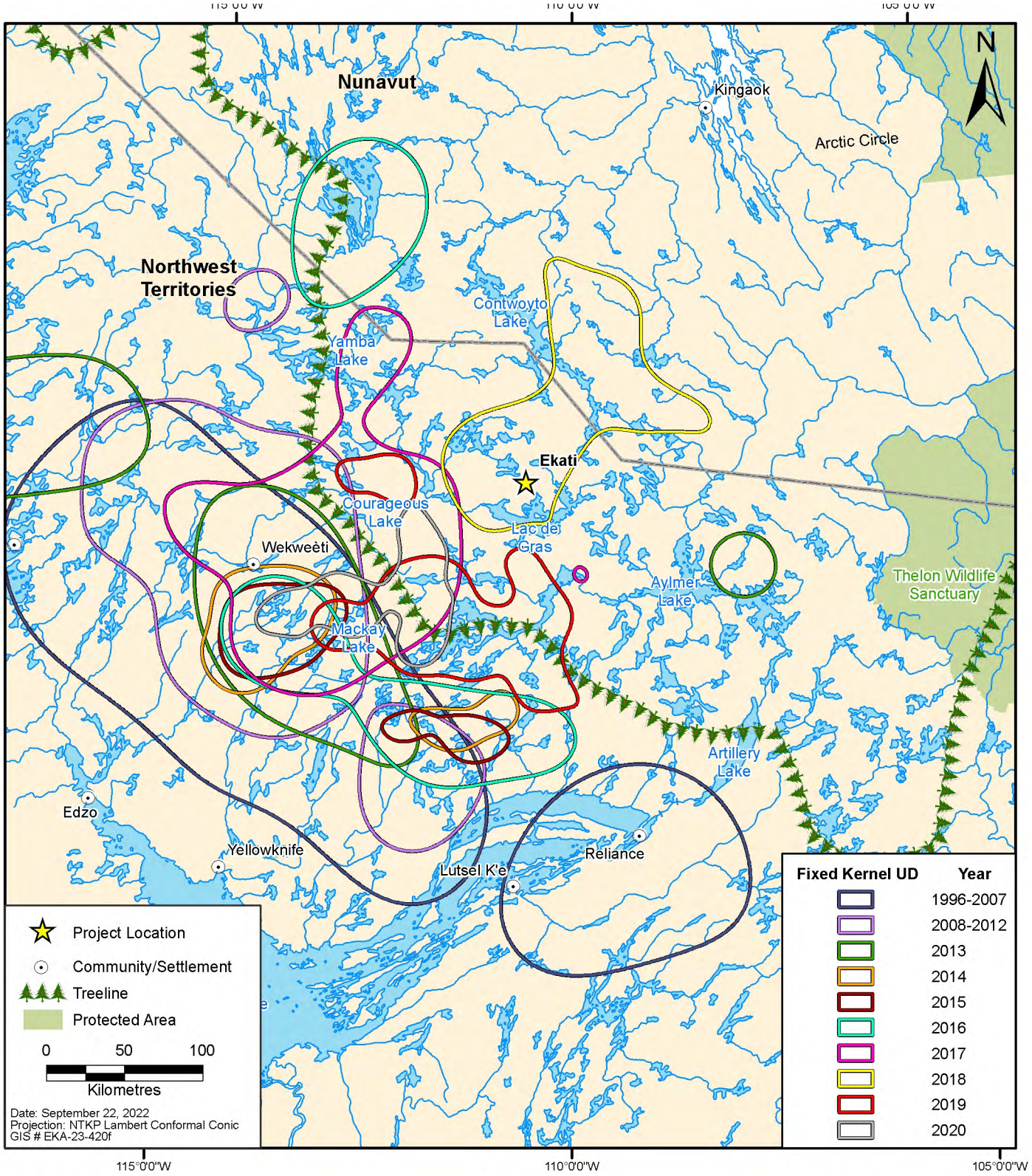


Figure 4.1-2b: Distribution of Satellite-collared Bathurst Caribou during Winter, 1996 to 2019/2020 (95% Kernel UD)

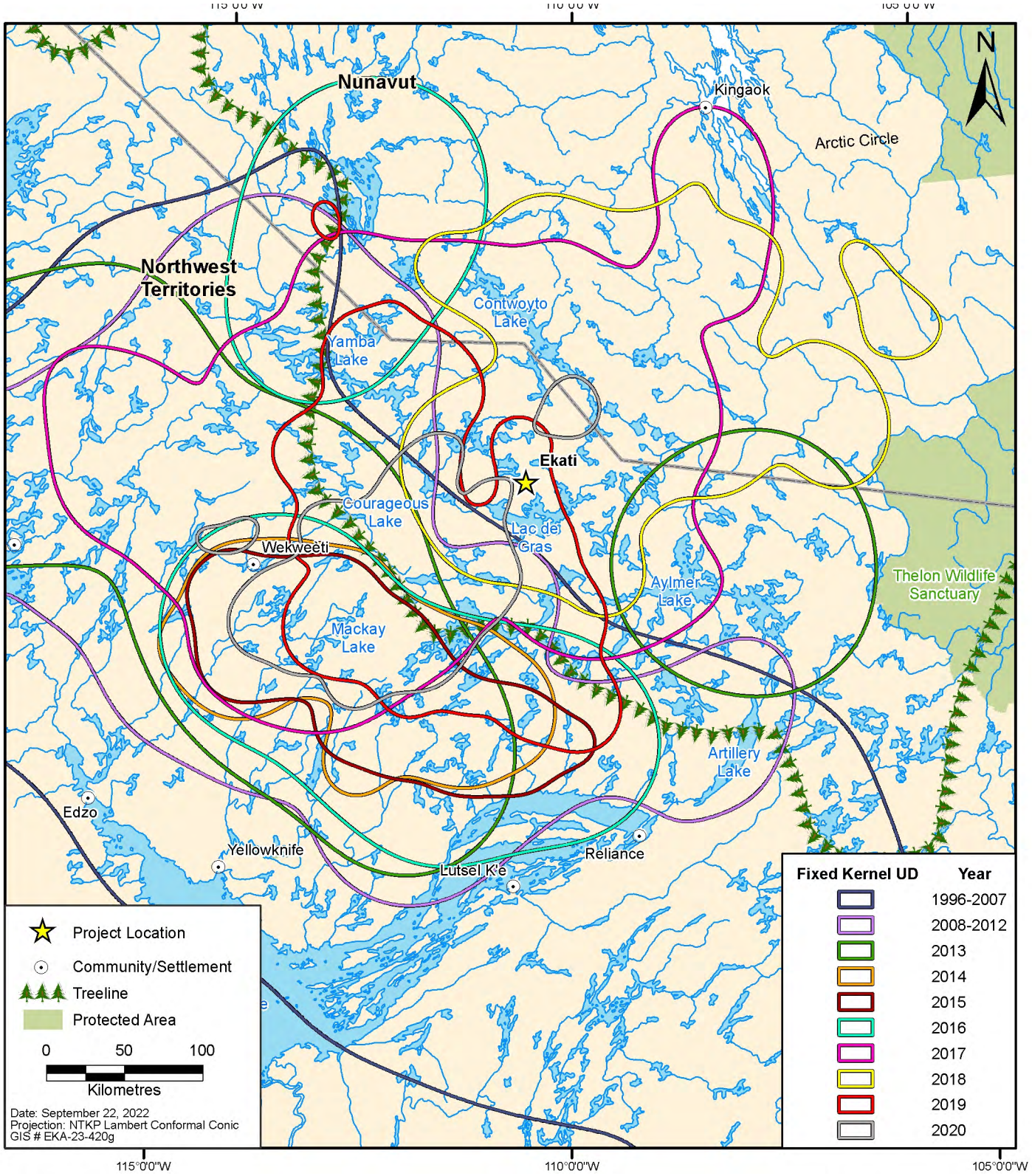


Figure 4.1-3a: Distribution of Satellite-collared Bathurst Caribou during Calving, 1996 to 2020 (50% Kernel UD)

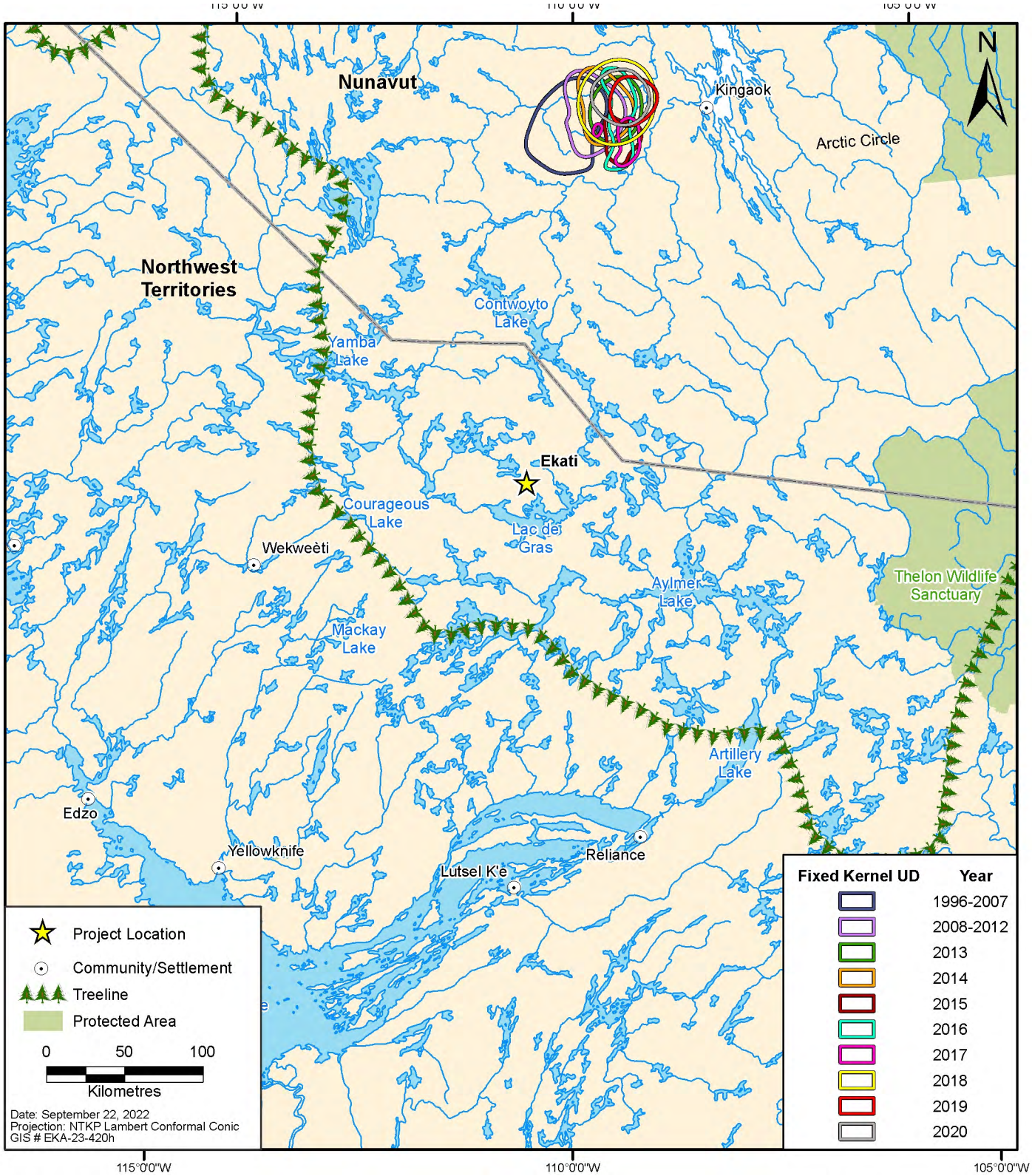


Figure 4.1-3b: Distribution of Satellite-collared Bathurst Caribou during Calving, 1996 to 2020 (95% Kernel UD)

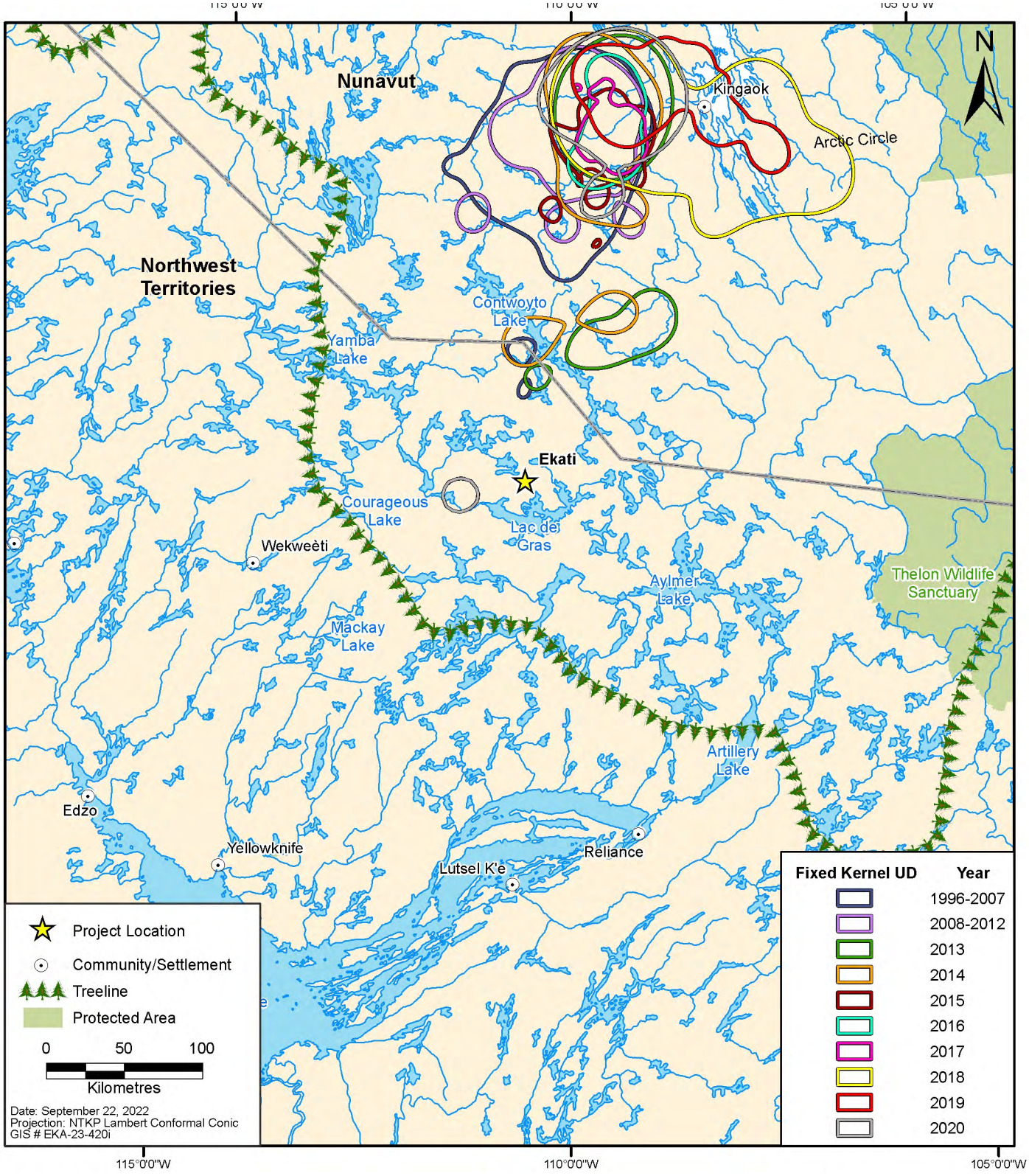


Table 4.1-1: General Seasonal Period Dates for Bathurst Caribou

Seasonal Period	Dates
Winter[1]	November 1st to April 14th
Spring migration[2]	April 15th to June 4th
Calving[3]	June 5th to June 15th
Post-calving[4]	June 16th to July 20th
Summer[5]	July 21st to August 31st
Fall migration[6]	September 1st to October 31st

[1] Includes late fall and winter periods defined in Gunn et al. (2008a).

[2] Gunn et al. (2008a); Johnson et al. (2005).

[3] Russell, Kofinas, and Griffith (2002); Gunn et al. (2008a); Gunn and Poole (2009).

[4] Five weeks post-calving, which includes post-calving and early summer periods defined in Gunn et al. (2008a) and Russell, Kofinas, and Griffith (2002).

[5] Gunn et al. (2008a).

[6] Johnson et al. (2005); includes rut period defined in Gunn et al. (2008a).

Cows usually arrive in late May on their calving grounds, which are currently concentrated between the James and Burnside Rivers, west of Bathurst Inlet (Figure 4.1-3), but sometimes arrive as early as April, and calving begins in early June (Table 4.1-1; KIA 2015). Non-parturient (non-pregnant) cows migrate more slowly than pregnant cows and may or may not reach the calving grounds. Bulls and juvenile caribou (born in the year previous) likely also follow females as some are present during calving, but generally north-bound males and juveniles are thought to meet females with calves in late June and early July on the post-calving range, which is more spread out relative to the calving grounds and located south of the calving grounds (Gunn and D'Hont 2002). The post-calving range overlapped with the Ekati Diamond Mine in earlier years (1996 to 2007) but has not overlapped since 2007 (Figure 4.1-4).

During the summer (July 21st to August 31st), most of the Bathurst caribou have traditionally passed the southern end of Contwoyto Lake and moved south, west, and then moved northwest in a clockwise direction across the summer range (Figure 4.1-5; Gunn et al. 2008a; Gunn et al. 2008b). The Bathurst caribou summer range has overlapped with the Ekati Diamond Mine in several years, though not in 2018 (Figure 4.1-5). During the fall (September 1st to October 31st), Bathurst caribou migrate towards the winter range (Figure 4.1-6). A portion of the Bathurst caribou range has frequently overlapped with the Ekati Diamond Mine during the fall period (Figure 4.1-6).

Ekati also regularly falls within the Mobile Core Bathurst Caribou Management Zone, within which hunting of barren-ground caribou is prohibited under the *Wildlife Act* (2013) and Bathurst Caribou Range Plan (GNWT 2019). The Mobile Zone is updated weekly by GNWT ENR based on current locations of collared caribou.

The WMMP includes several annual studies to monitor the predicted potential effects of the mining activities on caribou. Arctic Canadian monitors annual variation in caribou seasonal ranges and core areas at a regional scale and relative to the Ekati Diamond Mine using collared caribou. Other studies incorporate ground-based monitoring by local community members, Arctic Canadian staff, biologists, and through collaborations with Diavik. Elders and holders of TK are regularly invited to site to participate in these programs and to share their knowledge about caribou behaviour, diet, health, body condition, and movement paths while the caribou are migrating through the Ekati Diamond Mine area. In response to concerns that caribou may become trapped in the processed kimberlite in the LLCF, potentially leading to injury or death, or ingestion of processed kimberlite within the LLCF, formal surveys are conducted annually around the LLCF as part of the WMMP. Other surveys that are regularly conducted include road surveys, behavioural surveys, and camera trapping.

Figure 4.1-4a: Distribution of Satellite-collared Bathurst Caribou during Post-calving, 1996 to 2020 (50% Kernel UD)

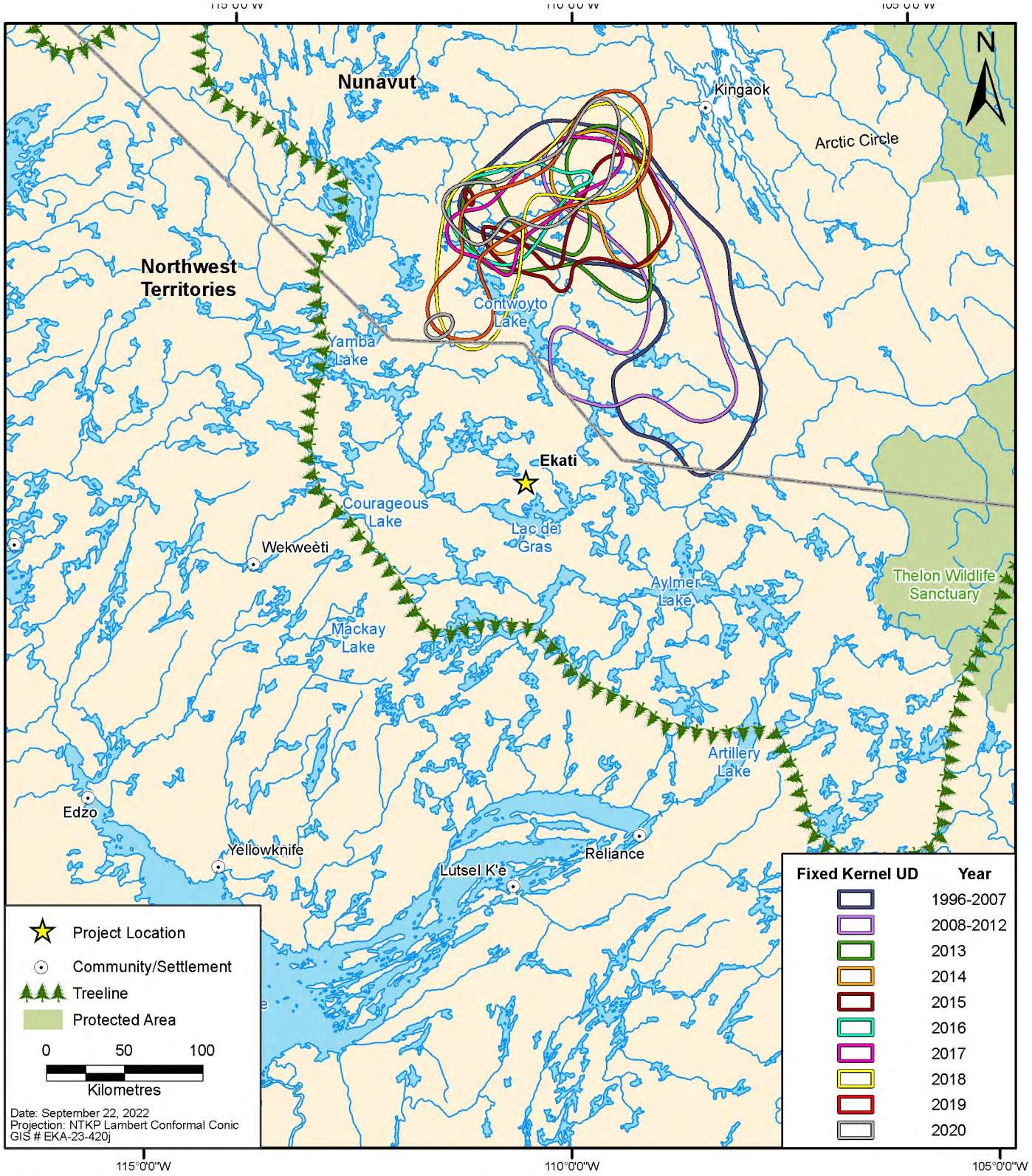


Figure 4.1-4b: Distribution of Satellite-collared Bathurst Caribou during Post-calving, 1996 to 2020 (95% Kernel UD)

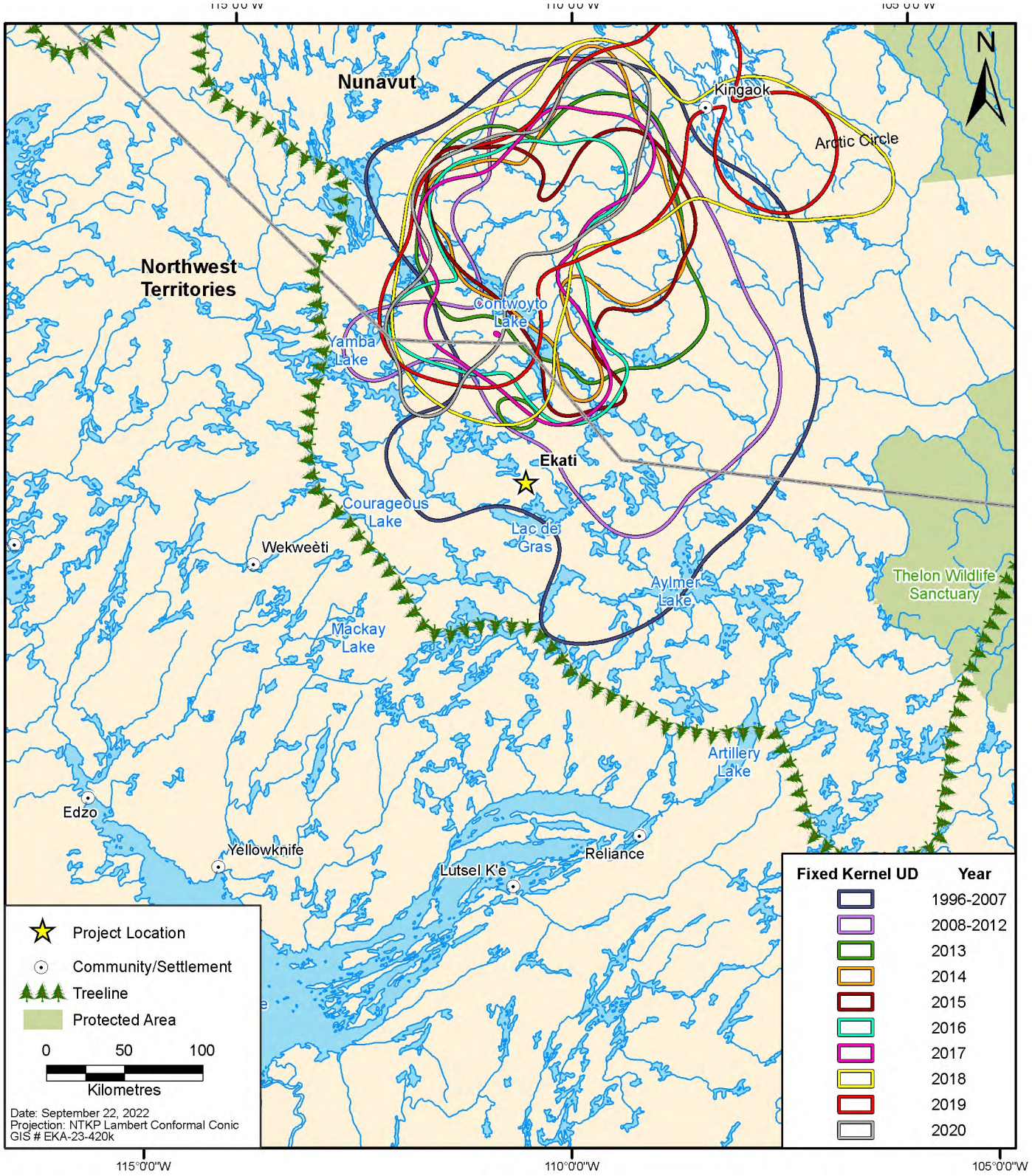


Figure 4.1-5a: Distribution of Satellite-collared Bathurst Caribou during Summer, 1996 to 2020 (50% Kernel UD)

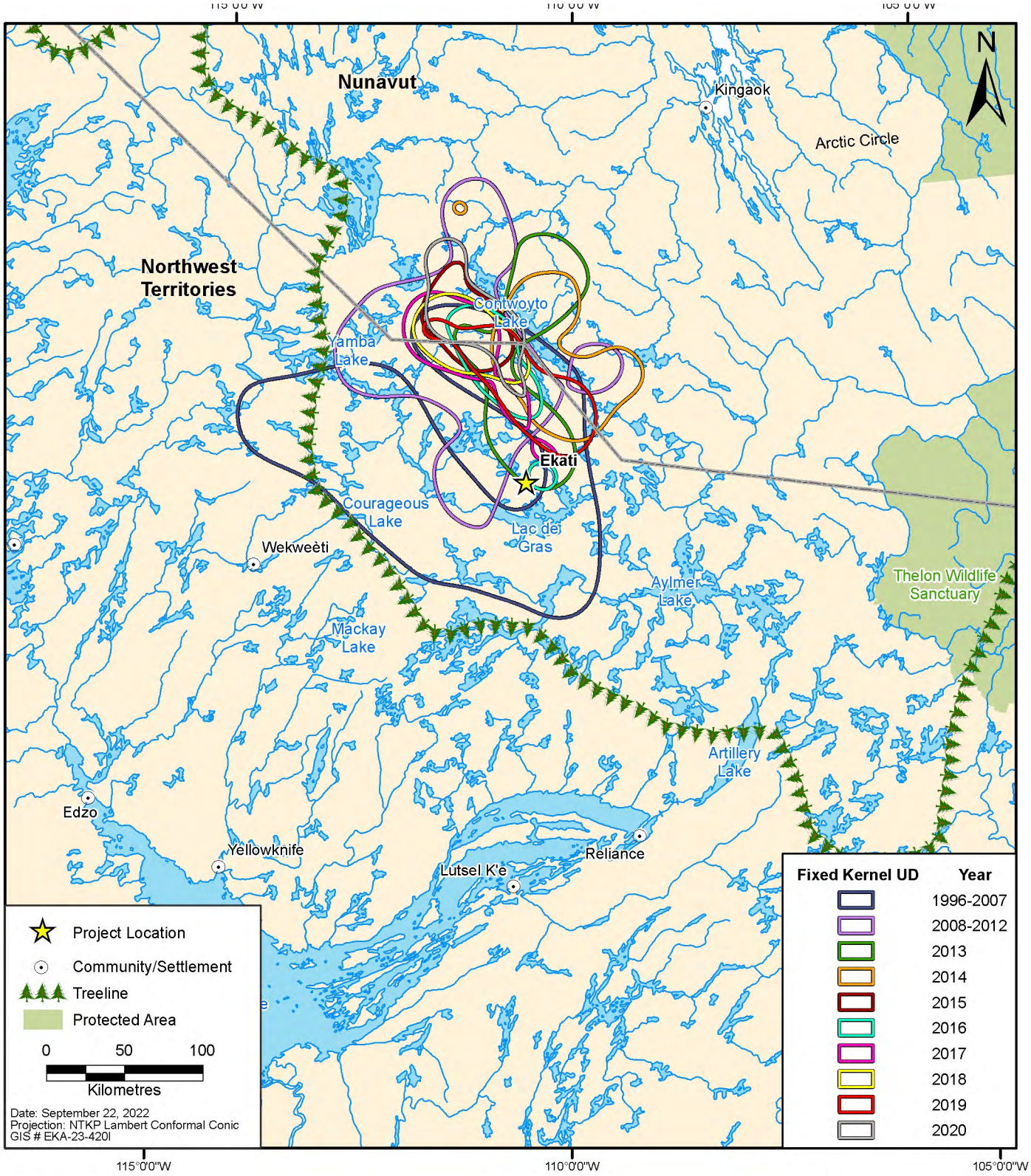


Figure 4.1-5b: Distribution of Satellite-collared Bathurst Caribou during Summer, 1996 to 2020 (95% Kernel UD)

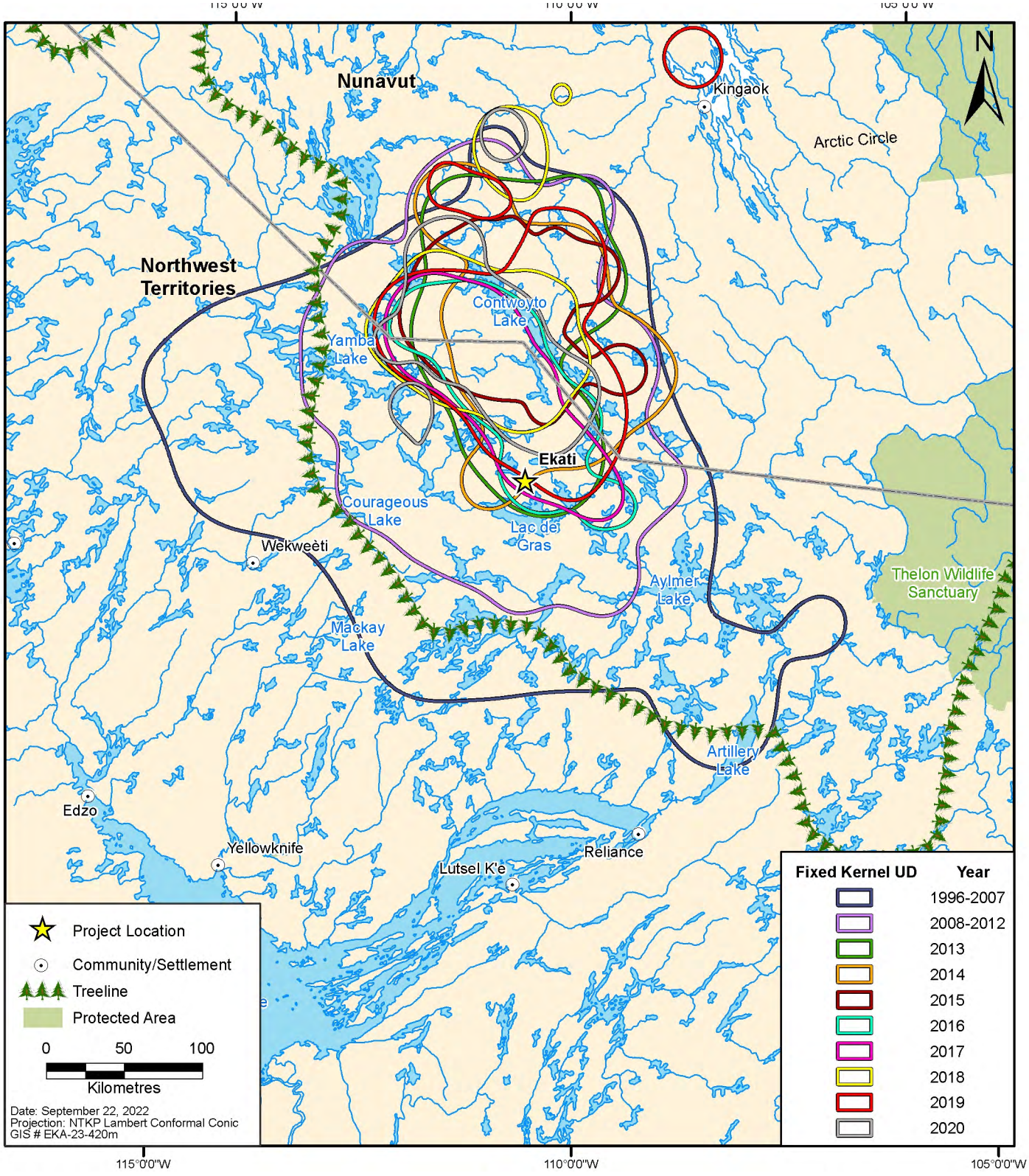


Figure 4.1-6a: Distribution of Satellite-collared Bathurst Caribou during Fall Migration, 1996 to 2020 (50% Kernel UD)

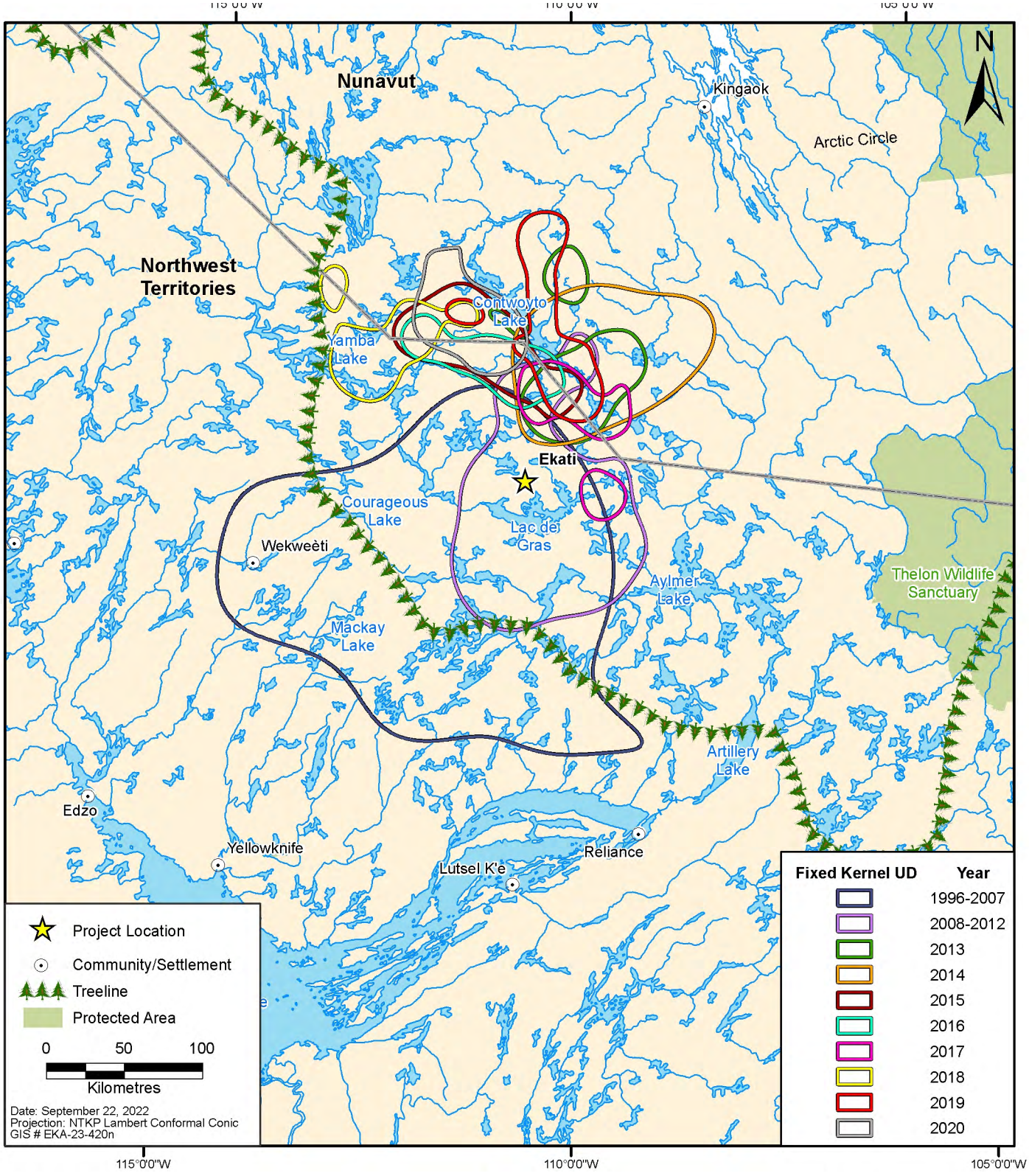
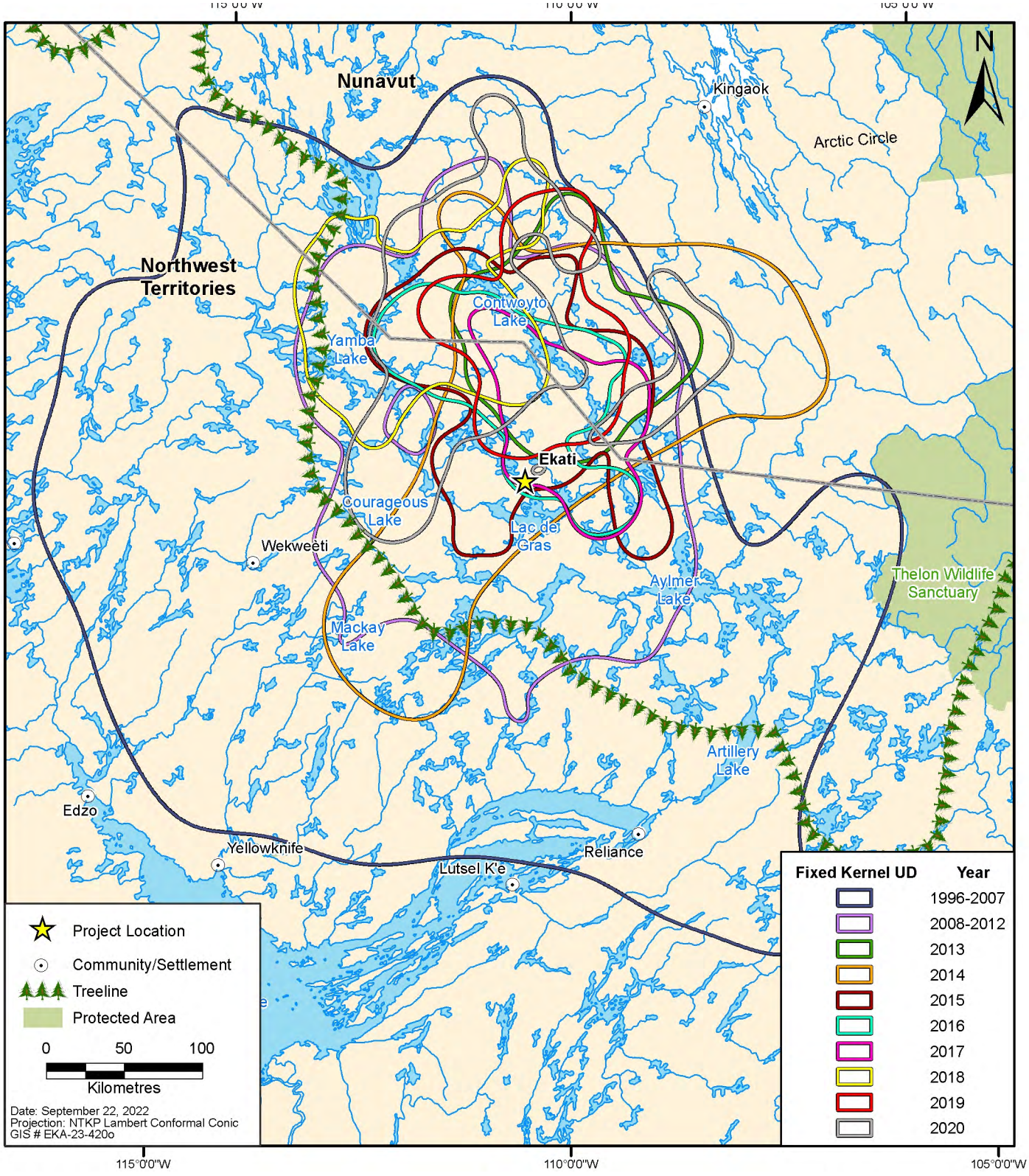


Figure 4.1-6b: Distribution of Satellite-collared Bathurst Caribou during Fall Migration, 1996 to 2020 (95% Kernel UD)



4.1.1.2 Grizzly Bear

Barren-ground grizzly bears are considered a wildlife VEC within the Ekati Diamond Mine study area. The species occurs at low densities in areas of low vegetative productivity and high seasonality (McLoughlin, Ferguson, and Messier 2000), which also results in large home ranges. On average, females range over an area of 2,000 km^2 and males travel over an area of 7,000 km^2 (McLoughlin et al. 2003). The large home-range requirements of barren-ground grizzly bears make it likely that an individual may come into contact with several different mine sites, including the Ekati Diamond Mine (McLoughlin et al. 1999). The grizzly bear was assessed as *"Special Concern*" by COSEWIC and Schedule 1 of *SARA* (Government of Canada 2022). The status of grizzly bear in the Northwest Territories is "*Vulnerable*" (CESCC 2016).

From 2012 to 2017, Ekati Diamond Mine and Diavik Diamond Mine collaborated on a Regional Grizzly Bear DNA study as part of their wildlife monitoring programs (ERM 2018a). The regional DNA study suggested that the central barrens of the Northwest Territories are productive for grizzly bears. The Lac de Gras region supports a large number of grizzly bears, potentially because of the prevalence of esker habitats for secure denning, seasonal access to caribou, fish resources in the abundant lakes and streams in the area, productive forage in riparian zones, and the relatively low level of hunting in this area. In the regional DNA study, grizzly bear densities ranged from 2.0 to 3.0/1,000 km^2 for males and 3.6 to 4.7/1,000 km^2 for females. The overall density of barren-ground grizzly bears was estimated to be 3.5 grizzly bears per 1,000 km^2 for the central barrens of mainland Nunavut and the Northwest Territories (McLoughlin and Messier 2001), and up to seven bears per 1,000 km^2 in the Kitikmeot region of western Nunavut (Dumond et al. 2015). The results of this regional study over the period of 2012 to 2017 suggest that grizzly bear numbers appear to be stable to increasing since estimates for the Slave Geological Province were last obtained in the late 1990s (3.5/1,000 km^2; McLoughlin and Messier 2002). These results provide evidence in support of the conclusion that the Ekati and Diavik Diamond Mines, which have been constructed since the last grizzly bear survey in the late 1990s, have not had a negative impact on the regional population of grizzly bears in the Slave Geological Province.

Waste from mine sites may potentially act as wildlife attractants, increasing the likelihood of human/wildlife interactions and wildlife habituation, hence the need to monitor for these interactions and adaptively manage based on results. Grizzly bears moving through the mine site area are a concern from the perspective of both human and wildlife safety. The stable to increasing population result from the regional study (ERM 2018a) is consistent with limited effects of the Ekati and Diavik mine sites on grizzly bears at a regional scale, given the small size of these projects relative to size of a female grizzly bear home range. At the Ekati Diamond Mine grizzly bears are currently monitored annually through incidental observations and documenting incidents.

4.1.1.3 Wolf

Grey wolves are considered a wildlife VEC within the Ekati Diamond Mine study area. Wolves in this area depend on the Bathurst caribou herd as their main source of prey (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. As predators of migratory caribou, wolves in the central barrens have larger home ranges and exhibit less territorial behaviour than wolves in other parts of North America (Walton et al. 2001). Food availability for wolves has been reduced by barren-ground caribou population declines. As a result, resource availability may decrease adult fitness and pup survival, both of which could have implications for population growth (Klaczek, Johnson, and Cluff H. D. 2015).

Wolves are listed as "*Secure*" in the Northwest Territories (CESCC 2016) and are considered "*Not at Risk*" by COSEWIC and are not listed on Schedule 1 of *SARA* (Government of Canada 2022). Populations are stable or increasing within their Canadian range, except in northern Alberta and some parts of the Northwest Territories (Frame, Cluff, and Hik 2008). Ekati is within the Enhanced North Slave Wolf Harvest Incentive Area, where increased incentives are available for wolves

harvested in the area by harvesters from both the Northwest Territories and Nunavut (GNWT 2022). This program has been ongoing since 2018 and was established to support the recovery of Bathurst and Bluenose East caribou populations.

Potential risks for the local population may arise from habitat removal and human disturbance (Clark, Paquet, and Curlee 1996). Human development can result in wolves avoiding certain areas (C. J. Johnson et al. 2005). Conversely, certain features of human developments (such as landfills and infrastructure) can act as wildlife attractants, increasing the likelihood of wildlife attraction and habituation.

In response to these concerns, Arctic Canadian monitors wolves near mine infrastructure, and supports regional wolf monitoring initiatives coordinated by ENR. Between regional wolf monitoring study periods, wolves have been monitored at the Ekati Diamond Mine through incidental observations.

4.1.1.4 Wolverine

The wolverine is considered a wildlife VEC within the Ekati Diamond Mine study area. Wolverines, the largest member of the weasel family, has a circumpolar distribution in the tundra, taiga plains, and boreal forests of North America (Weir 2004). Wolverine (eastern and western population designations) was assessed as a species of "*Special Concern*" with COSEWIC and Schedule 1 of *SARA* (Government of Canada 2022). The status of wolverine in the Northwest Territories is "*Vulnerable*" (CESCC 2016).

Wolverines are curious animals and will investigate human-made structures and food caches when humans are not present (COSEWIC 2014). They prefer undisturbed areas, but home ranges may overlap with human-caused disturbances such as trap lines and logging roads (COSEWIC 2014). Wolverine home ranges are typically 400 km^2 for females and 1,580 km^2 for males (Rowland et al. 2003; COSEWIC 2014). They opportunistically travel on snowmobile trails, and scavenge along trap lines and at hunter kills (COSEWIC 2014). 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 wildlife attractants, increasing the possibility of wildlife habituation. In response to these concerns, Arctic Canadian monitors for these interactions on an annual basis and adaptively manages based on results (i.e., repairing wildlife gates at the incinerator). Arctic Canadian also has contributed previously to regional wolverine hair snagging studies led by ENR to monitor populations using a DNA mark-recapture analysis. However, based on the results of these studies that impacts are not occurring regionally, current wolverine monitoring focuses on incidental observations and documenting incidents.

4.1.1.5 Raptors

Raptors are considered a wildlife VEC within the Ekati Diamond Mine study area. Raptors (i.e., eagles, falcons, hawks, and owls) and corvids (i.e., ravens and crows) can serve as indicators of the effects of human activities on ecosystem health because they are predators in the upper levels of the food chain and have large home range sizes. These life requisite characteristics render them more sensitive to environmental alterations and disturbances (Steenhof et al. 1999). Legislation for the protection of raptor species prevents destruction and/or disturbance to the individuals and their nests (eggs and nestlings) under the Northwest Territories *Wildlife Act, Section 38* (1988).

Three species of cliff nesting raptors observed frequently nesting within the mine study area include peregrine falcon, gyrfalcon (*Falco rusticolus*), and rough-legged hawk (*Buteo lagopus*). Common ravens are considered to be functional raptors as they use similar food and breeding resources as cliff-nesting raptors, and construct stick nests that are used by falcon species for nesting (Poole and Bromley 1988; Poole 2011). Of these cliff-nesting raptor species, the peregrine falcon is listed federally on Schedule 1 of *SARA* as "*Special Concern*" and was assessed with a status change to "*Not at*

Risk" by COSEWIC in 2017 (Government of Canada 2022). In the Northwest Territories, the peregrine falcon is ranked as "*Vulnerable"* (CESCC 2016).

Three species of ground nesting raptors have been observed in the study area: snowy owl (*Bubo scandiacus*), short-eared owl (*Asio flammeus*), and northern harrier (*Circus cyaneus*). The short-eared owl is ranked as "*Vulnerable*" in the NWT, and is also listed by COSEWIC as "*Threatened*", and is on Schedule 1 of *SARA* as a species of "*Special Concern*" (CESCC 2016; Government of Canada 2022). The snowy owl and northern harrier are ranked as "*Secure*" and "*Apparently Secure*" in the NWT respectively (CESCC 2016). All other cliff nesting and ground nesting raptor species likely to be found at the Ekati Diamond Mine are listed as "*Secure*" or "*Apparently Secure*" in the NWT and were assessed by COSEWIC as "*Not at Risk*" or were not assessed (e.g., common raven).

The monitoring of raptors is a priority at the Ekati Diamond Mine, particularly for birds that have a conservation status based on federal listings on *SARA* Schedule 1 (2002), COSEWIC assessments (Government of Canada 2022), and the listings under the Northwest Territories General Status Ranking Program (CESCC 2016). Arctic Canadian monitors raptors near mine infrastructure, and previously supported regional falcon monitoring initiatives coordinated by ENR. The results from regional falcon studies indicated that impacts are not occurring at that scale. As such, raptors are currently monitored at the Ekati Diamond Mine through incidental observations and pit wall nest monitoring surveys.

4.1.2 Additional Species and Wildlife Groups

4.1.2.1 Fox

Two species of fox inhabit the Slave Geological Province of the Northwest Territories: the red (or "coloured" or "cross") fox and the arctic fox. The population sizes of arctic and red foxes for the region are unknown, but estimates based on surveys from 2007 are > 10,000 for both species combined (GNWT ENR 2016). Both species are considered "*Secure*" in the Northwest Territories (CESCC 2016) and are not federally listed in Canada (Government of Canada 2022). Arctic fox and red fox were not identified as a VEC during the EARP; however, foxes (especially arctic fox) are considered important furbearers in the north for fur trade.

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. Foxes are the primary animal vector of rabies in the NWT (Walker and Elkin 2005). In response to these concerns, Arctic Canadian monitors incidental fox occurrences at the Ekati Diamond Mine.

4.1.2.2 Migratory Birds

The period in which migratory 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 Billiton 1998). Small perching birds and shorebirds are the most common breeders in the Ekati Diamond Mine study area, including the American tree sparrow (*Spizella arborea*), Harris's sparrow, lapland longspur (*Calcarius lapponicus*), least sandpiper (*Calidris minutilla*), and Savannah sparrow (*Passerculus sandwichensis*). Some other species that are present but less common in the study area include lesser yellowlegs*;* listed as "*Threatened*" by COSEWIC but not listed under *SARA* Schedule 1, pectoral sandpiper (*Calidris melanotos*), and yellow-rumped warbler (*Setophaga coronate*). The rusty blackbird and red-necked phalarope have also been observed in the Ekati Diamond Mine study area and are assessed as species of "*Special Concern*" by COSEWIC and Schedule 1 of *SARA* (Government of Canada 2022). The rusty blackbird and red-necked phalarope species are listed as "*Vulnerable*" in the Northwest Territories (CESCC 2016). Harris's sparrow is listed as "*Special Concern*" by COSEWIC but does not have a status under Schedule 1 of *SARA* (Government of Canada 2022). It is also listed as *Vulnerable*" in the Northwest Territories (CESCC 2016).

Natural and human-induced disturbances that occur during the breeding period can correlate with changes in migratory bird density, species richness, and diversity (Rottenborn 1999; Debinski and Holt 2000; Hennings and Edge 2003; Jokimaki and Kaisanlahti-Jokimaki 2003; Thorington and Bowman 2003). Consequently, migratory birds within the Ekati Diamond Mine study area were previously monitored annually. Avian species are often selected for use in monitoring programs because they represent an abundant and diverse group that can be surveyed with relative ease.

The formal migratory bird survey was terminated in 2009 in consultation with ENR and other stakeholders, following a review of 13 years of bird monitoring data that indicated no long-term consistent trends for overall species density near the Ekati Diamond Mine. Previous operators of the Ekati Diamond Mine also monitored migratory birds through the North American Breeding Bird Surveys (NABBS) from 2003 to 2019. However, due to evidence that effects to migratory birds are localized (Smith et al. 2005) these regional studies are no longer conducted. Currently, incidental observations of migratory birds in the study area are recorded to document any signs of breeding activity and to identify mine structures that provide potential nesting platforms. Bird species of conservation concern or uncommon species in the region are also documented when observed.

4.2 Potential Impacts and Key Environmental Risks to Wildlife

4.2.1 Potential Impacts

4.2.1.1 Caribou and Caribou Habitat

Below is a list of predicted potential effects of the Ekati Mine on caribou:

- increased hunting mortality related to the winter road;
- sensory disturbance or displacement as a result of mine operations; direct loss and fragmentation of plant communities and wildlife habitat from the Project footprint;
- direct injury or mortality (wildlife-vehicle collisions, depredation);
- attraction and increased human-wildlife interactions and mortality risk;
- attraction and increased predator numbers;
- local barrier effect to caribou movement; and
- effects on health (toxins, metals etc.).

4.2.1.2 Carnivores and Carnivore Habitat

Predicted potential effects on carnivores such as grizzly bears, wolves, and wolverines of the Ekati Mine include:

- habitat loss or modification due to mine infrastructure;
- disturbance and displacement from aircraft and vehicles; and
- negative interactions with humans as a result of increased human-wildlife interactions and attraction to the mine's landfills.
- direct injury or mortality (wildlife-vehicle collisions); and
- effects on health (toxins, metals etc.).

Foxes were not identified as a VEC in the EIS; however, fox occurrence at the Ekati Diamond Mine is an ongoing concern, and a decision was made to monitor foxes (at least informally) in 1997. Monitoring and recording incidental fox observations in the study area may help to direct mitigation actions to minimize risks associated with human and wildlife

interactions. Once a fox is sighted within the mine site area, staff that is at risk of encountering the fox are notified, and work activities are adjusted accordingly.

4.2.1.3 Migratory Birds and Habitat

The 1995 EIS predicted several potential effects of mine development on migratory birds including:

- loss of nesting habitat;
- disturbance from noise, human presence, vehicles, and aircrafts;
- collisions with vehicles (birds other than waterfowl only) and collisions with and disturbance from aircrafts (waterfowl in particular); and
- subsequent reductions in abundance and species diversity.

4.2.2 Key Environmental Risks for Wildlife

4.2.2.1 Environmental Impact Review

An EIR report is a requirement of the Environmental Agreement originally signed in 1997 between BHP Diamonds Inc. 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 Arctic Canadian at the Ekati Diamond Mine against the predictions of the 1995 EIS (BHP 1995a). The most recent reporting period for this comparison was from 2016 to 2019 (DDEC 2019). The EIRs completed in 2000, 2003, 2006, and 2009 concluded that the effects of the Ekati Diamond Mine on the environment have been of relatively minor significance and that the mine has left a manageable and reversible footprint on the Ekati Diamond Mine mineral lease area (BHP Billiton 2000, 2003, 2006, 2009). Following feedback and discussions regarding the EIR approach and methodology, the focus of the 2012 and 2016 EIRs varied from the four previous editions, providing ranked current Environmental Risks and management actions to address the risks (BHP Billiton 2012; DDEC 2016).

4.2.2.2 Environmental Risks for Wildlife

The key environmental risks for wildlife that were considered in the most recent EIR (DDEC 2019) included:

- changes in caribou migration routes and population decline;
- caribou interactions with linear features (roads and power lines);
- caribou interactions with mine activities and infrastructure (other than roads);
- habituation of carnivores; and
- migratory bird interactions with mine activities and infrastructure.

Caribou herds are a key concern and Arctic Canadian will continue to provide site-specific information relevant for input 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 Diamond Mine 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 Arctic Canadian 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 the Ekati Diamond Mine.

5.0 Mitigation

The environmental design features and mitigation policies, practices, and procedures that Arctic Canadian implements to avoid and minimize (limit) effects to wildlife abundance and distribution are collectively referred to as mitigation. The WMMP 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. 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.
- 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 Diamond Mine uses mitigation that avoids, minimizes, and reclaims adverse effects associated with potential effects and environmental risks. The results of the environmental assessments for the Ekati Diamond Mine (BHP 1995a; BHP 2000c) and Jay Project (DDEC 2014) indicate that there are no expected significant adverse environmental effects.

Mitigation at the Ekati Diamond Mine is applied and intensified or reduced within an adaptive management framework (see Figure 7-1). 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, occurs intermittently and is applied as required. The intensity of the application of this kind of mitigation can be implemented through monitoring and adaptive management. For example, 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.

Arctic Canadian implements several general mitigation actions to reduce potential interactions with wildlife, including:

1. Site-wide notification about the presence of wildlife via:
    a) site-wide emails,
    b) safety meetings at the beginning of each shift,
    c) department-specific radio channels,
    d) all call radio announcements, and
    e) safety alerts,

2. Wildlife awareness presentations to specific departments;
3. Posting road signs about reduced speed limits or to alert drivers that wildlife are in the area;
4. Delayed or postponed blasting activity if caribou are within a 1 km distance of the planned blasting area; and
5. Temporary road closures and/or work stoppages due to the presence of wildlife.

5.1 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 Diamond 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 WMMP.

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 Diamond 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 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.

Mitigation for habitat alteration and loss is designed so that the physical footprint of the Ekati Diamond Mine does not exceed that authorized in the Land Use Permits and includes the following:

- maintaining downstream flows within the natural range of variability to the extent practical;
- maximizing the use of the existing Ekati Diamond Mine infrastructure for the Point Lake Project to reduce the environmental footprint to the extent practical;
- new access and spur roads are as narrow as feasible, while maintaining safe construction and operation practices;
- progressive reclamation activities may be scheduled as part of the ICRP (Section 3.3) for mine areas where there is no potential for future benefits or business opportunities, or in areas where there is immediate environmental risk;
- 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;
- regular maintenance of equipment to limit noise and particulate matter emissions;
- dust suppression is 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 Point Lake Project and minimize the quantity of new sensory disturbances;
- 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 5.4.1);
- 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;
- continue to use TK to enhance caribou monitoring activities and adaptive management;
- Completion of project activities in accordance with the *Migratory Bird Convention Act*;
- Clearing of vegetation outside of the migratory bird season (approximately 15 May to 15 August), as practical;
- If site clearing and lake dewatering activities are completed during the migratory bird breeding season, then vegetation removal will be completed prior to the nesting season or nest searches will be completed prior to construction; and
- If nests are found during nest searches, mitigation will be applied to avoid incidental take of nesting individuals.

5.2 Waste Management and Habituation of Carnivores

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 Diamond Mine, and avoid and limit human-wildlife interactions and changes to predator-prey relationships. Improperly disposed waste from mine sites may potentially act as wildlife attractants, increasing the likelihood of human/wildlife interactions and wildlife habituation. Grizzly bears moving through the mine site area are a concern from the perspective of both human and wildlife safety. In response to these concerns, the following mitigation is implemented:

- apply the Waste Management Plan (Section 3.3) which also includes the Solid Waste Landfill Management Plan, the Hazardous Waste Management Plan, the Incinerator Management Plan, and the Compost Management Plan;
- separate bins are located throughout the accommodations complex, shops, and other facilities on-site for immediate sorting of domestic wastes;
- implementation of recycling bins for recyclable food containers, such as pop cans and water bottles;
- food wastes are 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 are skirted to prevent wildlife access to shelter under the buildings;
- weekly building skirting inspection at the Main Camp and Misery Camp buildings, and inspections of fencing structures at Misery Camp and around the Ekati Diamond Mine airport;
- wildlife activity is monitored at waste management areas, and provides feedback into adaptive management;
- landfill sites and waste storage areas are inspected;
- the efficiency of the waste management program is 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;
- a chain-link fence is maintained around Misery Camp to prevent wildlife from entering;
- dead animals (from carnivore kills) are moved away from roadways and camps;

- wildlife carcasses on or near the roads are removed to minimize the attraction of predators and scavengers to roads and road edges where there would be at an increased risk of colliding with vehicles;
- field crews are relocated or their work is delayed before making a decision to actively deter an animal;
- site-wide notifications are sent out to all staff when carnivores are observed in high traffic work zones;
- waste management procedures, site awareness (e.g., closing doors), and wildlife interactions continue to be a part of the orientation that new employees receive;
- shipment of solid waste (i.e., kitchen grease and liquid waste) off site and use of composter system,
- immediate reporting of misdirected waste to the Waste Management Department; and
- deployment of two cameras in the landfill to monitor activities in the area.

5.3 Deterring Wildlife and Wildlife Incidents and Mortalities

5.3.1 Deterring Wildlife

The goal of wildlife deterrent action is to respond to situations using humane methods that keep both humans and wildlife safe. Wildlife are only deterred when there is a risk to either humans or wildlife, as judged by the Ekati Diamond Mine Environment staff. All deterrent actions start with the least intrusive method, and then increase in intensity as needed. Each deterrent action stops 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 are documented and reported to ENR.

Arctic Canadian practices successive levels of deterrents, starting with avoidance (removing crews from the area in the case of grizzly bears; Appendix A1), visual monitoring, truck deterrence (including horn), bear bangers, rubber bullets, and helicopters. Relocating or killing of an animal is only considered after successive levels of deterrents are not successful at moving an animal from site. Whenever possible and safe to do so, all deterrent actions are completed in consultation with ENR.

Where appropriate, the first response to potential wildlife incidents is to remove personnel from an unsafe situation and reschedule work in the area. Only as a last resort (e.g., immediate safety concern) will a helicopter be used to deter grizzly bears from areas where personnel are working per SOP (Appendix A2).

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).

5.3.2 Wildlife Incidents and Mortalities

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 Diamond 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 WMMP.

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), and destruction of migratory bird nests includes the following:

- implementation of the mitigation from the CRMP (Section 5.4.1).
- the current mitigation policies and practices for safety of wildlife on roads, airstrip and other areas of the Ekati Diamond Mine will be continued (Section 5.4). These practices include reporting of wildlife sightings by all employees, and control of encounters by Environment staff.
- site environmental technicians investigate all caribou and other wildlife incidents and mortalities, report to government, and recommend follow-up (Section 6.3).
- caribou and other wildlife are deterred from areas of risk.
- 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/raven nests (Section 6.6.2).
- birds showing nesting activity in areas of critical risk will be actively deterred. Arctic Canadian will not deter birds from nesting in inactive pits.
- 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.
- inuksuit (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 incorporates 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) are installed on the power line in identified areas of concern (e.g., near waterbodies known to represent staging areas).
- to the extent practicable, vegetation clearing occurs outside of the migratory bird nesting period.
- if vegetation clearing is required during the sensitive migratory bird nesting period (approximately May 15 to August 15), activities will be managed to comply with the *Species at Risk Act* (2002) and the *Migratory Birds Convention Act* (1994). Non-intrusive survey methods are used to search the area for nesting activity prior to clearing.

- Environment and Climate Change Canada (Environment Canada 2015) recommended setback (buffer) distances specific to species groups be implemented around nests detected during pre-clearing (Table 5.3-1). Implementation of setback distances will be based on further discussion with ECCC 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 5.3-1: Environment and Climate Change 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.

5.4 Linear Features and Traffic

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 Sable, Misery and Lac du Sauvage roads, and associated power lines and pipelines that results in barriers to the movement of caribou and other wildlife the Ekati Diamond Mine site is a key concern for Arctic Canadian, communities, IEMA, ENR, and the public.

The operation of the Ekati Diamond Mine requires a large number of roads to support a variety of equipment, from light duty (i.e., pick-up trucks) to heavy duty (i.e., haul trucks) vehicles. The Ekati Diamond Mine also has an airstrip used to access the mine site. Vehicles encountering wildlife on roads and along the airstrip can pose a risk for wildlife and human safety. Arctic Canadian has implemented several mitigation measures to avoid and limit the semi-permeable barrier effects from roads on caribou and other wildlife and to minimize potential interactions between mine-related traffic and wildlife:

- 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 (Section 5.4.1).
- Speed limits are reduced, and short and long-term road closures may be implemented according to action levels in the CRMP; kimberlite stockpile areas have been designed in strategic locations that facilitate continued mine operations through short-term and long-term road closures.
- Only one access road crosses the Lac du Sauvage esker, and the intersection will be constructed as a caribou crossing.
- 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.

- 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.
- Employee education.
- Speed limits are posted and enforced; speed limits are 60 km/h along haul roads, 20 km/h around Main Camp, and 40 km/h along other roads unless otherwise indicated.
- Wildlife always has the right-of-way.
- Observations of wildlife sightings on roads are communicated to the Environment Department and other drivers in the area.
- Wildlife carcasses on or near the 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.
- Snow berm height is managed during the winter by pushing out and leveling off accumulated snow banks to 1 m to reduce the continual drifting of windblown snow along roads, whereby reducing the potential impact that roads with snow banks may have in presenting visual or physical barriers to caribou movement. Monitoring along Misery Road during spring migration found deflections of caribou when berms were at least 1.6 m high, therefore berms are continuously cleared during spring migration.
- Signage indicating caribou are likely to be encountered.
- Increased signage in areas where caribou might encounter the road.
- Site-wide notifications of caribou approaching the Ekati Diamond Mine.
- 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.
- Use of TK to create accessible roads and caribou crossing ramps; surface height and side-slopes of Misery, Sable, and Lynx roads constructed close to surrounding land surface to facilitate easy access for caribou to roadways.
- Construct caribou crossings along the Lac du Sauvage Road that respect the importance of this area for caribou migration and movement, as identified by community engagement and TK; caribou crossings were constructed along 70% of the Lac du Sauvage Road.
- 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 gated chain-link fence is maintained around Misery Camp to prevent wildlife from entering.
- Inuksuit (traditional rock structures; Photo 5.4-1) are placed at intervals around the airstrip, Pigeon Culvert, Fox Haul Road, Beartooth Pit, and other potentially hazardous mine structures to deter caribou from these areas.

5.4.1 Mitigation from the Caribou Road Mitigation Plan (CRMP)

A Caribou Road Mitigation Plan (CRMP) was originally created for the Jay Project, a previously permitted extension to the Ekati Diamond Mine (Golder Associates 2017b). Although the Jay Project is no longer planned or permitted, Arctic Canadian has committed to applying the CRMP on a site-wide basis. The CRMP provides details on strategies to reduce the potential effects from roads to caribou. In the previous WEMP, the CRMP was provided separately, however, the updated WMMP now incorporates the mitigation from the CRMP.

Photo 5.4-1: Example of an Inuksuit (traditional rock structures) that are placed at intervals around infrastructure to deter wildlife and minimize potential interactions between mine-related traffic and wildlife.

The objectives from 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 Lac du Sauvage, Sable and Misery roads (and other Ekati Diamond Mine roads) to caribou movement and migration; and
- limit the effect of sensory disturbance from roads and traffic on caribou behaviour.

5.4.1.1 Adaptive Management

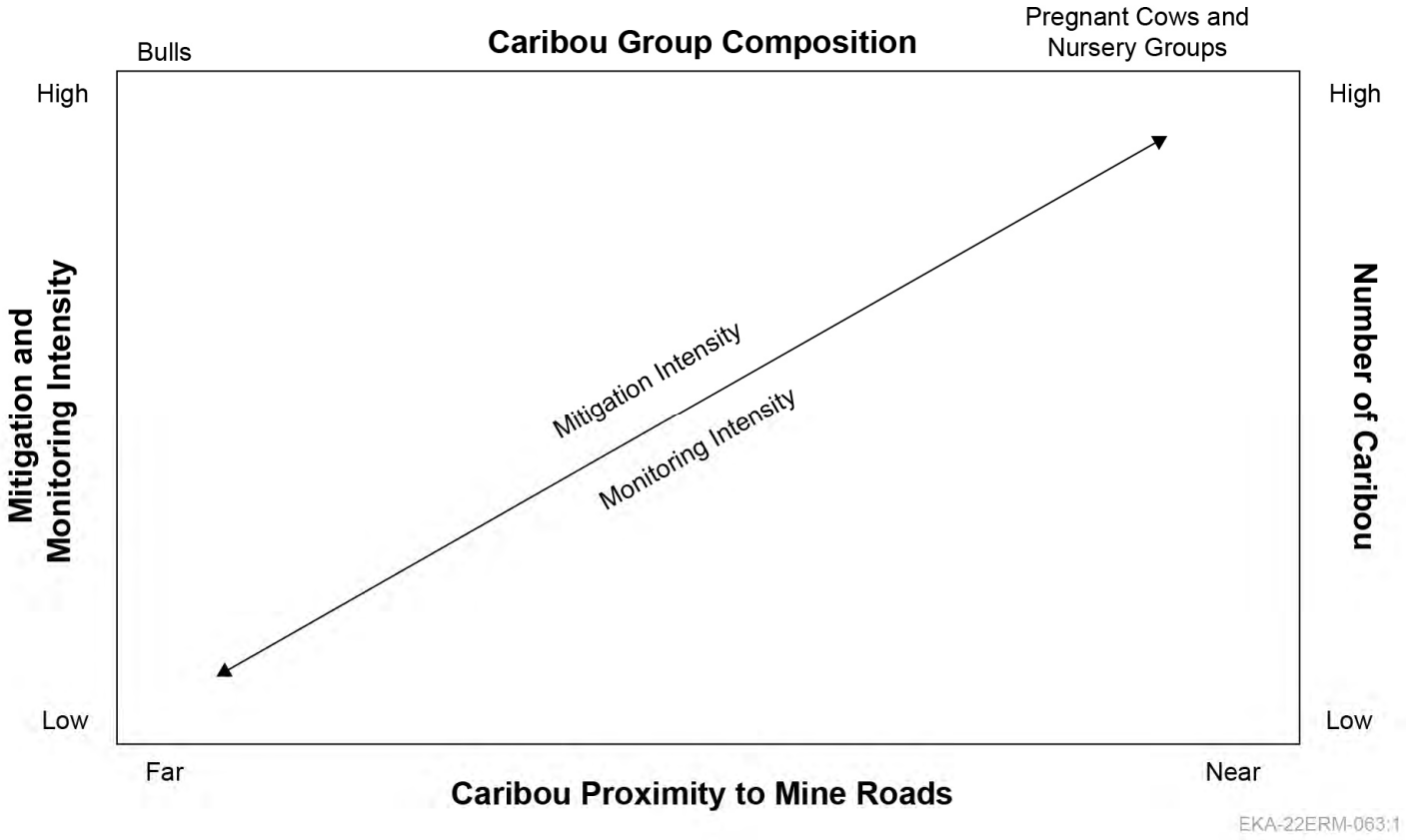
Adaptive management will be informed by the results of the comprehensive telemetry project that will determine the effectiveness of mitigation measures for caribou at a regional scale. If results of the comprehensive telemetry analysis warrant it, the mitigation and monitoring from the CRMP (Section 5.4.1; Section 6.4.1) will be revised with stakeholder input. The results of this research are expected in 2022 or early 2023 and will be reported on separately from the WMMP annual report.

5.4.1.2 Mitigation and Monitoring Framework

Arctic Canadian's strategy for managing risks to caribou (and other wildlife) associated with roads is to increase mitigation and monitoring as caribou approach the Ekati Diamond Mine (Figure 5.4-1). Four levels of mitigation and monitoring occur (Figure 5.4-2), and the intensity of mitigation and monitoring increases when specific action levels (triggers) are met (Table 5.4-1) including:

- Operational Level (blue – continually);
- Level 1 (yellow – low risk);
- Level 2 (orange – medium risk); and,
- Level 3 (red – high risk).

Figure 5.4-1: Mitigation and Monitoring Intensity for Ekati Diamond Mine Roads



This tiered approach for managing mitigation and monitoring (above the regular Operational Level) is similar to other Ekati Diamond Mine operation plans (e.g., cold weather policy). This consistency allows mine employees to understand the hierarchical structure of increasing and decreasing caribou mitigation and monitoring.

Operational Level mitigation and monitoring occurs continually throughout the year, and higher levels are implemented when the associated action levels are met (Figure 5.4-2). For example, if Level 1 mitigation and monitoring is underway when Level 3 is triggered then there is an immediate escalation from Level 1 to Level 3 mitigation and monitoring, and caribou observations are compared continuously to the action levels. All mitigation from the previous lower level is applied to the next higher level. Thus, escalation from Level 1 to Level 3 includes mitigation and monitoring in Level 2.
The mitigation and monitoring for each level continues for the minimum amount of time until the trigger is no longer met, regardless of how long this takes. For example, the mitigation and monitoring for Level 1 continues until caribou have moved out of the Regional Study Area (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. Mitigation has been designed to provide the highest protection for caribou encountering the Ekati Diamond Mine during these seasons. Most mitigations are applied to all seasons in the same way so that caribou are given a high level of protection throughout the year. In addition, mitigation is increased depending on the season and group composition of caribou approaching roads (Figure 5.4-1).
The mitigations listed below are based on those that have been used at the Ekati Diamond Mine over the past 24 years of mine operations. There has never been a caribou mine-related mortality resulting from a vehicle collision at the Ekati Diamond Mine despite annual interaction of caribou with the mine site. 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 preventing caribou injury and mortalities.

Figure 5.4-2: Decision Tree for Road Traffic Mitigation and Monitoring

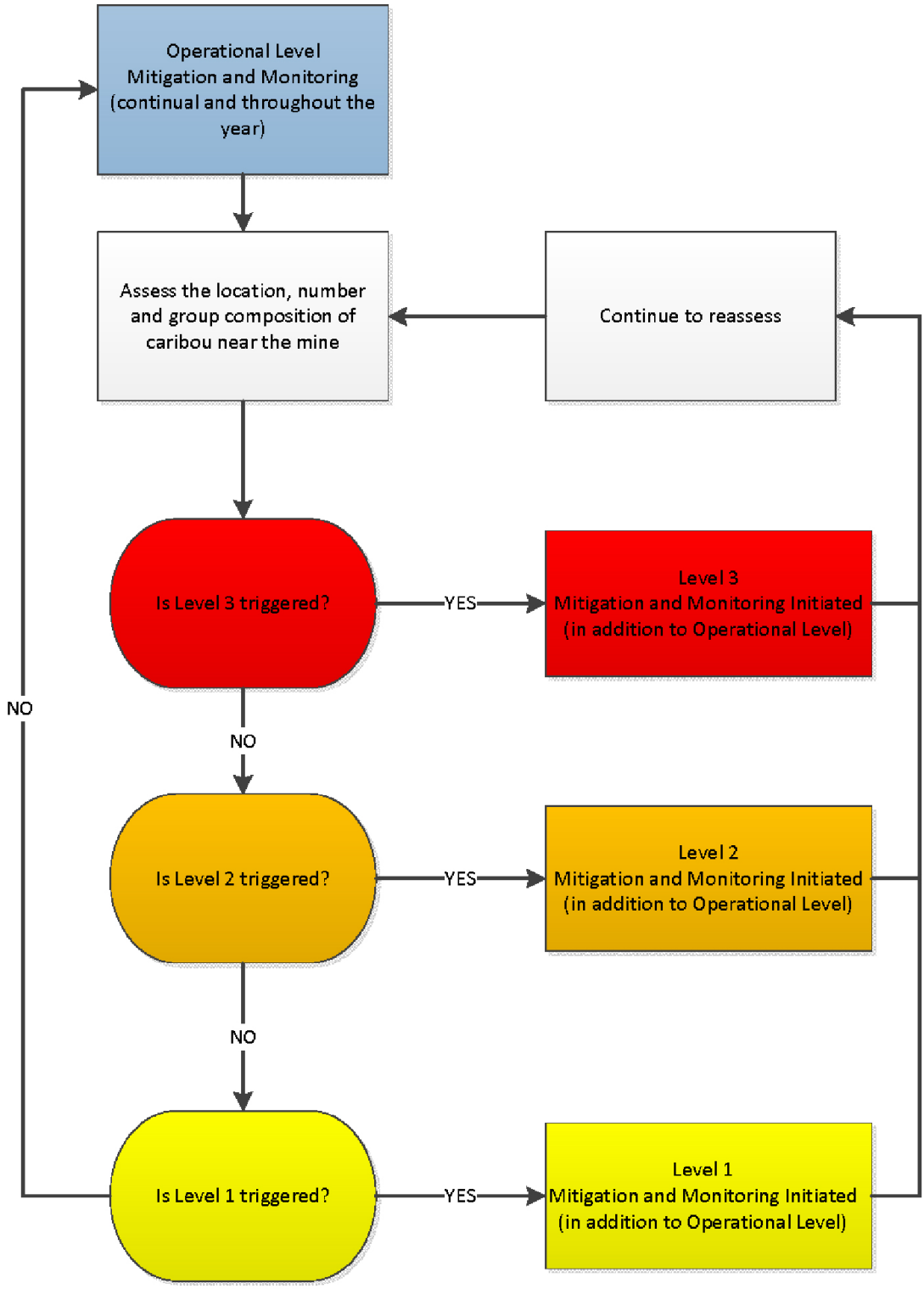


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Table 5.4-1: Action Levels (Triggers) and Associated Caribou Road Mitigation and Monitoring

Level (Alert)	Action Level (Triggers) to Initiate	Wildlife Road Mitigation	Caribou Monitoring
Operational (Blue)	• Continual and throughout the year	• Roads incorporate caribou crossings • Employee education • Speed limits are posted • Wildlife have right-of-way on all roads • Observations of wildlife on roads are communicated to the Environment Department and other drivers in the area • Wildlife carcasses on or near roads are removed • Road snow berm height are managed during winter (~1 m high)	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and 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 Diamond Mine (i.e., RSA)	• Site-wide notifications of caribou approach to Ekati Diamond Mine • Signage indicating caribou could be encountered (yellow alert)	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and cameras at road and esker crossings • Daily road surveys
2 (Orange)	• One or more collared caribou within 14 km of the Ekati Diamond Mine • Caribou sightings are reported near roads • 0.25% of total cows in the Bathurst herd are between 200 to 500 m of the Lac du Sauvage, Sable or Misery roads during any season	• Site-wide notifications of caribou approach to Ekati Diamond Mine • Increased signage in areas where caribou might encounter the road • Signage indicating caribou are likely to be encountered (orange alert) • Speed limits are decreased and posted	• Collared caribou monitoring • Incidental wildlife sightings • Behavioural observations and cameras at road and esker crossings • 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 Lac du Sauvage, Sable or Misery roads during any season • One or more cow caribou are observed within 500 m of the Lac du Sauvage, Sable 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 Diamond 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 Diamond Mine.

Monitoring of caribou with satellite collars provides early detection of caribou approaching roads and assists in managing appropriate levels of mitigation to protect caribou and other wildlife. The monitoring techniques discussed below are to be considered in sequence. Monitoring is completed and assessed by the Environment Department and is 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 (Section 7).

5.4.1.3 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 Diamond Mine RSA. Many of the mitigations presented below have been applied to the Ekati Diamond Mine since operations began in 1998 (BHP 2000a).

Employee Education

The Environment Department completes 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 are made to the departments that use the Sable, Misery and Lac du Sauvage 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 are in addition to employee mine orientation training and driver training, and are 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 gives drivers more reaction time and reduces the distance required to stop. Haul truck traffic is monitored at site using Wenco. Wenco is an on-board vehicle electronic tracking system that records vehicle location and can be used to calculate speed.

Wildlife Have the Right-of-way on All Roads

All employees operating vehicles are responsible for stopping for caribou and other wildlife on the Lac du Sauvage, Sable and Misery roads (and other Ekati Diamond Mine roads). If a driver encounters wildlife or caribou on the road, they must report this to the Environment Department and Dispatch. This allows 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 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 5.4-2).

Table 5.4-2: 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 their speed to 40 km/h. When the animal has moved more than 500 m from the road the driver can increase their 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 5.4-1). In other words, once Environment personnel are on site, traffic may be directed to remain stopped at distances greater than 100 m, depending on the behaviour and movement of caribou.

Observations of Wildlife on Roads Are 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 Diamond Mine annual monitoring report.

Wildlife Carcasses on or near Roads Are 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 ENR department of the GNWT and receives direction from ENR regarding disposal. Arctic Canadian 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 Diamond Mine and details regarding carcass removal (e.g., distance carcass was moved from the road) are included in the Ekati Diamond 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, Sable and Lac du Sauvage roads are maintained at a height less than 1.6 m, where practicable. The grader used to manage snow clears snow to a height of approximately 1 m.

5.4.1.4 Level 1 (Yellow)

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

Site-wide Notifications of Caribou Approaching the Ekati Diamond Mine

Notifications are communicated through site-wide email, during morning safety meetings or department-specific radio channels by the Environment Department. Notification included signage alerting drivers departing on the Lac du Sauvage, Sable and Misery roads that migrating caribou are approaching the Ekati Diamond Mine.

Signage Indicating Caribou Could Be Encountered (Yellow Alert)

The Environment Department posts yellow (Level 1) alert signs for drivers that caribou could be encountered in the area. This provides drivers with reminders to be vigilant. Signs are posted at entry points of the Lac du Sauvage, Sable and Misery roads. All drivers are notified at the beginning of their shift the alert level the mine is currently at and are provided with maps of any recent incidental caribou sightings. These maps include recent observations and information of where caribou have historically been encountered along the road.

5.4.1.5 Level 2 (Orange)

This level of additional mitigation occurs when one or more collared caribou or caribou observations occur within 14 km of the Ekati Diamond Mine or when 0.25% or more of total cows in the Bathurst herd are observed at 200 to 500 m from the Misery, Sable or Lac du Sauvage 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.

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 are 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 posts alert signs at key sections of the roads to warn drivers that caribou are approaching the mine. This reminds 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 5.4-2). The location of the signs is based on incidental caribou observations, camera trapping data and TK. Together these data are used to update the map distributed to drivers 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.

Speed Limits Are Decreased and Posted

The maximum speed limit on portions of the haul roads is 60 km/h. As a general rule for drivers, speed limits are decreased to 40 km/h along sections of the Lac du Sauvage, Sable or Misery roads when 0.25% of total cows in the Bathurst caribou herd are observed at 200 to 500 m from the road (Table 5.4-2). When caribou are observed 100 m to 200 m of the road, the speed limit is decreased to 20 km/h. Vehicles are to stop and remain stopped when caribou are within 100 m of the road. Importantly, these triggers and actions are guidelines for drivers when Environment personnel are not present. The length and section of the road, and duration of the speed limit decrease will be determined by the Environment Department, and traffic may be stopped for periods of time at any distance, depending on the behaviour and movement of caribou. Speed limits will apply to all vehicles. Wildlife will continue to have the right-of-way during speed limit reductions.

5.4.1.6 Level 3 (Red)

This level of additional mitigation and monitoring is triggered when 0.25% or more of total cows in the Bathurst herd are within 200 m of the Misery, Sable or Lac du Sauvage 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, Sable or Lac du Sauvage roads. The trigger is 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, Sable or Lac du Sauvage 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 roads; and

- sensory disturbance from roads and traffic on caribou behaviour (and associated adverse changes in energetics and reproduction).

Signage Indicating Caribou Are Highly Likely To Be Encountered (Red Alert)

The alert signs posted in Level 2 mitigation 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 is 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 Lac du Sauvage, Sable or Misery roads (as determined by the lowest number between the most recent ENR photo census or calf recruitment survey). Road closures further reduce sensory disturbance and maximize the time interval between vehicles. Short-term closures involve closing sections of the road from one minute to six hours. Long-term closures involve closing the entire Lac du Sauvage, Sable 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 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, Sable or Lac du Sauvage 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 occur when a single cow is within 500 m of the roads and their direction of travel indicates they could encounter a road. Any additional mitigation efforts 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.

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 focuses 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.

5.4.1.7 Mitigation for the Lac du Sauvage Road

The Lac du Sauvage Road east of the Point Lake Access Road will be modified in 2023 from the current haul road configuration to further facilitate caribou passage while supporting future uses of the road. The work may include removing rock berms, modifying side slopes, and using overburden excavated from the Point Lake Open Pit to construct road crossing ramps. The work prescriptions will be the subject of further engagement and will be conducted according to the requirements of the Point Lake Land Use Permit as issued by the Wek'eezhii Land and Water Board.

5.4.2 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 Diamond Mine have been reported (DDEC 2019). At high risk areas, heavy weight orange barrier fencing has been 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 Diamond 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 (Section 6.6.2)

5.4.3 Dust

The Ekati Diamond Mine produces dust through various sources including blasting and crushing rock, road construction and traffic. Pro-active measures to reduce fugitive dust at the Ekati Diamond Mine include:

- Establishment of speed limits on all roads; and
- Control of fugitive dust emissions through road watering and the use of approved dust suppressants.

Dust suppression as a mechanism to mitigate the effects of fugitive dust at the Ekati Diamond Mine has been employed since the commencement of mining in 1998. Monitoring the long-term effectiveness of dust suppression is presented in the AQMP reports (e.g., lichen tissue results; ERM 2018b). Various methods of dust suppression have been used on-site including road watering, the application of DL-10 and EnviroKleen, and the use of EK-35 on the airstrip.

Water is used as a dust suppressant and is approved by the GNWT Lands Inspector for usage as a dust suppression method. The application of water as a dust suppression method is applied once temperatures remain above freezing and during the spring, prior to application of chemical dust suppressants.

EK-35 is used on the Ekati Diamond Mine airstrip in accordance with Boeing guidelines to assist in the control of fugitive dust from incoming and outgoing aircraft and associated vehicle traffic.

In addition to the application of the above dust suppressants, the Ekati Diamond Mine continues to implement a reduced speed limit around site, which minimizes the impact of vehicle generated road dust since emissions increase almost directly with the speed of the vehicle (US EPA 2006a).

5.4.4 Toxic Substances and Contaminants

The following mitigation policies and procedures decrease the risks to caribou and other wildlife from ingestion of toxic substances or encounters with toxic spills on the Ekati Diamond 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 Diamond Mine 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 Contingency Plan (Section 3.3) 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 (Section 3.3) and soil will be remediated in the landfarm or shipped off-site;
- 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 (Section 3.3).

5.5 Education

Environmental education is part of every employee's mandatory training upon starting at the Ekati Diamond 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 Ekati Diamond Mine environment department also provides role and department-specific training and presentations based on seasonal environmental issues. For instance, haul truck drivers are given presentations prior to the Bathurst herd spring migration reminding them of mitigation and alerting them to the increased likelihood of caribou presence.

6.0 Monitoring

6.1 Wildlife Habitat Alteration and Loss

Direct loss of terrestrial wildlife habitat may occur through site clearing, industrial structural development, and facility expansion. The cumulative annual amount of direct habitat loss accrued from the Construction and Operation phases of the Ekati Diamond Mine have been monitored annually since 1997. These losses were predicted and approved through the EIR process; i.e., the EIS (BHP Billiton 1995), the Environmental Assessment Report conducted for Sable, Pigeon, and Beartooth in 2000 (BHP and Dia Met 2000), the amendment for Lynx Development in 2014 (Water Licence W2012L2-0001), the Jay Project DAR in 2014 (DDC 2014), and the Point Lake Project (Arctic Canadian 2021b).

6.1.1 Objectives

The objective for this component of the WMMP is to:

- determine the amount of direct habitat loss due to ongoing development and operations of the Ekati Diamond Mine.

6.1.2 Methods

The cumulative area of direct habitat loss is determined by superimposing the current project footprint on the pre-development (i.e., baseline) habitat map of the study area using Geographic Information System (GIS) software. Both the project footprint and the baseline habitat map were developed from LANDSAT Thematic Mapper satellite imagery (BHP Billiton 2004). Direct habitat loss is measured by classifying pre-disturbance land cover into 15 habitat types (Table 6.1-1) that represent an association of vegetation, soil, and moisture characteristics, using the Ecological Land Classification system developed for the Slave Geological Province (Matthews, Epp, and Smith 2001). Direct habitat loss is measured in hectares and determined as cumulative, successive annual changes in the project footprint. Disturbed areas that are under reclamation are included in the tabulated results.

Table 6.1-1: Description of Habitat Types within the Ekati Diamond Mine 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.
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.

Habitat Type	Description
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. Understory 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)	Water bodies that contain submerged 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.

Source: Matthews, Epp, and Smith (2001). ‘>’ refers to greater than; ‘<’ refers to less than. spp. refers to multiple species.

6.1.3 Frequency

Mine footprint updates are provided annually.

6.1.4 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 Diamond Mine will be included in the annual monitoring report.

6.2 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. Wooden pallets and heavy cardboard containers are 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, Arctic Canadian 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 WMMP is designed to address the key environmental risk of habituation of carnivores (DDEC 2019).

6.2.1 Objectives

The objectives of this component of the WMMP are to:

- monitor the misdirection of wildlife attractants and hazardous wastes in waste bins to avoid and minimize possible wildlife incidents at these locations;
- evaluate the effectiveness of waste management protocols for reducing misdirected waste in waste bins;
- identify problem areas where improvements may be required; and
- manage potential wildlife attractants, wildlife activity, and habituation to the waste bins.

6.2.2 Methods

6.2.2.1 Landfill

Waste from Ekati Main Camp as well as from Misery Camp and Sable lunchrooms is hauled to the Ekati Diamond Mine landfill, incinerator, and composter. The landfill survey involves visual investigations of the Ekati Diamond Mine landfill on foot. The amount and type of animal attractants (i.e., food, food packaging, oil products, and oil-contaminated wastes) and other misdirected wastes (i.e., batteries and aerosol cans) are recorded (Appendix A3). The availability of attractants is categorized as none, low (1 piece), medium (2 to 5 pieces), high (6 to 10 pieces), and very high (>10 pieces; Appendix B1).

All attractants and other misdirected wastes are safely removed and properly discarded, or immediately buried by the Waste Management Department if attractants cannot be safely removed. The presence of wildlife and wildlife signs (such as tracks and scats) are noted, photographs are taken where possible, and behaviour of animals is recorded to document potential habituation, illness and/or injury.

6.2.2.2 Waste Bin

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, bulbs and aerosol cans) within the various waste bins types are counted, recorded, and removed if possible (Appendices A4, A7 and B2). The availability of attractants is categorized as none, low (1 piece), medium (2 to 5 pieces), high (6 to 10 pieces), and very high (> 10 pieces). Wildlife signs (visual observations, tracks, scat), species, number of individuals, and behavior are also recorded. Misdirected waste (wildlife attractants and/or waste placed incorrected in the specified waste bin category) and wildlife observations detected during surveys are reported to the Environment Department and Waste Management Superintendent, and the supervisor of the area is contacted to arrange for removal of all misdirected wastes from waste bins prior to disposal in landfills.

6.2.3 Frequency

The landfill surveys occur two or more times per week (more if concerns are noted by Environment Department staff). The waste bins at the Ekati Diamond Mine Camp, Misery Camp, and Sable lunchroom are surveyed approximately once every two weeks (more frequently if concerns were noted by surveyors).

6.2.4 Data Analyses

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

6.3 Wildlife Incidents and Mortalities

Natural wildlife activity and ecological processes are left undisturbed unless there is risk to the safety of Arctic Canadian staff. Incidents include observations of wildlife-vehicle, wildlife-aircraft, wildlife-infrastructure and wildlife-human interactions where there is a potential risk of harm to people, wildlife, and/or infrastructure. Incidents also include any action where deterrents are deemed necessary. Incidents involving wildlife in close proximity to mine infrastructure, such as roads, open pits, waste rock storage areas, and the LLCF must be managed to minimize risk to wildlife and staff. As part of the WEMP, all wildlife incidents are recorded and reviewed to adaptively manage these incidents.

Natural and human-caused wildlife mortalities are monitored at the Ekati Diamond Mine to determine whether wildlife VECs or other species of interest (e.g., fox) are being injured and/or dying when interacting with the Ekati Diamond Mine site.

Wildlife carcasses can attract carnivores to the mine site, creating risks for both carnivores (e.g., being drawn to the road by carrion and subsequently being struck by a vehicle) and people who encounter them. Mitigation measures, such as removing carcasses, are in place to avoid any potential negative interactions between wildlife and humans, and to reduce the likelihood of wildlife associating the site with food.

As part of the WMMP, all wildlife mortalities are recorded and reviewed to determine if mine operations contributed to a mortality event. Documenting and evaluating mortalities enables adaptive management approaches and improvements to mitigation.

6.3.1 Objectives

The objectives of this component of the WMMP are to:

- document, minimize, and mitigate potential effects of mine activities and infrastructure on wildlife;
- reduce risks to both wildlife and people;
- monitor if any wildlife are killed or injured as a result of vehicle and aircraft interactions; and
- evaluate whether preventative measures are sufficient to minimize risks of wildlife injury and mortality.

6.3.2 Methods

6.3.2.1 Incidents

Wildlife incidents are reported to the Environment Department, recorded on an Incident Form, and entered into a database. Incidents include observations of wildlife-vehicle, wildlife-aircraft, wildlife-infrastructure and wildlife-human interactions where there is a potential risk of harm to people, wildlife, and/or infrastructure. Descriptions of species, number of individuals, sex and age, location, condition of the animal, management responses, wildlife behaviour, type of incident (i.e., interaction with field crew, vehicle, aircraft, mine infrastructure, mortality, or other), type and number of deterrents used, and outcome, are recorded for all incidents. All deterrent actions are documented and reported to ENR (Table 6.3-1). Deterrent measures used during an intensive pit wall raptor nest monitoring program are reported separately (Section 6.6.2).

Table 6.3-1: Management Authority Contacts and Circumstances for Contact

Circumstance	Management Authority	Contact
VEC mammal or raptor mortality	GNWT ENR	ENR Wildlife Enforcement Officer
Migratory bird mortality at Ekati Diamond Mine	ECCC-CWS	cwsnorth-scfnord@ec.gc.ca

Detailed inspections of skirting around buildings (Appendix A5, A7 and B4) and fencing (Appendices A6, A7 and B5) are conducted on a weekly basis. Specifically, surveys are completed by walking or driving around buildings with skirting (i.e., the Ekati Diamond Mine Main Camp and Misery Camp), and around fencing structures (i.e., Misery Camp, and Ekati Airport). Surveyors record any sign of wildlife (e.g., scats, tracks, and digs), as well as evidence of damage (e.g., holes, tears) to the skirting or fencing and repair needs are communicated to Site Services for prioritized execution.

6.3.2.2 Mortalities

Arctic Canadian records detailed information on wildlife mortality in a wildlife mortality database. Wildlife mortalities observed by Arctic Canadian staff are reported immediately to the Environment Department and an inspection by Environment staff determines the probable cause of death. Obvious injuries, the position of the animal, and anything considered unusual is photographed and recorded. Further information including time, date, location, estimated time of death, and any sightings of other wildlife in the area is also recorded (Appendix B6).

Arctic Canadian is required to report wildlife mortality details to ENR each time a VEC species, fox, common raven, or raptor is found dead anywhere at the Ekati Diamond Mine site (Table 6.3-1). Migratory bird mortalities are reported to ECCC as the responsible agency for migratory birds under the *Migratory Bird Act* (1994). Unless otherwise directed by ENR or ECCC, carcasses found close to the mine site are 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. Natural wildlife activity and ecological processes are left undisturbed unless there is risk of harm to onsite personnel or wildlife. For example, carcasses found in an area where they do not pose any threat to wildlife or human safety are left on the tundra.

6.3.3 Frequency

Wildlife incident and mortality monitoring is undertaken as required, continuously throughout the life of the Ekati Diamond Mine. All incidents and mortalities require follow-up to determine if anything can be done to prevent similar events from occurring in the future.

6.3.4 Data Analyses

Data analyses are conducted to identify trends over time in the number of mine-related incidents and mortalities. Analyses also attempt to determine the cause of incidents or mortalities, and identify any further mitigation that would improve the effectiveness of wildlife safety.

6.4 Caribou

6.4.1 Caribou Road Mitigation Plan (CRMP)

6.4.1.1 Operational Level (Blue)

Operational monitoring includes reviewing the locations of collared Bathurst caribou (Section 6.4.4), incidental sightings of caribou (Section 6.4.2), weekly road surveys (Section 6.4.3), behavioural observations (Section 6.4.5) and motion-triggered camera traps (Section 6.4.6), and the results are documented in the Ekati Diamond Mine annual monitoring report.

Snow berm height will also be monitored during winter months and will include monthly transects. There will be one transect with ten sample points per travel direction per road . Sections of road where there are safety berms will be excluded.

6.4.1.2 Level 1 (Yellow)

Level 1 monitoring includes all of the monitoring in the Operational Level; however, the frequency of road surveys is increased from weekly to daily surveys (Appendix B7). The frequency of yellow alert level, and all observations from additional road surveys are documented in the Ekati Diamond Mine annual monitoring report.

6.4.1.3 Level 2 (Orange)

Level 2 monitoring includes all of the monitoring in Level 1, and additional monitoring listed below. The number of occasions when there is an orange alert level, the road, frequency, duration and length of road segments of speed limit reductions is documented in the annual monitoring report.

Environment Technicians Dispatched to Monitor Traffic and Provide Caribou Safety

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

6.4.1.4 Level 3 (Red)

Level 3 monitoring includes 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 is documented in the Ekati Diamond Mine annual monitoring report.

Behavioural Surveys (Scan and Focal Sampling)

Ground-based scan and focal sampling from the road is initiated to document caribou response to stressors (e.g., haul trucks). Behavioural monitoring of caribou allows 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 increases the likelihood that monitors can complete behavioural surveys, while mitigation actions are still being actively managed. Environment staff remain with observed caribou until the caribou are no longer visible from the road even if the behaviour monitoring has been completed.

6.4.2 Incidental Caribou Observations

Incidental caribou observations around the mine site are monitored and recorded to minimize potential risks associated with human and wildlife interactions, and to identify mine structures that might be acting as potential bar riers to caribou movement. Furthermore, recording incidental caribou observations aids in determining the composition (e.g., age and sex) of caribou herds moving through the study area.

6.4.2.1 Objectives

The objectives of this component of the WMMP are to:

- identify the composition of caribou groups moving through the Ekati Diamond Mine area;
- document the annual timing of caribou use of the Ekati Diamond Mine area to compare temporal trends in migration patterns; and
- track any trends in the number of caribou moving through the Ekati Diamond Mine area over years.

6.4.2.2 Methods

Incidental caribou observations at the Ekati Diamond Mine are reported to the Environment Department by helicopter operators, ground-based field workers, other mine site personnel, and people from visiting groups (Appendices A8 and B8). For each caribou observation, the date, number of individuals, and location (UTM coordinates when possible) are recorded. Other information such as composition, dominant behaviour, distance to mine infrastructure, and presence of a satellite-collared animal are recorded where possible. Incidental observations of caribou are summarized by broad seasonal periods, recognizing that these seasonal periods vary annually, particularly dates surrounding the calving and post-calving periods (Sutherland and Gunn 1996; Russell, Kofinas, and Griffith 2002; Gunn et al. 2013).

6.4.2.3 Frequency

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

6.4.2.4 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.

6.4.3 Caribou Road Surveys

Road surveys are completed by vehicle along the Lac du Sauvage (formerly Jay), Misery, and Sable roads to determine the location and number of caribou as they approach the Ekati Diamond Mine Environment Department personnel surveying the roads implement additional mitigation, such as deploying signs to notify personnel to the presence of caribou or the need for road closures (Section 5.4.1). The road surveys proposed as part of the Jay Project represented a new type of monitoring. During the Jay Project EA, stakeholders raised concerns regarding how Arctic Canadian would detect caribou approaching roads at night and in poor visibility. A Forward Looking Infrared T640 thermal imaging camera was used on site in 2017 as a preliminary test for its ability to detect caribou. Initial testing at short range (200 m) produced inconclusive results. Natural insulation of Arctic species meant that wildlife were not visible using the thermal imaging technology during winter months. This testing was further complicated as weather severe enough to limit visibility of caribou resulted in roads at the Ekati Diamond Mine being closed to anything except emergency travel. Fortunately, this means that when caribou cannot be easily detected by the human eye there is no traffic to threaten their safety.

6.4.3.1 Objectives

The objective of this component of the WMMP is to:

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

6.4.3.2 Methods

One to two observers travel by light vehicle along Sable, Misery, and Lac du Sauvage roads to record the location, number, and proximity of caribou adjacent to roads (Appendices A9 and B9). When caribou are observed, information on group size, composition, dominant behaviour, and signs of caribou stress are recorded. Though caribou may exhibit a wide variety of behaviours, for the purposes of the road survey, behaviour data are grouped into four categories (see definitions in Section 6.4.5): bedding, feeding, standing and travel (including walking, trotting, and running). Signs of distress (deflection, hesitation, and alert) are also noted (see additional information in Section 6.4.5 regarding stressors). Observations of wildlife and evidence of wildlife activity (i.e., tracks, scat), are also recorded during each survey. In cases where caribou tracks are identified, surveyors noted the direction of movement. In cases where the caribou group size is

provided as an approximate number (e.g., greater than 70 individuals), group size is conservatively assumed to be the lower value (i.e., 70 individuals).

6.4.3.3 Frequency

The frequency of surveys begins at one per week and will become more frequent as higher action levels occur (Section 5.4.1). The number of surveys completed during these caribou migrations is determined by the number of caribou in the regional study area and the proximity to mine roads.

6.4.3.4 Data Analyses

The results will be assessed on the days that surveys are conducted so that appropriate mitigation can be implemented immediately. This includes 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.

6.4.4 Caribou Telemetry Monitoring

Caribou herds exhibit periodic changes in seasonal migration routes and in calving and winter ranges (Gunn, Dragon, and Nishi 1997; Gunn, Dragon, and Boulanger 2002; BCMPC 2004; Boulanger et al. 2004). Seasonal ranges and core use areas can also vary from year to year within a large spatial extent, which can be illustrated by comparing historical collar data to more recent satellite data. The locations of collared caribou are monitored to determine the proximity of caribou relative to the Ekati Diamond Mine. Maps generated by the GNWT that show the location of satellite-collared individuals are used as tools to inform the required local monitoring and/or change in the mitigation levels (Table 5.4-1).

6.4.4.1 Objectives

The objectives for this component of the WMMP are to:

- provide advance warning of caribou approaching the study area to inform monitoring and mitigation;
- Identify potential effects, investigate drivers, and evaluate effectiveness of mitigation;
- document the presence and annual timing of caribou movements relative to the Ekati Diamond Mine; and
- compare temporal trends and spatial variability in migration patterns relative to the Ekati Diamond Mine.

6.4.4.2 Methods

Seasonal movements of the Bathurst herd are tracked using satellite collars on caribou cows. As male caribou were not included in monitoring of the Bathurst herd until 2015, and as they use different ranges than females at some periods within the year, data from male caribou are not included in the seasonal analyses.

Throughout the year, satellite collars provide point location data on caribou at fixed time intervals. With these data, linear pathways between consecutive points are created to plot spring migration routes from winter ranges north to the calving grounds. The data are also used to identify movement corridors and river crossings.

For periods other than spring migration, satellite daily collar location data are used to calculate fixed kernel Utilization Distributions (UDs) that represent levels of use by caribou. The core range is defined by the 50% kernel UD, an area with a 50% probability that an animal (or group of animals) will be found inside that area. The seasonal range extent is represented by the 95% kernel UD, an area with a 95% probability that an animal (or group of animals) will be found inside that area. Data during fall are sporadic and movements of caribou during this time are slow relative to spring migration; therefore, these data are presented as ranges rather than movement paths.

The fixed kernel UDs were analyzed by season/life history stage. The time period for spring and fall periods are defined by movement rates during migration relative to more resident periods when caribou occupy their winter, summer, calving, and post-calving range (Johnson et al. 2005). The general seasonal period dates for Bathurst caribou are provided in Table 4.1-1.

All seasonal periods are contained within the calendar year, except winter period (Table 4.1-1). The fixed kernel UDs for the winter period combines data from November 1st to April 14th.

Fixed kernel 50% and 95% UDs are also calculated for winters for the Beverly/Ahiak herd from data from collared females. For the purposes of the analyses, the same dates are used to define the winter season for the Beverly/Ahiak herd as for the Bathurst herd (November 1st to April 14th).

Motion-triggered cameras and incidental observations of caribou are used to identify additional time periods when caribou may be present in the study area.

To determine the effectiveness of mitigation for caribou, a comprehensive telemetry analysis is occurring in 2022. The analysis will use a step-selection approach to model movement steps in relation to ecological covariates including land cover classes, insect harassment indices, and proximity to mine infrastructure. Step-selection functions (SSFs) will be used to examine caribou movements by season, year, and sex. Step-selection function analysis involves plotting individual movement paths from pairs of telemetry locations (steps) separated by a specific time interval (e.g. 1 hour, 8 hours, 1 day) and characterizing the step by the environmental covariate along or at endpoints of the movement path. For each observed step, a number of random steps are also created originating at the same, real location point. Each random step is then characterized by the same set of environmental covariates as the real step. The SSF analyses will be conducted over multiple scales to example the influence of environmental factors, including mine infrastructure, at a range of scales.

6.4.4.3 Frequency

Maps are generated weekly by the GNWT to show the proximity of collared caribou to the mine. Seasonal distributions are determined annually for the annual monitoring report. The comprehensive telemetry analyses are following a timeline independent from the WMMP given the importance and complexity of them.

6.4.4.4 Data Analyses

See methods section above for data analysis details. Caribou satellite collar data will also be used to compare against the results of the other monitoring programs that evaluate caribou presence (e.g., road surveys and camera trapping).

Arctic Canadian is focused on conducting a comprehensive telemetry analysis for effectiveness of mitigation measures as a separate analysis. Based on the results of the telemetry analysis and the traffic/camera data comparisons, Arctic Canadian will explore methods for incorporating the telemetry and traffic data effectively. Arctic Canadian anticipates that the results from the comprehensive telemetry analysis will indicate the effectiveness of current mitigation. This analysis will inform the requirement for updates to the mitigations identified in the CRMP; Section 5.4.1; Section 6.4.1). If results of the comprehensive telemetry analysis warrant it, the mitigation and monitoring from the CRMP (Section 5.4.1; Section 6.4.1) will be revised with stakeholder input. The results of this research are expected in 2022 or early 2023 and will be reported on separately from the WMMP annual report.

6.4.5 Caribou Behaviour: Activity Budgets and Response to Stressors

Caribou behaviour can be influenced by industrial development (Bradshaw, Boutin, and Hebert 1997). Adult female caribou with calves are more sensitive to disturbances than other caribou group compositions (Miller 2001). 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, Griffith, and Gray Wolfe 2000). In some situations, mine infrastructure and mine-related activities can inhibit normal caribou behaviours, such as feeding and resting (Nellemann and Cameron 1996). Caribou behavioural responses tend to increase in proportion to the sound intensity of overhead aircraft, and helicopters induce stronger responses than fixed wing aircraft (Larkin 1996). At the Ekati Diamond Mine, stressors that have the potential to influence caribou behaviour include vehicle traffic, aircraft activity, the presence of mine staff, and blasting.

6.4.5.1 Objectives

The objective of this component of the WMMP is to:

- determine if caribou behaviour changes with distance from the mine or in response to various potential stressors; and
- Behaviour is a component of the telemetry project; therefore, the future of this objective will be based on the results of that project.

6.4.5.2 Methods

Two approaches, focal sampling and scan surveys (Altmann 1974), are used to record the behaviours of caribou in the Ekati Diamond Mine study area (Appendices A10, A11 and B10). Focal observations of a single animal are ideal for obtaining information on activity budgets (i.e., the proportion of time an animal is engaged in different behaviours), the temporal sequence of behaviours relative to stressors or other stimuli, and the length of time it takes the animal to return to a non-stressed state following a stressor event (Martin and Bateson 1993). Scan samples of a group of animals are more useful for quantifying the frequencies of dominant behaviours in a group over a period of time (Altmann 1974), which can be thought of as an activity budget at the group level (or an average of individual activity budgets for all members of the social group being surveyed).

For both focal and scan sampling, when first arriving on site, the observers waited five minutes before commencing the surveys. During that time, distance from mine infrastructure, information on group location and insect harassment is recorded, and a composition count conducted. In the event that caribou remain on site for sufficient periods of time, or additional personnel are not available, priority is given to focal sampling over scan sampling.

For focal watch surveys, an individual caribou is randomly selected from a group, and in the case where focal observations are conducted on multiple individuals from a group, the sex of the individual selected for observation alternates. The location of each group from which an individual is randomly sampled is recorded, and group composition is tallied (bulls, cows, calves, yearlings, unknowns). There is no distinction made between nursery and non-nursery groups for analysis. Observations are conducted on either cows with calves, lone cows, bulls, or juveniles. An attempt is made to monitor the behaviour of individuals for a minimum of 20 minutes; however, survey length is reduced in cases where caribou move out of the observer's sight line. Depending on the size of the group, observations on several individuals may occur, time permitting. Surveys are recorded as completed if the survey took place for the full 20 minutes or if it was under 20 minutes and stressors are recorded.

For scan surveys, a caribou group is selected for monitoring. For groups of 10 to 30 animals, all animals are included in the scan. For larger groups, a sub-sample of 20 to 30 animals is observed. Priority is placed on surveying nursery groups (groups with calves). The group composition (bulls, cows, calves, yearlings, unknowns) and group size is recorded for the total group present or the sub-sample group surveyed. An attempt is made to monitor groups for a minimum of 32 minutes

at 4-minute intervals; however, survey length is reduced in cases where caribou moved out of the observer's sight line. Surveys are recorded as completed if the survey took place for the full 32 minutes or if it was under this time and stressors are recorded. Incomplete focal and scan surveys are excluded in analyses.

Focal and scan survey observations are conducted whenever caribou were passing through the mine site, when possible. For each individual or group, the following behaviours are recorded: bedding (e.g., sitting with all four legs tucked under body, lying down, sleeping on the ground), feeding (i.e., actively grazing, ruminating, chewing cud), standing, alert (e.g., quickly raising the head and orienting it toward a stimulus, pricking the ears and rotating them towards a stimulus, remaining motionless in an alarm posture), walking, trotting, running, and sparring.

In the event that a stressor occurs during a focal or scan observation, the observers record the immediate response in terms of a change in behaviour from one state to another. Estimated distance from the stressor is also recorded. Categories of potential stressors recorded during focal surveys included 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 humans on foot. Observers, where possible, 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.

6.4.5.3 Frequency

This monitoring is completed every year, depending on the presence of caribou observed at site.

6.4.5.4 Data Analyses

Data from focal surveys is presented as the average percentage of time observed spent on each type of behaviour. Group composition is reported from scan surveys and the percentage of time caribou are observed in the different behaviours. The total number of observed stressor events is reported from each survey type. The distance to the assumed stressor is reported for both focal and scan surveys.

As per ENR8 comment on the 2020 Wildlife Effects Monitoring Program Report (ERM 2021b) and as discussed in a meeting with ENR on November 12, 2021, the comprehensive telemetry analysis (Section 8.3) may be a more appropriate way to evaluate caribou behavioural changes due to potential barrier and stressor effects of the mine. Therefore, it is anticipated that the results of the separate telemetry analysis will inform the relevance of continuing on the ground behavioural surveys in the future.

6.4.6 Camera Trapping

Communities and regulators are particularly concerned about potential mine related effects to caribou in light of the population declines observed in recent decades. Arctic Canadian is committed to the ongoing evaluation of its wildlife programs to provide the most accurate information and the best techniques are used to monitor and mitigate impacts to wildlife. Of particular interest to the Ekati Diamond Mine has been monitoring the degree to which roadways and other infrastructure may be acting as semi-permeable barriers to wildlife movement. Mitigation measures, including caribou crossing ramps along the Misery, Sable, and Lac du Sauvage roads, constructed of compacted fine crushed rock particle using 6 to 8 inch minus fill, are designed to enable wildlife to cross these linear features, minimizing the likelihood of habitat fragmentation. Information derived from TK and community engagement sessions have facilitated the design and location of caribou crossing ramps along these roads.

Camera trapping, the use of remotely triggered cameras that automatically take images when triggered by motion (Rovero and Marshall 2009), is routinely used as an effective tool for monitoring wildlife (Meek et al. 2014). The use of motion-triggered cameras has a long history in wildlife research (Cutler and Swann 1999), and over the past two decades camera traps have become more readily available and affordable. The result was a rapid and diverse growth in the

application of motion-triggered cameras (Rowcliffe and Carbone 2008). Wildlife cameras are now being used to monitor wildlife activity around roads and other human infrastructure (Olsson, Widén, and Larkin 2008; Braden et al. 2008; Dunne and Quinne 2009; Noel et al. 2006). Remote photography has replaced traditional methods of visual surveys, drive counts, radiotelemetry, and track counts (Silveira, Jácomo, and Diniz-Filho 2003). A distinct benefit of remote photography is that it can be completed year-round (with some maintenance of the cameras through the winter). In addition, cameras remove observer and sample timing bias by providing data coverage 24 hours per day. Combined with 1-year battery life and memory storage for approximately 30,000 photos, data collection opportunities increase over traditional techniques with minimal human involvement or invasiveness to wildlife.

In addition to ongoing caribou monitoring activities, the Ekati Diamond Mine implemented the use of motion-triggered cameras to monitor caribou activity near the mine site. The camera monitoring program was initiated in 2011 as an alternative survey methodology to monitor for potential effects on caribou (and other wildlife) movements and behaviour, which contributes to the ongoing evaluation and implementation of effective mitigation measures. The program has continued annually, with between 49 and 90 cameras deployed each year. Improvements in data processing and best practices for data coding, data standardization, and analysis have continued throughout the duration of the program.

TK continues to be an important component in establishing the annual objectives of this program and for determining general areas where cameras should be deployed. Results from the 2011 to 2013 camera monitoring program suggested that the road was not a barrier to caribou movement through the Ekati Diamond Mine area, either due to the physical construction of the road or due to current traffic volumes (ERM Rescan 2014). The program continued in 2014 and 2015 and motion triggered photos collected from roadside camera locations were combined with data on roadside characteristics at historical camera locations and analyzed to determine whether road features along Misery Road influence road crossing behaviour by caribou and to identify what road features may facilitate or hinder caribou crossing events. The data were used to examine the road features associated with road crossings or deflections from crossing, concluding that road features were not significantly associated with caribou crossing or being deflected by roads at the Ekati Diamond Mine (ERM 2016).

6.4.6.1 Objectives

The objectives for this component of the WMMP are to:

- determine the level of caribou (and other wildlife) activity and traffic along active haul roads at the Ekati Diamond Mine;
- determine caribou (and other wildlife) responses to roads (i.e., crossing or deflecting);
- determine caribou (and other wildlife) activity at other mine infrastructure; and
- The future objectives of this monitoring program will consider the results of the telemetry project and be designed so that results from both programs can be integrated and evaluated holistically, if possible.

6.4.6.2 Methods

Cameras are deployed annually to monitor roads, as well as other strategic locations that were identified as annual objectives of the program, including locations recommended by TK holders. The cameras are programmed to take pictures at a specific timed interval (timed photos) and to take pictures when triggered by motion infrared sensor (motion triggered photos; Appendix A12).

A series of 10 motion-triggered photos with a one-second delay between each photo are automatically recorded whenever the camera's infrared signal-monitoring system detected movement in the camera's field of view. There is no time delay set between motion-triggered series events. Additionally, one timed photo is taken at noon each day for the purposes of determining camera effort. The date and time of each digital image is recorded.

Each camera is checked at least once during the survey period to check battery levels, determine the available memory on the SD memory card, and examine if the camera was still operating as programmed and had not been disturbed by wildlife or weather (Appendix A13). Memory cards and batteries are exchanged when necessary to prevent data loss. Data from memory cards are retrieved for processing and analysis throughout the fall and winter period (Appendix A14).

Frequency

This monitoring is completed annually on an ongoing basis. Camera data are analyzed and reported on separately from the annual monitoring report. Reports are based on three years of new camera data being collected. The next scheduled camera analysis and report are scheduled for issuance in 2023.

6.4.6.3 Data Analyses

Data analyses will be completed to identify patterns associated with caribou behaviour and traffic, roads and other Ekati Diamond Mine infrastructure. Camera-specific crossing success will be determined as (1 – the deflection rate). The physical attributes of camera locations that indicate less than 90% crossing success will be reviewed for improvement, including with the Traditional Knowledge Elders Group.

Prior to analyses, camera data are screened with the following criteria:

- Only photographs that captured caribou are included.
- All photographs containing caribou are included in analyses of calm versus stressed behaviour.
- For analyses of caribou responses to roads (deflection versus on-road [including road crossing]) only photographs from cameras along roads are included while data from cameras placed away from roads are excluded.

Consequently, cameras that fail to function properly or that fail to capture any caribou during their operation are excluded from all analyses. Analyses are restricted to an examination of photographs that include caribou.

All photos are processed for detections of lone caribou or caribou groups. Given the limitations to quantifying animal behaviour from timed photographs, behavioural analyses are restricted to motion-triggered photos (and those timed photos that are within the same field of view as the motion-triggered photos) to remove any potential bias in caribou detections. In addition, the cameras' fields of view likely mean that portions of some groups are never photographed. Thus, remote camera monitoring yields conservative estimates of group size.

Animal behavior is quantified from the motion-triggered cameras, including the number of caribou and up to three dominant behaviours exhibited by group members. When possible, individuals are classified by age (adult or juvenile) and sex (male, female, unknown). The dominant behaviour of each caribou group is determined; with priority given to categorizing road usage and road avoidance. Additionally, each individual that is exhibiting alert behaviour is noted (e.g., body oriented towards a potential stressor, ears erect and pointed in a particular direction, or remaining motionless in an alarm posture throughout several consecutive motion-triggered photos). Potential stressors, such as vehicles travelling along the road, are also recorded whenever evident in the photos. As a conservative estimate of behaviour frequency, calm behaviours (i.e., foraging, bedded or standing) had the lowest priority in terms of scoring the dominant group behaviour. The key attributes related to camera data analyses are provided in Table 6.4-1.

For each recorded crossing/deflection at mine site roads by caribou from wildlife cameras, traffic volume in the previous 60 minutes will be summarized. Data will be analyzed for patterns of crossing success correlated with traffic volumes (Section 6.4.7) and road closure timing.

Table 6.4-1: Caribou Photograph Coding Relevant to Analyses

Attribute	Codes	Description
Group size	1 2 3+	Group sizes of single animals, pairs of animals, or groups of three or larger.
Calm or stressed behaviour[1]	Calm	Behavioural observations assessed for all groups photographed. Calm behaviours include: bedded away from or near road; foraging away from or near road; foraging while walking; investigating camera; and resting/bedded.
	Stressed	Stressed behaviours include: evidence of being startled (tail flick, head going up, quick run or change of direction); deflected/deterred from path of motion (did not fully cross road); running (away from road); running along road; and running off road.
Behaviour regarding road usage	Deflected	Behavioural observation made for all photographs from cameras adjacent to roads, noting if the group had entered the road corridor. These include neutral behaviours and both stressed and calm behaviours noted above.
	On road	Deflected behaviour indicated animal deflected/deterred from path of motion (did not fully cross road). On-road behaviours include: crossing road walking or running (fully crossed road), walking or running along road, and running off road.

Note:

[1] In addition to calm and stressed behaviour categories, standing and walking are considered as neutral behaviours and are excluded from both calm and stressed categories.

Each photograph receives a code for group size; one or more codes for calm or stressed behaviours; and one or more codes for on-road or deflected behaviours. A single photograph might be coded as including both calm and stressed animals; it is also coded for on-road and deflected behaviours and might include animals in each of those categories.

6.4.7 Traffic Monitoring

Concern has been raised with regards to roads being semi-permeable barriers and the effects of traffic volumes on the willingness of caribou to cross roads. Arctic Canadian committed to traffic monitoring as part of the Point Lake WEMP Addendum (Arctic Canadian 2021a) and anticipates a full traffic monitoring dataset beginning in 2023.

6.4.7.1 Objectives

The objectives of this program are:

- determine hourly traffic volumes; and
- analyze traffic volumes associated with caribou crossings identified from wildlife cameras and caribou collar data.

6.4.7.2 Methods

Traffic monitoring technology will be established on Misery, Sable and on the Lac du Sauvage Road both east and west of the Point Lake Access Road. Please see Point Lake WEMP Addendum (Arctic Canadian 2021a) for a detailed description of monitoring for the Point lake Project. The technology will record time and date of each vehicle passage and is expected to be able to differentiate among types of vehicles and direction of travel. A database will be created including all records.

6.4.7.3 Frequency

This monitoring will occur continuously throughout the year.

6.4.7.4 Data Analyses

Data will be summarized for each hour in each day for each counter. For each recorded crossing from wildlife cameras and caribou collar data, if possible, traffic volume in the previous 60 minutes will be summarized. Data will be analyzed for patterns of caribou crossing success correlated with traffic volumes.

6.4.8 Long Lake Containment Facility Monitoring

Wildlife use of the LLCF is monitored as part of the WMMP. Small particle processed kimberlite (sand sized and smaller) from the processing plant is deposited in the LLCF. The LLCF consists of five cells (A to E) with processed kimberlite currently stored in three of the cells. Cells A and C, receive Fine Processed Kimberlite (FPK; sand sized and smaller, < 5 mm) from the Process Plant as a slurry (i.e., suspended in water). The FPK settles out and dries, taking on the consistency of hard, fine sand. At Cell B, progressive reclamation and reclamation research is in progress with plantings of grasses along the western edge of the cell conducted in 2014 and continued re-vegetation work from 2015 to 2019 (Dominion Diamond 2018). Cells D and E remain open water and there are no plans to deposit processed kimberlite into these two cells.

Ingestion of processed kimberlite by wildlife and the potential for injury or entrapment of wildlife in the LLCF is of potential concern. An important consideration is that the processed kimberlite at the Ekati Diamond Mine does not contain the same metals nor does it require processing with chemicals typical of gold and other metal mines. Environmental studies have shown that the risk to caribou from ingesting processed kimberlite is very low (BHP Billiton 2005; Rescan 2006).

6.4.8.1 Objectives

The objectives of this component of the WMMP 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.

6.4.8.2 Methods

The surveys involve a visual scan of the LLCF to observe and record caribou presence (Appendices A15 and B11). Surveys of the LLCF are conducted via vehicle along the entire Long Lake Road and dikes to monitor all LLCF cells (A, B, C, D, and E). Cells A, B, and C are the primary focus of the surveys. Incidental sightings of caribou in the LLCF outside of the formal survey are reported to the Environment Department and recorded as incidental observations (see Section 6.4.2).

When caribou are observed during surveys, the group size, composition, dominant behaviour, and signs of caribou stress are recorded. Though caribou may exhibit a wide variety of behaviours. For the purposes of the LLCF surveys, behaviour data are grouped into four categories: bedding (including bedded alert), feeding, standing (including standing alert), and travelling (included walking, trotting, and running). Observations of wildlife and wildlife signs within the LLCF are also recorded during each survey, particularly the presence, abundance, and nesting activity of waterfowl. Information from surveys may support reclamation research and planning.

6.4.8.3 Frequency

Cells A, B, and C are surveyed on an approximately weekly schedule during most months. Weekly surveys of Cells D and E are conducted during the open-water season.

6.4.8.4 Data Analyses

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

6.5 Carnivores

6.5.1 Grizzly Bear

A regional DNA study, that Ekati and Diavik Diamond Mines collaborated on from 2012 to 2017, indicated that the central barrens of the Northwest Territories are productive for grizzly bears (ERM 2018a). Grizzly bear numbers were stable to increasing since estimates for the Slave Geological Province were obtained in the late 1990s (3.5/1,000 km^2; McLoughlin and Messier 2002). These results provided evidence in support of the conclusion that the Ekati and Diavik Diamond Mines, which have been constructed since the last grizzly bear survey in the late 1990s, have not had a negative impact on the regional population of grizzly bears. Based on the results of the research, grizzly bear monitoring now is specific to incidental observations and documenting incidents as there wasn't evidence of regional impacts.

6.5.1.1 Incidental Observations

The recording of incidental grizzly bear observations in the study area provides information on grizzly bear activity, which can help locate and eliminate bear attractants and minimize human/bear interactions. Once a bear is observed within the mine site, Arctic Canadian personnel are notified, and work activities are adjusted to avoid encounters. As a follow up to any wildlife incident, the areas are scanned for any possible wildlife attractants. Incidental observations can also be used to monitor changes in bear activity near the mine over time, and to assess incidents by mine location or by differences in activity by population demographic (e.g., age, sex groups).

Objectives

The objectives of this component of the WMMP are to:

- avoid and minimize bear-human interactions;
- identify the presence and composition of incidental bear observations in the study area; and
- document and determine the cause of direct mine-related mortality of bears should they occur.

Methods

Incidental observations of grizzly bears in the vicinity of the Ekati Diamond Mine are reported by Arctic Canadian staff to the Environment Department on an ongoing basis (Appendices A8 and B8). This includes all grizzly bear observations by helicopter operators, field workers, and by other staff on all working shifts. For each bear observation, the date, number of individuals, sex and age when possible, condition, behaviour, presence of a collar, and UTM coordinates (when possible) or a description of the location are recorded.

All observations of persistent grizzly bears reported in close proximity to roads, personnel, and mine structures at the Ekati Diamond Mine are investigated, as these are of particular concern with regards to human and wildlife safety. Where necessary, grizzly bears were deterred from these areas through the use of vehicles, air horns, screamers, bear bangers, and/or bean bags (Section 5.3.1).

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati Diamond 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.5.2 Wolf

Regional wolf monitoring including den occupancy and productivity surveys were coordinated by the GNWT ENR and over the years operators of the mine have collaborated in support of the wolf monitoring initiatives. Den monitoring is no longer an active component of the WMMP. Wolf monitoring is specific to incidental observations and incidents as previous studies did not indicate impacts were occurring at a regional scale.

6.5.2.1 Incidental Observations

Potential risks associated with human and wildlife interactions may be avoided by monitoring incidental wolf observations in the study area. Once a wolf is observed within the mine site, Arctic Canadian personnel at risk of encountering the wolf are notified and work actions are adjusted accordingly. In addition, incidental wolf observations help determine the timing and family composition of wolf packs moving through the study area.

Objectives

The objectives of this component of the WMMP are to:

- avoid and minimize wolf-human interactions;
- identify the presence and composition of incidental wolf observations in the study area; and
- document and determine the cause of direct mine-related mortality of wolves should they occur.

Methods

Incidental wolf observations in and near the Ekati Diamond Mine are reported to the Environment Department (Appendices A8 and B8). Incidental observations includes those made from helicopter surveys and ground-based field work and other staff. Each wolf observation includes the date, location, number of individuals sighted, the sex and age of individuals (when possible), dominant behaviour, condition of the animal, and the presence or absence of a radio or satellite collar.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati Diamond 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.5.3 Wolverine

In 2015, the mine participated in the wolverine DNA program conducted by GNWT ENR. Nineteen individual wolverines were identified from the samples collected in the Ekati Diamond Mine study area in 2015 (Efford and Boulanger 2018). The 2015 density was calculated as 3.88 wolverines per 1,000 km^2 (95% confidence interval: 2.60 – 5.79); the overall population trend in the Ekati Diamond Mine study area from 2005 to 2015 was $\lambda = 0.982$ (95% confidence interval: 0.931 – 1.035). Efford and Boulanger (2018, p.15) assessed the finding as providing no evidence for population decline in the Ekati Diamond Mine study area. This study is now completed and wolverine monitoring is specific to incidental observations and documenting incidents as the previous research did not indicate regional impacts

6.5.3.1 Incidental Observations

Monitoring incidental wolverine observations near the mine site helps to avoid the potential risks associated with human – wolverine interactions. Once a wolverine is sighted within the mine site area, Arctic Canadian personnel that are at risk of encountering the wolverine are notified and work activities are adjusted accordingly.

Objectives

The objectives of this component of the WMMP are to:

- avoid and minimize wolverine-human interactions;
- identify the presence and composition of incidental wolverine observations in the study area; and
- document and determine the cause of direct mine-related mortality of wolverines, should they occur.

Methods

Incidental observations of wolverines are reported to the Environment Department (Appendices A8 and B8). This included all wolverine observations made by helicopter operators, field workers, and other staff. Each wolverine observation includes the date, number of individuals, sex, age, location, behavior, and condition of the animal.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati Diamond 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.5.4 Fox

6.5.4.1 Incidental Observations

Monitoring incidental fox observations near the mine site may help to avoid and minimize potential risks associated with human and wildlife interactions. Once a fox is observed within the mine site area, personnel that are at risk of encountering the fox are notified, and work activities are adjusted accordingly.

Objectives

The objectives for this component of the WMMP are to:

- avoid and minimize fox-human interactions;
- identify the presence and composition of incidental fox observations in the study area;
- document and determine the cause of direct mine-related mortality of foxes should they occur; and
- document abnormal behaviour in foxes to identify possible cases of rabies.

Methods

Incidental observations of foxes are reported to the Environment Department. These observations include those made by helicopter operators or by field workers and other Arctic Canadian staff (Appendices A8 and B8). Each fox observation includes the number of animals, sex, age, location, dominant behavior, and condition of the animal.

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

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati Diamond 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.6 Raptors

Regional ENR falcon surveys were last conducted in 2015 and results were presented in the 2015 WEMP report (ERM 2016). Falcon occupancy, abandonment, and productivity varied over time. In 2015, falcon nest occupancy was the lowest recorded since 1995, but abandonment and productivity in 2015 were within the range recorded in 1998 and from 2000 to 2010. To further investigate the occupancy in 2015, the percentage of falcon nests occupied were compared to those near Daring Lake, a “control” site 50 km west of the Ekati Diamond Mine. The occupancy at Daring Lake was 41%, which was slightly higher than that recorded near the Ekati Diamond Mine (35%). The results of the analyses indicated that falcon occupancy at the Ekati Diamond Mine was not significantly influence by the mine. Regional falcon surveys are no longer an active component of the WMMP as impacts are not occurring at that scale. As such, monitoring is specific to incidental observations and pit wall nest monitoring and deterrence when needed.

6.6.1 Incidental Observations

Incidental raptor observations around the mine site are monitored and recorded to minimize potential risks associated with human and wildlife interactions, to identify mine structures that are used by raptors as nesting locations, and to identify any species of conservation concern in mine site area.

6.6.1.1 Objectives

The objectives of this component of the WMMP are to:

- avoid and minimize raptor-human interactions;
- document the presence of breeding raptors at the Ekati Diamond Mine;
- document sightings of uncommon raptors or species of conservation concern in the area; and
- document and determine the cause of direct mine-related mortality of raptors should they occur.

6.6.1.2 Methods

Helicopter operators, ground-based field workers, and other mine site personnel report incidental raptor observations of cliff-nesting and ground-nesting raptors in the Ekati Diamond Mine study area to the Environment Department (Appendix B12). Each raptor observation includes the date, the species, the number of individuals, the location and habitat type, the behavior, and any breeding evidence.

6.6.1.3 Frequency

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

6.6.1.4 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.6.2 Pit Wall Nest Monitoring

In northern environments, bird 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 the Ekati Diamond Mine 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 the Ekati Diamond Mine, particularly for birds that have a conservation status based on federal listings on Schedule 1 of *SARA* (2002), COSEWIC (Government of Canada 2022), and the listings under the Northwest Territories General Status Ranking Program (CESCC 2016). The eggs, nests, and individuals of gyrfalcon, peregrine falcon, and other raptor species (e.g., rough-legged hawk, golden eagle [*Aquila chrysaetos*]) are legally protected under the Northwest Territories *Wildlife Act, Section 38* (1988).

The use of active pits for nesting could pose a risk to raptors and their young. Raptor deterrence methods are used to minimize the number of raptors that are impacted by mining operations and prevent raptors from nesting and raising young in high-risk areas. Intensive monitoring and a bird deterrent program at active open pits ensures that nests are not established in potentially unsafe areas for the raptors and to also prevent temporary cessation of mining activities, which would be required for the duration of the nesting period in cases where nests are located close to blasting areas.

6.6.2.1 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.

6.6.2.2 Methods

Visual surveys for nesting activity will occur at all active pits at Ekati between April and August. Observations of birds, nests, and nesting activity (i.e., nest construction, perching, and incubation) in active pits will be recorded by Environment staff and ENR will be contacted immediately for advice on mitigation (Appendix A7 and A16).

6.6.2.3 Frequency

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

6.6.2.4 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.

6.7 Non-VEC Wildlife Groups

6.7.1 Migratory Birds

A study conducted at the Ekati Diamond Mine suggested that migratory bird species that prefer open-disturbed habitat may be attracted to mine infrastructure, while other species may avoid developments (Smith et al. 2005). However, since changes in behaviour were localized and similar to predicted effects this survey is no longer an active component of the WMMP. As such, monitoring is specific to incidental observations including rare or uncommon species and documenting incidents.

6.7.1.1 Incidental Observations

Recording incidental bird sightings at the Ekati Diamond Mine is one component of the migratory bird monitoring program conducted by Arctic Canadian. The information has been reported in the WMMP since 2013. Incidental bird observations around the mine site are monitored and recorded to minimize potential risks associated with human and wildlife interactions, to identify mine structures that are used by migratory birds as nesting locations, and to identify any species of conservation concern in mine site area.

Objectives

The objectives of this component of the WMMP are to:

- document the presence of migratory birds at the Ekati Diamond Mine;

- document sightings of uncommon birds or species of conservation concern in the area; and
- document and determine the cause of direct mine-related mortality of migratory birds should they occur.

Methods

Incidental migratory bird observations around the Ekati Diamond Mine are recorded by the Environment Department staff (Appendix B12). For each bird observation, the species, number of individuals, date, location (UTM coordinates, where possible), habitat, breeding evidence, and behaviour are recorded.

Frequency

Incidental sightings logs will be maintained at site throughout the life of the Ekati Diamond 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 conducted. Instead results inform where and when additional monitoring or mitigation may be required.

6.7.2 Rare or Uncommon Species

Arctic Canadian 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 Diamond Mine study area (Appendices B8 and B12). These observations will be reported in the annual monitoring report. The WMMP 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. Arctic Canadian will make the final decision whether or not to include a rare or uncommon species based on discussions with communities and relevant government agencies.

7.0 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 TK. The Ekati Diamond Mine WMMP has and will continue to incorporate adaptive management.

The process of developing a WMMP is collaborative and requires input from communities, IEMA, government and other regulators. As indicated in Section 1.1, the overall objectives of monitoring include:

- 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.

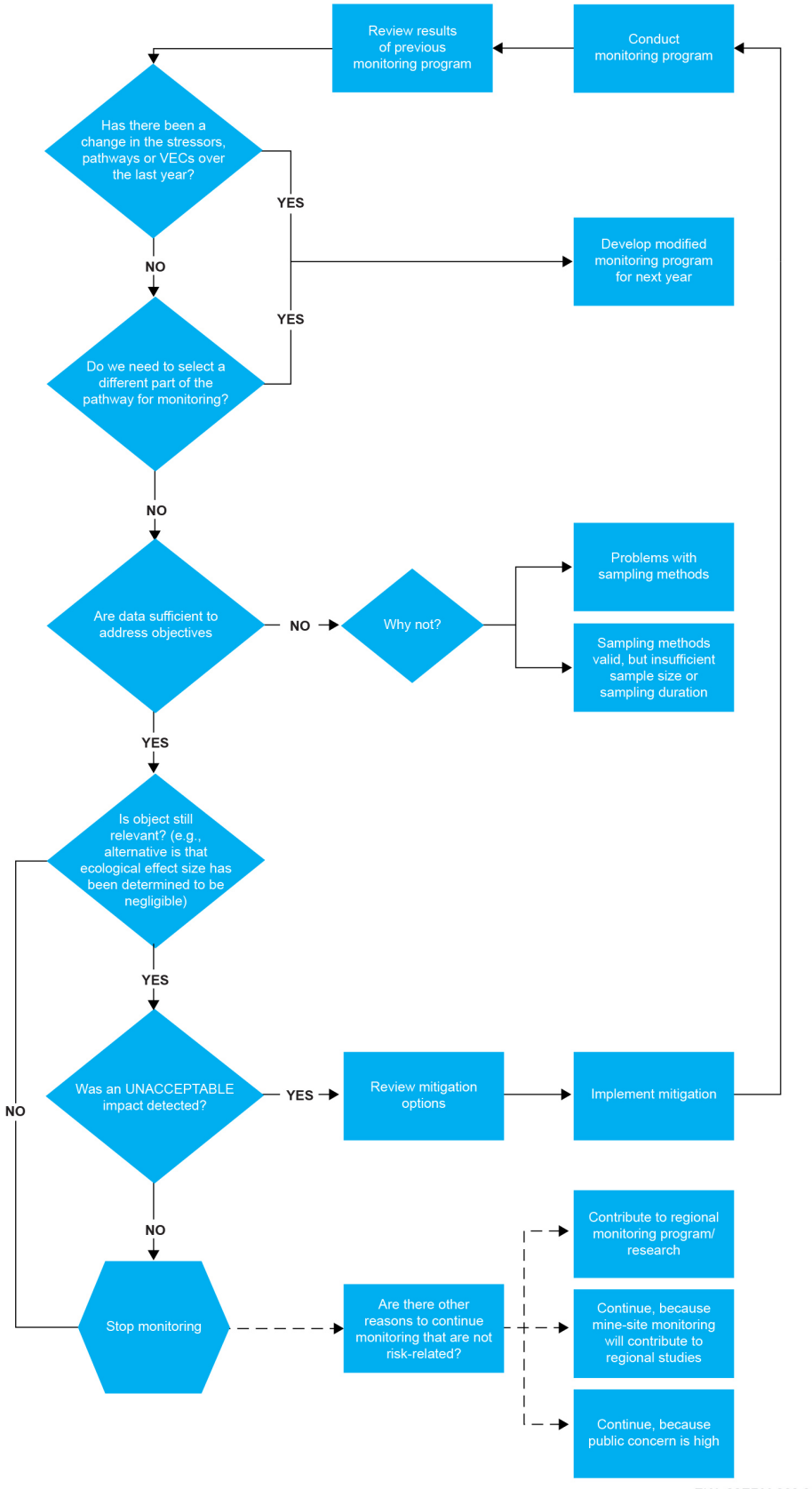
Results from local (i.e., mine-specific) and regional collaborative monitoring programs are used to provide feedback to Ekati Diamond Mine operations to determine if the objectives are being met (Figure 7-1). Modification and/or implementation of additional mitigation may be required as determined through 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 indicator 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 migratory birds, which after a decade of sampling showed little effects from the Ekati Diamond 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.

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 7-1). For example, the WMMP provides regional data on caribou, grizzly bear, wolverine, 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 7-1).

Arctic Canadian has and will continue to actively seek input from regulatory authorities and communities through engagement activities and other regional programs led by the GNWT. Annual reports and meetings are ways that Arctic Canadian 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 WMMP have and will continue to be adaptively managed over the life of the mine.

Figure 7-1: Adaptive Management Decision Tree for the Ekati Diamond Mine



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 TK. Following the principles of adaptive management, wildlife monitoring has undergone changes since the initial development of the WMMP 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.

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

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

The results of the stand-alone telemetry project being conducted in 2022 will inform an evaluation of triggers for the CRMP, future monitoring objectives for the caribou behaviour surveys, and camera trapping program as well as the best methodological approaches for combining analyses from telemetry (Section 6.4.4), traffic volume (Section 6.4.7), and camera trap data sets (Section 6.4.6).

8.0 Reporting Protocols

Data analysis and reporting will continue to focus on meeting 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 WMMP 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 effects 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.

8.1 Data Processing

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.

8.1.1 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 WMMP, study designs, field methods, and data collection techniques will be reviewed on an ongoing basis by Arctic Canadian 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. This approach is intended to provide a WMMP that generates feedback for adaptive management and which concurrently complies with the terms and conditions in the Environmental Agreement for the Ekati Diamond Mine.

8.2 Annual Report

The annual monitoring report will be produced and distributed to communities, the Wek'èezhìı Renewable Resources Board (WRRB), and other relevant stakeholders 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 includes, but is not limited to the following information:

- any updates or recommended changes to mitigation, environmental design features, or other strategies required to meet the WMMP 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.

8.3 Caribou Road Mitigation Plan (CRMP)

Evaluation of triggers for the CRMP will be conducted after the comprehensive telemetry analysis has been completed. The telemetry analysis will provide a more comprehensive investigation of caribou behavioural changes with increasing proximity to the mine. The telemetry analyses were not available to inform the mitigation and monitoring included in this revised WMMP due to the time required to reach consensus on objectives and methods; however, project is now proceeding. If warranted, the results of the comprehensive telemetry analysis (once completed) will inform revision of the CRMP, which will be revised with stakeholder input.

9.0 Roles and Responsibilities

To limit effects to wildlife it is necessary to define all of the mine staff roles and responsibilities with respect to implementing mitigation and monitoring for wildlife and wildlife habitat (Table 9-1).

Table 9-1: 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 mitigation from the CRMP into the site Traffic Management Plan
Superintendent Environment	• Owner of the WMMP • Ensure resources are available to establish, implement, execute, and maintain mitigation and monitoring • Responsible for overseeing the review and update of the WMMP
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 WMMP, and completing the review and any updates
Environment Specialist	• Understand procedures, execute the WMMP mitigation and monitoring
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 WMMP procedures and act in accordance with Arctic Canadian's Environmental Standards and Policies

10.0 References

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Appendix A Standard Operating Procedures

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Work Instruction

EKA WI 2115.36 Remotely Piloted Aircraft System (RPAS) DJI Mini 2

Version:	1.0
Replaces:	N/A
Creation Date:	2022-03-08
Scheduled Review Date:	2027-03-08
Review Date:	N/A
Document Team Members:	Team Leader – Environment Operations Environment Advisor – Operations Environment Specialist – Compliance Environment Advisor – Wildlife
Document Owner:	Environment Adviser – Wildlife
Document Approver:	Superintendent Environment
Related Documents:	DJI Mini 2 Startup and Maintenance Guide DJI Mini 2 User Guide/Manual
Key Contacts:	Team Leader – Environment Operations Environment Advisor – Wildlife Ekati Airport Technician – Wendy Wiseman
Change Requests:	N/A
Brief Description:	To ensure the safe and effective operation of Environment Team's DJI Mini 2

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TASK DESCRIPTION:

Conduct wildlife scans of a given area to evaluate crew safety from potential wildlife presence prior to deploying a ground-based team.

HSE INFORMATION / SAFETY RISKS:

- **Equipment and traffic interactions**
- **Wildlife encounters**
- **Slips/trips/falls/strains/sprains**
- **Powerline safety**
- **Pit operations**
- **RPAS interaction with raptors**

ADDITIONAL RESOURCES REQUIRED:

- Standard PPE
- Light vehicle
- Radio programmed with site appropriate channels (e.g., Channel 9 for Environment)
- RPA (DJI Mini 2)

WORK PREPARATION:

Item	Task Description
1	Only personnel with sufficient RPA training are qualified as operators (i.e., Enviro Team Lead must sign off).
2	Review Group JHA and complete PSC describing all risks and the steps taken to eliminate these risks.
3	Become familiar with the roads and radio call in procedures.
4	Be familiar with the species of wildlife that you are likely to encounter on any given day, including species defined as valued ecosystem components in the Environmental Agreement (e.g. Grizzly Bear, Wolverine, Caribou, Wolves and Raptors).
5	If you are not comfortable with the requirements above, wildlife reference sheets found posted in the wildlife office may be brought into the field.
6	Be aware of the road conditions and whether road access is possible.
7	Check batteries (and bring a charged spare) as well as all RPA equipment and confirm all maintenance has been performed per manufacturer's specifications and that no irregular alterations to the RPA has been done (see relevant DJI Mini 2 User Manual).

WORK EXECUTION STEPS:	
Item	**Task Description**
1	RPA flight crew will provide an email to Ekati Airport Technician (AT) at the beginning of the day describing the expected coordinates of use and flight plans. If ad hoc flights are required, positive communication with AT must be established. Minimum 15 minutes prior to launching the RPA, the RPA flight crew will contact the AT on radio channel 8 to advise the intention to begin the operation and advise on location and expected flight duration, as well as notify any relevant individuals on the appropriate Ekati radio channels. Further, the flight crew will establish positive communication with helicopter pilot to ensure safe operation of the RPA. Ekati AT will provide information of any weather conditions, air traffic, and safety issues that may interfere with the RPA operation and the pilot will follow instructions from Ekati AT. RPA operation will only proceed if Ekati AT has not objection. Ekati AT will be the single point of contact with Diavik Airport ATC to advise of all relevant RPA operations. Diavik ATC: - 1-867-880-2220, radio channel 8. - CDK2 1-867-669-6500 ext. 5936. - Local Frequency 122.7.
2	RPA flight crew will monitor radio channel 8 during RPA operation.
3	All members of the RPA flight crew shall be instructed on their duties, the location of emergency equipment associated with operation, and the contact information and procedures in case of an emergency.
4	Meteorological conditions and air traffic shall be observed prior to flight and if conditions or circumstances are not in compliance with the manufacturer's specifications RPA operation shall not commence. The following meteorological conditions must be met before commencing RPA operation: - Wind – Max 10.5 m/s or 37.8 km/h. - Temperature – 0° to 40°C. - Precipitation – No snow, rain, or fog. - Visibility – Minimum 3 statute miles or ~5 km, daylight.
5	Prior to launch, the RPA flight crew will complete a visual site survey, noting: - The boundaries of the area of the operation. - The estimated altitude and routes to be used on the approach to and from the areas of operation. - Proximity of manned aircraft operations. - Proximity of aerodromes, airports and heliports. - Location and height of obstacles (e.g., buildings, towers). - Weather conditions remain favorable within area of operation. - Maximum distance the RPA can be used without the safety of people, property, or environment being at risk (Never fly drone directly overhead of people or above active pits). In addition, the RPA flight crew will: - Complete RPA checklist. - Ensure all parts are working properly. - Ensure the site determined for take-off, landing or recovery is suitable for the intended operations.

WORK EXECUTION STEPS:	
6	During RPA operation the following Emergency Contingency Plan is in effect: - In the event of an emergency requiring the activation of Ekati's ERT team, the RPA flight crew will call a Code 1 on radio channel 4. ERT will respond according to their emergency response plan and in collaboration with the RPA flight crew. - In the event of a vertical/horizontal loss of control ("Fly Away") where the RPA goes outside the designated operation area, the RPA flight crew will immediately inform Ekati AT of the fly away aircraft, location, lats known flight direction, altitude and anticipated battery life in hours and minutes (Ekati radio channel 8). Ekati AT will inform Diavik ATC with relevant information as well as broadcast on radio frequencies 122.7, 126.7, and 123.75 at their discretion. - In the event of a lost link between the command station and the RPA or a low battery, a pre-programmed Return To Home (RTH) failsafe will be initiated automatically by the RPA. - In the event a Flight Termination System (FTS) is required, it will only be initiated if it will not endanger people, property, or environment. - In the event of a failed landing where the RPA is damaged, the damage will be properly documented and repaired according to the manufacturer's specifications.
7	Notify Ekati AT and any relevant individuals on the appropriate Ekati radio channels that the RPA has landed and operation is terminated.

GENERAL REMARKS
The RPA is property of Arctic Canadian Diamond Company ("Arctic") and must be operated in compliance with this WI and under all restrictions as outlined in the Canadian Aerial Regulations (CARs) and Transport Canada's drone requirements. Nothing in this WI overrides the information in the CARs. If inconsistencies exist, the CARs take precedence.

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REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER	Sarah Harrison		13-Mar-2022
DOCUMENT OWNER	Tommy Thorsteinsson		18-May-2022
DOCUMENT APPROVER	Harry O'Keefe		16-Jun-2022

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Work Instruction

EKA WI 2115.37 Helicopter Usage for Deterring Bear Activity

Version:	1.0
Replaces:	N/A
Creation Date:	2022-10-02
Scheduled Review Date:	2023-10-02
Review Date:	N/A
Document Team Members:	Team Leader – Environment Operations Environment Advisor – Operations Environment Specialist – Compliance Environment Advisor – Wildlife
Document Owner:	Environment Adviser – Wildlife
Document Approver:	Superintendent Environment
Related Documents:	
Key Contacts:	Team Leader – Environment Operations Environment Advisor – Wildlife Ekati Airport Technician – Wendy Wiseman
Change Requests:	N/A
Brief Description:	To ensure the safe and effective operation of helicopter when used to deter bear activity near Ekati

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TASK DESCRIPTION:

Using a helicopter to deter a bear away from an undesirable area at Ekati.

HSE INFORMATION / SAFETY RISKS:

- **Equipment and traffic interactions**
- **Wildlife encounters**
- **Slips/trips/falls/strains/sprains**
- **Powerline Safety**

ADDITIONAL RESOURCES REQUIRED:

- Standard PPE
- Radio programmed with site appropriate channels (e.g., Channel 9 for Environment)
- Camera for photo/video documentation of the deterrent event
- GPS (if coordinates describing the deterrent event cannot be obtained from helicopter pilot)

WORK PREPARATION:

Item	Task Description
1	Review Group JHA and complete PSC.
2	The Journey Management Plan (JMP) can be prepared ahead of time using a template map (Appendix A)
3	Any personnel in the helicopter are required first to complete the helicopter Safety Pavilion module, Review of the Acasta Safety Briefing video (this can be arranged through the Acasta HSC), as well as a pilot briefing of the current pilot
4	All members of the flight crew shall be instructed on their duties, the location of emergency equipment associated with operation, and the contact information and procedures in case of an emergency.

WORK EXECUTION STEPS:

Item	Task Description
1	When a bear needs helicopter deterrence (“a push”), the crew will establish positive communication with helicopter pilot to confirm expected coordinates of flight plans and to complete the required JMP.
2	Environment will be required to have a person accompanying the pilot during the push. Other passengers on the flight should be kept to a minimum.
3	The Environment person in the helicopter during the push should have or be given information relating to the bears general health and details around its activity at site. This allows the Environment personnel in the helicopter to avoid unnecessary stress on the bear if applicable i.e., unhealthy or weak bear.
4	The Environment personnel on the bear push should be aware of ambient temperature and other conditions that could place stress on the bear during the push. In general, during hotter days the effectiveness of the push may be limited to the environmental factors of that day.
5	When possible, the bear should be directed towards lakes and ponds to provide effective cooling. Do not actively push a bear in the water. Allow it to exit the water body on its own.
6	Document the timeline and use photos to indicate the health of the bear over the course of the push. Photos of the bear swimming or resting will show the condition of the bear is not being adversely affected. Also, document distance and direction of push.
7	Update the Incident Tracker and upload any photo/video documentation in SharePoint with details of the deterrent event and provide quick update to Wildlife Advisor of outcome of deterrent event.

GENERAL REMARKS

Outside of urgent health and safety concerns for employees and wildlife, all reasonable efforts will be made to ensure that a bear is not pushed in the general direction of caribou.

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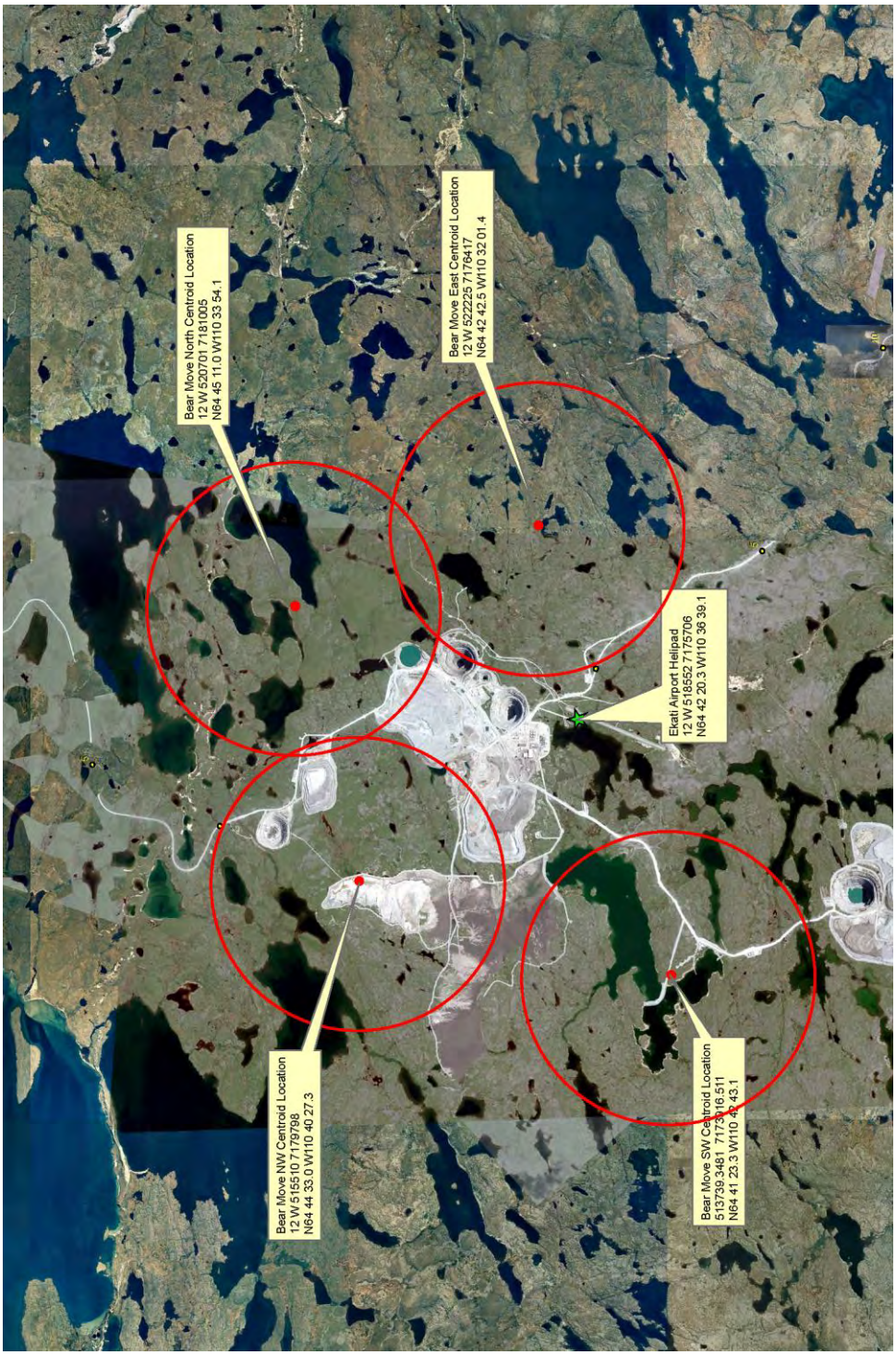
Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER	Rich Ehlert		13-Mar-2022
DOCUMENT OWNER	Tommy Thorsteinsson		18-May-2022
DOCUMENT APPROVER	Harry O'Keefe		16-Jun-2022

Appendix A


Bear Move North Centroid Location
12 W 520701 7181005
N64 45 11.0 W110 33 54.1
Bear Move East Centroid Location
12 W 522225 7176417
N64 42 42.5 W110 32 01.4
Ekati Airport Helipad
12 W 518552 7175706
N64 42 20.3 W110 36 39.1
Bear Move NW Centroid Location
12 W 515510 7179798
N64 44 33.0 W110 40 27.3
Bear Move SW Centroid Location
513739.3481 7173516.511
N64 41 23.3 W110 42 43.1

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Work Instruction

EKA WI 2115.08 Landfill Survey

Version:	1.1
Replaces:	N/A
Creation Date:	2013-11-25
Scheduled Review Date:	2020-12-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	The Ekati Landfill is designed for the disposal of inert waste. Regular inspections are required to ensure waste management procedures are being followed.

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TASK DESCRIPTION:

The Ekati Landfill is designed for the disposal of inert waste. Landfill surveys are conducted regularly to ensure we are adhering to waste management procedure and policies. Preventing hazardous materials from entering the landfill ensure that there will be no leaching or environmental contamination after reclamation. Removal of wildlife attractants from the landfill protects animal health, prevents habituation and limits potential interaction between people and wildlife all over site. Proper waste management is the key to controlling wildlife activity around site.

HSE INFORMATION / SAFETY RISKS:

- **Hazardous Materials**
- **Sharp Objects (nails, glass, steel)**
- **Wildlife Encounters**
- **Heavy Equipment working in area**
- **Slips/trips/falls**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Shovel or other device to manoeuvre /uncover buried items in the landfill
- Garbage Bags
- Camera
- Landfill Survey Form, Clipboard and Pencil
- PPE including Kevlar Gloves
- Peterson's Guide to Animal Tracks
- GPS and spare batteries
- Radio

WORK PREPARATION:

Item	Task Description
1	Gather all materials listed above for survey.
2	Review work instructions and become familiar with all aspects of the Landfill Survey.

WORK EXECUTION STEPS:

Item	Task Description
1	Complete a JHA to identify risks and eliminate hazards.
2	Drive to Landfill; if heavy equipment is operating in the area, communicate with operator and either reschedule inspection or park in a safe area and wait for equipment to vacate the landfill. If there is no

WORK EXECUTION STEPS:	
	equipment present and/or it is safe to do so, park the vehicle close to the area to be inspected (it can act as refuge if unexpected wildlife show up).
3	Scan for a minimum of 40 minutes, looking for wildlife and record all sightings. If any potentially dangerous wildlife are present do not leave the vehicle, but continue to take photos and record their behaviour from within the truck. Make sure to note the portions of the landfill they explore, this is a strong indication of attractants. When it is safe to do so inspect all portions of the landfill pile concentrating on any area where wildlife were or where there is sign of wildlife activity such as tracks, chews and digs**. Note: Vary the day of the week you visit the landfill and the time of day. People and wildlife have schedules, routines and routes. We want to have a representative sample of the landfill across all days of the week and times of day.**
4	If no carnivores are present, survey the area on foot focusing on the region around the burn bin and location where garbage is exposed. Locate, identify, count, photograph and record all animals (including birds) and/or animal signs (scat, tracks, chewing, hair, etc).
5	Be sure to locate and record any wildlife attractants (i.e., food, food packaging, hydrocarbons and hydrocarbon impacted waste) and any other misdirected waste (i.e., batteries and aerosol cans) on the field datasheets.
6	If safe to do so, collect all attractants and misdirected waste and properly dispose of it. Use a shovel or other device to manoeuvre/ uncover and waste items to prevent coming into contact with sharp objects that are obscured by snow or other waste. Report misdirected waste to the Wildlife Adviser and/or Team Leader immediately and provide pictures.
7	If it is not safe to collect the waste, have the Team Leader or Wildlife Advisor arrange to have equipment remove any hazardous waste or cover any inert attractants like food waste.
8	Upon return to the office upload photos onto SharePoint. Enter data into the Landfill Survey spread sheet on SharePoint. The Wildlife Technician that did not enter the data will complete the QA/QC of data and then scan the field sheet and save it on SharePoint.

GENERAL REMARKS
When observing the behaviour of any wildlife at the landfill, record any signs of habituation such as begging, approaching the vehicle, or lack of fear of humans. Also record any indication of injury or disease and take lots of photos of both the animal's condition and of its behaviour.
Frequency: Minimum of 3 times per week (on varying days at varying time).
Time requirements: 1 hour

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REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

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Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-10-31
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.02 Waste Bin Survey

Version:	1.1
Replaces:	N/A
Creation Date:	2013-07-26
Scheduled Review Date:	2020-12-15
Review Date:	2015-12-15
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	This document contains the standard methods to complete a waste bin survey for both Ekati and Misery Mines

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TASK DESCRIPTION:

Survey all waste bins around the mine site to ensure compliance to proper waste management procedures. Record and report all misdirected waste including wildlife attractants and hazardous materials.

HSE INFORMATION / SAFETY RISKS:

- **WHMIS**
- **Wildlife Encounters**
- **Heavy Equipment Traffic**
- **Slips/trips/falls**
- **Pinch/Pulls/Cuts and Punctures**
- **Active work area on main floor of truck shop when accessing man doors through shop**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Communications (radio with Misery Simplex programmed on it)
- PPE including Kevlar Gloves
- Bear Banger Kit
- Waste Bin Wildlife Attractant Survey Form, Clipboard and Pencil
- Peterson's Field Guide to Animal Tracks

WORK PREPARATION:

Item	Task Description
1	Become familiar with waste management procedures, available in the Waste Management Plan and in training provided upon site orientation by the training department. Wastes are segregated into different waste categories and bins according to the method of ultimate disposal. Current categories include incinerator/food waste, landfill waste (all inert, non-reactive solid wastes), oily rags, aerosols, batteries, metals, beverage containers, plastics, fluorescent bulbs and contaminated snow and soil.
2	Become familiar with all waste bin locations around Main Camp and Misery Site. Waste bin current locations: main accommodations, main fuel bay, security building, power house, power plant, carpentry shop, Fox fuel farm, logistics, the truck shop, and underground. Misery currently has landfill bins only and camp services deals with all other categories of waste.
3	Be familiar with driving around site and any changes to the traffic management plan (temporary or permanent). There are bins located in areas that could be deemed unsafe when heavy equipment is operating in the area (e.g. near the truck shop's bay doors).
4	Be familiar with types of animal attractants. Animal attractants include food, food packaging, oil products and oil-impacted waste, fuel cans, rubber gas lines, cigarettes packages and leather amongst others.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Visit all waste bins at site and record bin location (e.g. underground), bin type (e.g. landfill), the amount and type of misdirected waste (e.g. animal attractants), any wildlife observations, and any general comments. Ensure to record the date, the start and finish time of the survey and take photos of waste bins with misdirected waste.
2	When accessing the truck shop waste bins through man doors on the east side, delay work if there is any welding / grinding in the vicinity of the access way or man door to the waste bin until after that work is completed.
3	At the end of your survey notify the Environment Team Leader, Wildlife Advisor and Team Leader Facilities via email of any bins that are out of compliance including the details of the issue, pictures and any corrective actions taken.
4	Enter data collected into the Waste Bin Survey data spread sheet. For regular and/or large amounts of misdirected waste immediately contact the Wildlife Advisor.
5	Save any representative photos and routine correspondence on SharePoint. Ensure that all photos and emails are names as follows: YYYY-MM-DD Location & Issue. (e.g. 2012-08-15 Main Camp Landfill Bin Oil Impacted Waste).
6	All worksheets much be scanned and saved on SharePoint each week.
7	All data entered must be QA/QC by the Wildlife Tech that did not enter the data, if your coworker is not available ask the Wildlife Advisor to complete the QC/QC for your surveys.

GENERAL REMARKS
When waste is improperly disposed, it creates unsafe conditions for the personnel handling the waste, unsafe conditions for wildlife on site as well as the potential to pollute the environment.
Waste materials that create an odour can function as attractants to wildlife. Wildlife can incur harm by ingesting waste products at the landfill or directly out of waste bins. Wildlife can become habituated to the camp and this poses a threat to workers as well as the animal because habituated wildlife is often relocated or dispatched due to the threat they pose.
Frequency: to be conducted at least three times per rotation.
Time requirements: 2 hours (4 if Misery is included)

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Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-11-16
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.06 Skirting and Wildlife Inspection

Version:	1.1
Replaces:	N/A
Creation Date:	2013-11-23
Scheduled Review Date:	2020-10-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	Visual inspection of all skirting (Ekati and Misery) to ensure that all access points are closed and there is no damage which could allow wildlife access the spaces under any infrastructure

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TASK DESCRIPTION:

Visual inspection of all skirting (Ekati and Misery) to ensure that all access points are closed and there is no damage which could allow wildlife access the spaces under any infrastructure. Subsequent surveys serve as a check to ensure that repairs are completed in a timely manner.

HSE INFORMATION / SAFETY RISKS:

- **Wildlife Encounters**
- **Slips/Trips/Falls**
- **Weather**
- **Heavy Equipment Traffic**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Accommodations Skirting Inspection Form, Clipboard and Pencil
- Radio
- GPS and spare batteries
- Camera
- Bear Banger Kit
- Peterson's Field Guide to Animal Tracks
- Flagging Tape

WORK PREPARATION:

Item	Task Description
1	Be familiar with wildlife identification and wildlife sign recognition (digs, hair, scat, prey remains and tracks).
2	Be familiar with the Ekati and Misery traffic and communication procedures.
3	Be familiar with the layout of the accommodations at both Ekati and Misery camps.

WORK EXECUTION STEPS:

Item	Task Description
1	Complete a JHA to identify hazards and mitigate risks.
2	Walk or drive around all areas of the EKATI and Misery accommodations areas. **Consideration should be given to the fact that many people work night shit. Driving, especially reversing, should be limited around any dorm wings.** If weather conditions preclude safe driving, the survey can be completed from various windows inside accommodations and other buildings.

WORK EXECUTION STEPS:	
3	Scan the skirting area for wildlife and wildlife signs and record all observations in the inspection form. Record the GPS coordinates of all wildlife/wildlife sign locations. For all wildlife in or around the skirting take digital photographs. This could help identify problem wildlife, attractants and possible corrective actions.
4	Scan the skirting for holes large enough for wildlife to enter, holes with potential to become enlarged, or any damage. Record the GPS coordinates of the holes in the inspection form and take a photo of the hole using an object for scale. Mark holes with flagging tape so that maintenance can easily locate them. **Note: Wildlife May Become Trapped Under Buildings, Check for Sign That Wildlife Might be Under Buildings Before Covering Holes.**
5	If there are no signs that wildlife have gone under the building, temporarily block the hole until maintenance can create a permanent fix.
6	If holes are observed, contact the Wildlife Advisor or Environment Team Leader by e-mail with photos and exact locations of the hole(s) and ensure that any reported holes or damage in the skirting are repaired as soon as possible. Follow up the Wildlife Advisor or Environment Team Leader if holes have not been repaired.

GENERAL REMARKS
Wildlife often seek access under buildings for shelter, warmth, protection from predators, and/or in search of food sources (e.g., sewage lines, sheltering prey etc.). Wildlife that has gained access to areas underneath buildings may become trapped, injured, and/or aggressive. There is a high potential to encounter wildlife around and under buildings where skirting has been compromised. Practice extreme caution to prevent dangerous wildlife interactions.
Try to limit presence and noise around accommodations wings where night shift crews may be sleeping.
When snow builds up during the winter months it may cause strain on the skirting so be aware of this when the snow thaws for summer months.
Ensure pilling snow does not create easy access to the rooftops of buildings.
As Misery camp is far away it is always helpful to go into the Misery office and talk to individuals such as the Safety personnel to get an idea of wildlife activity and concentrate on problems areas.
Survey Frequency: Ekati - 3 Times per rotation Misery – 2 Times per Rotation.
Time Requirements: 1-2 hours per survey (longer if you have to commute to Misery).

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ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-10-22
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.07 Fence Inspection

Version:	1.1
Replaces:	N/A
Creation Date:	2013-11-23
Scheduled Review Date:	2020-10-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	To monitor wildlife interactions with and the conditions of Airport and Misery Camp fences to ensure that they are in good repair and effectively managing wildlife movements

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TASK DESCRIPTION:

To monitor wildlife interactions with and the conditions Airport and Misery Camp fences to ensure that they are in good repair and effectively managing wildlife movements. These fences were designed to separate people and wildlife, and keep wildlife off the runway. The ultimate goal of these barriers is to eliminate wildlife incidents and mortalities. The fence must to be inspected routinely to ensure that damage or disrepair of the fence doesn't result in wildlife crossing it, becoming entangled and ensuring wildlife and reducing the likelihood of wildlife staff interactions.

HSE INFORMATION / SAFETY RISKS:

- **Wildlife Encounters**
- **Slips/trips/falls**
- **Weather**
- **Isolation**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Fence Survey Form, Clipboard and Pencil
- Communications (Radio)
- Binoculars
- GPS and spare batteries
- Zip-ties
- Camera
- PPE/Kevlar gloves
- Bear Banger Kit
- Peterson's Field Guide to Animal Tracks

WORK PREPARATION:

Item	Task Description
1	Be familiar with the wildlife species and signs that are commonly seen. Use the Petersen's Guide to Animal Tracks or Birds of North America, as well as the identification cards (commonly spotted birds at Ekati) to identify tracks, scat, birds or wildlife you are not familiar with.
2	Review work instructions and become familiar with all aspects of the Fence Survey.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete a JHA to identify hazards and eliminate risks.
2	Drive to fence and find a safe area to park with good visibility in order to conduct a wildlife scan before beginning fence survey.
3	If animals are detected during your scan be sure to observe and record the behaviour of the wildlife and in particular, how it interacts/responds to the fence. Take video of any VEC species adjacent to the fence so their behaviour can be more thoroughly assessed. a) If caribou are present your first priority is to complete behavioural surveys. The information gathered during a behavioural survey is more important than a fence inspection. Make sure to note on the behavioural form how far the caribou were from the fence and any behaviours you notice (attempting to cross, going around the fence, scared of fence etc.) Note: You are still required to complete the fencing survey and include relevant information about the caribou including that a behavioural survey was completed. b) If you are alone you must video tape the caribou adjacent to any barrier structure, a behavioural scan will be completed later.
4	If no wildlife is present, begin the survey. If radio reception is expected to be limited while walking the fence, check in with the Environment Department to make them aware of your location and expected check-in upon completion of the survey. a) Walk the length of the fence(s) looking for areas where wildlife may be able to get under/over the fence, as well as areas where weather and other conditions may have caused the fence to fall or sag. b) Record any damage or disrepair to fence(s) and repair as needed using the zip-ties. c) If damage is observed and is not repairable, take photos, record the GPS coordinates and inform Wildlife Advisor or Team Leader as soon as possible. d) Take photos and GPS coordinates of any wildlife signs and record all observational data. e) Enter data into excel spreadsheet in SharePoint. f) Enter all photos or routine correspondence into SharePoint (Naming Convention: yyyy-mm-dd Location Subject). g) The tech who did not enter the data will QA/QC the entry, scan the field sheet and save in on SharePoint.

GENERAL REMARKS
If damage is noted to chain link fencing, have the Wildlife Advisor or Team Leader follow-up with maintenance to ensure that any reported damage to the fence(s) is repaired in a timely matter.
Fences to be inspected include the Airport and Misery Camp.
Time Requirements: Typically 1.0 hour per fence being surveyed, additional time can be taken as needed, especially for larger fences such as the Airport fence.

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Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-10-22
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.09 Misery Inspections and Surveys

Version:	1.1
Replaces:	N/A
Creation Date:	2013-11-25
Scheduled Review Date:	2020-10-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technician, Wildlife Advisor and Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	Summary of tasks to be completed by Wildlife Tech during trips to Misery

TASK DESCRIPTION:

Wildlife Technicians must travel periodically to Misery camp to complete several surveys (fence survey, waste bin survey, skirting survey and the seasonal pitwall survey). Due to the time necessary to make this trip, it makes sense to complete the surveys all at once. This also provides the opportunity to scan Misery road for wildlife, signs of wildlife activity and adherence to any wildlife protection measures, such as reduced speed limits.

Since Misery camp has recently resumed their operations, it should be noted that camp policy is continually being amended (i.e., check-in requirements and muster station locations) so maintain feedback with site supervisor on possible changes.

HSE INFORMATION / SAFETY RISKS:

- **Distance from main camp and services (i.e. Misery Rd.)**
- **Road conditions and heavy equipment traffic**
- **Wildlife encounters**
- **Changing weather conditions**
- **Snow-blindness in winter season**
- **Slips, trips and falls**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Binoculars
- GPS
- Radio
- Spotting scope
- Tripod
- SLR camera with zoom lens
- Data-sheets for Required Misery Camp Surveys
- Clipboard and Pencils
- Field Guides – Tracks and Birds
- Light vehicle (First-Aid, mortality kit, radio)
- Bear Deterrents (bear bangers)
- Incidental Wildlife Sighting
- Wildlife Incident Form
- Incidental Bird Observation Form
- Wildlife Mortality Form
- Caribou Behavioural Survey Forms
- PPE
- Safety Glasses

WORK PREPARATION:	
Item	**Task Description**
1	Before leaving the office, make sure to bring: a) Fence Inspection Form b) Waste Bin Survey Form c) Accommodations Skirting Inspection Form d) Pit Wall Nest Monitoring Form (when in season) Refer to work instruction guidelines of each individual survey for detailed work procedure.
2	When wildlife is seen walking along the road they always have the right of way. All vehicles must stop and not harass the wildlife until they are safely off the road, no longer threatened or a threat to human activity.
3	The time frame for this work instruction should take 4-5 hours to complete.
4	It is important that you receive a Misery site orientation before ANY surveys begin! In case of an emergency at Misery camp, a site orientation will inform you how to react to certain scenarios and where to go (I.e. muster stations). In addition, a site orientation will inform you on the proper procedures on entering and leaving the Misery camp premise.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete a JHA identifying risks and eliminating hazards.
2	Due to the distance and remote location of Misery Camp, completion of any one survey is very time consuming. It is extremely important to double check that you have all the required equipment and documentation.
3	The remote location also means that surveys are only completed twice per rotation. Also, be prepared to complete other duties while travelling the Misery Road (i.e. mortality clean-up, caribou behavioural surveys (when in season) and wildlife sightings).
4	When driving on Misery Road, every 5 Km you must announce your location, vehicle type and direction of travel. If there is traffic near Paul Lake Bridge, North bound traffic always has the right of way.
5	When doing the Misery surveys, please refer to work instruction guidelines of each individual survey for detailed work procedure.
6	Misery Pit is an active mining area with equipment and moving machinery. To gain access to the various observation/lookout areas, vehicles must request permission to enter by contacting the Pit Supervisor. Tell the supervisor your name, department and that you need to enter the pit area to complete a Pit Wall survey. Remember that the landscape of the pit is always changing so be prepared for changing road alignment and access routes to the survey location.

GENERAL REMARKS
There might be some inconsistency with updates regarding Wildlife Sightings at Misery camp due to its isolation and the Wildlife Technicians limited ability to monitor the area. Maintain communication with Misery Safety Staff for updates.

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Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-10-22
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.33 Incidental Wildlife Survey

Version:	1.0
Replaces:	N/A
Creation Date:	2017-06-20
Scheduled Review Date:	2020-12-15
Review Date:	N/A
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	Protocol for monitoring and recording incidental wildlife sightings reported at the Ekati Diamond Mine.

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TASK DESCRIPTION:

Record wildlife sightings occurring outside of planned surveys, including observations of wildlife made by staff outside of the environment department.

HSE INFORMATION / SAFETY RISKS:

- **Equipment Interactions**
- **Wildlife Encounters**
- **Slips, Trips, and Falls**

ADDITIONAL RESOURCES REQUIRED:

- Light vehicle
- Radio for communication with the environment department and heavy vehicles
- Binoculars and spotting scope with tripod
- GPS and spare batteries
- Camera
- Incidental survey forms, clipboard and pencil
- Peterson's Field Guide to Animal Tracks; Sibley's Field Guide to Birds

WORK PREPARATION:

Item	Task Description
1	Be familiar with the species of wildlife that you are likely to encounter on any given day including migratory birds and species defined as valued ecosystem components in the Environmental Agreement (Grizzly bear, wolverine, caribou and wolves). You need to be comfortable identifying caribou herd composition, wildlife behaviour and habitat identification to complete this survey.
2	If you are not comfortable with the requirements above, you can bring the wildlife and habitat reference sheets posted in the wildlife office.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete a JHA describing all risks and the steps taken to eliminate these risks. When wildlife is observed, record the following information: a) Date, species of wildlife, number of animals, age and sex. If caribou are present record the composition of the herd. b) Location, using UTMs of possible, or grid map number with location description. c) Dominant behaviour (e.g. B = Bedded, F = Feeding, W = Walking; see survey form for a list of behaviour codes) and breeding evidence for birds (see bottom of survey form). d) Comments should contain a note if any photos were taken and any pertinent comments related to unusual behaviour or anything out of the ordinary. Take photos of interesting wildlife/wildlife sign observations. Save only the best or most representative photo on SharePoint with the following naming conventions yyyy-mm-dd Location Subject (e.g wolf track).
2	Return to the Wildlife Technician office and enter data collected into the corresponding Excel spread sheet on SharePoint. Have the Wildlife Tech who did not enter the data complete QA/AC and scan the completed form and save on SharePoint.

GENERAL REMARKS
Separate field sheets incidental for mammals, caribou and birds.
When caribou are observed, immediately initiate a behavioural survey on the animals.

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Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-06-20
DOCUMENT APPROVER	Harry O'Keefe		2017-06-20

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Work Instruction

EKA WI.2115.23 Road Monitoring Survey

Version:	1.0
Replaces:	N/A
Creation Date:	2018-11-16
Scheduled Review Date:	2021-11-16
Review Date:	N/A
Document Team Members:	Wildlife Technician, Wildlife Advisor & Team Leader Environment Projects
Document Owner:	Wildlife Advisor
Document Approver:	Team Leader Environment Projects
Related Documents:	Caribou Road Mitigation Plan Wildlife Effects Monitoring Program Plan
Key Contacts:	Wildlife Advisor
Change Requests:	Wildlife Advisor
Brief Description:	Protocol for monitoring and recording caribou and other wildlife activity near and on the haul roads.

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TASK DESCRIPTION:

Monitor the along the haul roads (Misery Road, Sable Road, Lynx Road, and Jay Road) and record all caribou sightings and signs of caribou (e.g. scat and tracks) to determine if present mitigation measures effectively minimize the potential risks associated with the road to wildlife and meet the requirements of the Caribou Road Mitigation Plan (CRMP).

HSE INFORMATION / SAFETY RISKS:

- **Equipment Interactions**
- **Wildlife Encounters**
- **Slips, Trips, and Falls**
- **Powerline Safety**

ADDITIONAL RESOURCES REQUIRED:

- Light vehicle
- Radio programmed with Channel 9 (Environment), 42 (Misery Road and Jay Road) and Channel 17 during ice road season (Misery Road), Channel 41 (Sable Road), and Channel 25 (Lynx Road)
- Binoculars and spotting scope with tripod
- GPS and spare batteries
- Camera
- Road Monitoring Survey Form, clipboard and pencil

WORK PREPARATION:

Item	Task Description
1	Become familiar with the roads and radio call in procedures.
2	Be familiar with the species of wildlife that you are likely to encounter on any given day, including migratory birds and species defined as valued ecosystem components in the Environmental Agreement (e.g., Grizzly Bear, Wolverine, Caribou, Wolves, and Raptors). You need to be comfortable identifying caribou herd composition, wildlife behavior and habitat identification to complete this survey.
3	If you are not comfortable with the requirements above, wildlife reference sheets found posted in the wildlife office may be brought into the field.
4	Be aware of the road conditions and whether road access is possible.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete a Personal JHA describing all risks and the steps taken to eliminate these risks.
2	The operator of the light vehicle is first and foremost required to focus on the responsibilities of operating a vehicle on the haul road, other operators, calling in km and driving conditions, etc. This task is best accomplished with two persons: one that operators the light vehicle and keeps their full attention on the road and the other person/passenger that completes the survey.
3	It is important to track and record survey effort. Record a line of data on the data form for every day. If surveys cannot be completed for that day due to weather, road access, or resourcing issues, this information is recorded in the comments section. Survey start and end time for each leg of the survey (northbound and southbound) is also recorded as a measure of survey effort.
4	On Misery Road, surveying should be conducted on one leg of the trip, the southbound trip (adjacent to the power line). The northbound trip on Misery Road falls under the Powerline Monitoring Survey (EKA WI.2115.21) as is recorded on the respective datasheet. On all other roads, the survey should be conducted on both legs of the trip. The presence of large mammals or VEC species that have not been noted earlier in the survey should be recorded, particularly if they have not crossed the road since the southbound trip.
5	When caribou or signs of caribou activity are observed, record the following information on the Road Monitoring Survey form: - Date, start time, observer(s). - Road name: Misery, Sable, Lynx or Jay road. - Type of sign: visual or track/scat. - Total # of caribou. - Herd composition: number of individuals of bulls, cows, calves, yearling, unknown. - Location: grid map location or place. - UTM East and North: record if available. - Distance to sighting from waypoint and direction. - Signs of distress, including alert behavior (directed gaze, erect tail, sniffing, erect ears, stiff posture with spread hind legs), deflections (changing path of motion at road) from the road or hesitation in crossing the road. - Dominant behavior: record the main behavior of the individual/herd as either bedded (B), bedded alert (BA), feeding (F), standing (S), standing alert (SA), walking (W), trotting (T), running (R), unknown (U), no data (X). Immediately report any signs of distress to Wildlife Advisor or Team Leader. - Caribou Behavioral Survey Completed (Y/N): enter “Y” if a behavioral survey is conducted on the caribou individual or group before or after the road monitoring survey. Otherwise, enter “N”. - The comments section should contain a note if any photos were taken and any pertinent comments related to unusual behaviour or anything out of the ordinary. Take photos of interesting wildlife/wildlife sign observations and all wildlife in distress. Save only the best or most representative photo on SharePoint with the following naming conventions yyyy-mm-dd Road km X Subject (e.g. Caribou crossing). **Note**: If no wildlife were recorded during survey, fill in the date, start time, and observers only on the datasheet. This is important for tracking survey effort for both surveys with caribou detections and surveys without detections.

6	Return to the Environment office and enter data collected into the corresponding Excel spread sheet on SharePoint. QA/AC and scan the completed form and save on SharePoint.

GENERAL REMARKS

Frequency: In line with the CRMP (Caribou Road Mitigation Plan) monitoring – once per week minimum, increase to daily with CRMP monitoring increases, which are linked to caribou abundance near the Ekati Diamond Mine. Survey to be conducted daily during the Orange and Red level triggers.

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Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER	Richard Ehlert		
DOCUMENT OWNER	Christine Rock		11-16-2018
DOCUMENT APPROVER	Harry O'Keefe		

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Work Instruction

EKA WI.2115.12 Caribou Focal Survey

Version:	1.0
Replaces:	N/A
Creation Date:	2013-11-25
Scheduled Review Date:	2023-10-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technicians, Environment Advisor – Wildlife, and Environment Projects - Team Leader
Document Owner:	Environment Advisor - Wildlife
Document Approver:	Environment Projects - Team Leader
Related Documents:	EKA WI.2105.10 Field Check-ins EKA WI.2105.04 Working in Remote Locations
Key Contacts:	Environment Advisor – Wildlife, Environment Projects – Team Leader
Change Requests:	Environment Advisor – Wildlife
Brief Description:	The document describes the process for monitoring and recording the behaviour of individual caribou using the focal survey method. While the behaviour of individual caribou is known to be a function of herd behaviour, it is still important to recognize that the different demographics of the caribou population may react differently to disturbances.

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TASK DESCRIPTION:

The objectives of the caribou behaviour studies are to:

a) Monitor the effects of mine and mine-related activities on the dominant behaviours in a group (activity budget at the group level) over a period of time (e.g., time spent feeding, resting, walking, running, etc.); and;

b) Quantify the relative degree of responses to specific stressors by caribou (e.g., aircraft, vehicles, blasts).

The purpose of a focal survey is to capture the behaviour of caribou at the individual level, allowing us to create an activity budget for each segment of the population. It is important that we attempt to capture the entire demographics of caribou population, whenever possible focal surveys should alternate between capturing the behaviour of males, cows and cows with calves. Every attempt should be made to complete focal surveys at a variety of locations around site to assess the potential impact of each area and its associated activities on individual behaviour.

HSE INFORMATION / SAFETY RISKS:

- **Heavy Equipment Traffic**
- **Wildlife Encounters**
- **Communication**

Approach: Contact the Environment Department every two hours while in the field. Wear PPE at all times, do not approach wildlife, and maintain a safe distance.

ADDITIONAL RESOURCES REQUIRED:

WORK PREPARATION:

Item	Task Description
1	Technician Skills: The identification of females, males and calves for the classification of individual behaviour; identification of incidental wildlife observations; identification of vegetation habitats; determination of directional movement of caribou; and GPS operation.
2	Both focal and scan sampling will be used to record the behaviour of individual caribou and groups of caribou, respectively. Please see the work instruction EKA WI 2115.11 for further information about Scan sampling.
3	For focal surveys, when first arriving on site, the observers will wait five minutes before commencing the surveys. During that time, surveys will record basic survey details, information on group location, weather, site location, and a herd composition count, as available on the data sheet. If parking on a haul road, announce stop on radio channel and contact dispatch to advise of expected duration of parking. Ensure truck is on with all lights on and cone is placed on roadway along with chocks.

WORK PREPARATION:	
4	Prior to beginning the work, both surveyors should familiarize themselves with the datasheet to ensure that all data is collected during the survey. Surveyors should work in teams of two with one person recording data/timing and the other person verbally calling changes in behaviour and potential stressors that are detected (visual or audio).

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Select a herd: Select a suitable single animal from a herd of any size.
2	**Before Focal:** a) When you have found a site with a caribou herd, wait 5 minutes to begin the focal survey. During this time, fill out the page one of the datasheet located on SharePoint under Forms (located here). (Date and Arrival Time, Weather, Description of location relative to mine, UTM Coordinate, Herd Composition Count/number). Weather data can be obtained from the airport (channel 8) or from CAM Building remote connection. b) Record GPS location (i.e., waypoint), use rangefinder to estimate distance to nearest mine structure. c) Determine group composition and the number of animals in the group.
3	**Start Focal Survey:** a) Caribou behaviours are recorded on the datasheet every time the focal individual changes its behaviour, or a potential stressor event is noted by the observer. The length of a scan survey is at least 20 minutes; however, survey time will be extended if a stressor occurs (focal surveys should be continued for 15 minutes following a stressor event), assuming the focal individual remains within the surveyors view for the entirety of the survey. Data may be supplemented with the use of video recordings. b) Observations will be conducted whenever possible, including during the northward migration/calving (May/June), post-calving (July/August), and southward migration (September/October) periods. The following behaviours will be recorded: i. bedding (e.g., sitting with all four legs tucked under body, lying down, sleeping on the ground); ii. feeding (i.e., actively grazing, ruminating, chewing cud); iii. standing; iv. alert (e.g., quickly raising the head and orienting it toward a stimulus, pricking the ears and rotating them towards a stimulus, remaining motionless in an alarm posture); v. walking; vi. trotting; vii. running; and viii. other. c) If 'other' is recorded as the dominant behaviour, the 'other' behaviour should be described in the comments section of the datasheet. Record the time for each observed behaviour during the 20 min survey. If the individual is engaged in two behaviours at the same point in time (e.g., alert while standing), the dominant behaviour is recorded (i.e., alert) for that point in time.

WORK EXECUTION STEPS:

4	**Stressor Observations:** a) In the event that a stressor occurs at any point during a scan survey, the observers will record the time that the stressor occurred (i.e., the time that the stressor is first observed by surveyors), the duration of the stressor from start to finish, and the 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). The minimum distance from the stressor is also estimated by using a rangefinder, and recorded on the datasheet (i.e., the closest distance a stressor, e.g., a moving vehicle, comes to the herd) as is any behaviour change of a caribou from the first indication of the stressor is recorded. Stressors include aircraft (helicopter and airplane), three categories of vehicles (light [e.g., pick-up truck], medium [e.g., water truck, bus], and heavy truck [e.g., haul truck]), blasts from pits, wildlife (e.g., bears), and human presence (the observer is not a stressor unless they move during the survey). b) Observers will watch the animal for up to 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. Regardless of stressors, the survey will not extend beyond 60 min.
5	**Data Entry**: a) Data will be entered into the WEMP Data sheet in SharePoint.

GENERAL REMARKS

Survey Frequency:

Up to several times per week during field season (approximately late April to late September) when caribou are present within the study area.

Annual Timing Window:

Observations will be conducted whenever possible, including during the northward migration/calving (May/June), post-calving (July/August), and southward migration (September/October) periods.

Brief Study Design Summary for Focal surveys:

Focal sampling of caribou groups (males, females) will be used to monitor caribou behaviour as function of distance from the mine and roads. The method will ideally involve two observers (one recorded and one observer). Caribou activity will be recorded for an individual within a group as feeding (includes walking with head down), bedding, standing, alert (may be standing or bedded with head up and ears pointed), walking, trotting, running, or other for a period of 20 minutes. GPS location will be recorded, with the direction and distance estimated to the caribou group.

Survey Time Requirement:

Upon arrival, the observers will wait for 5 minutes before commencing the survey to allow the group to acclimate. During this time, the group composition should be classified (males, females, yearlings, calves). Focal individual is selected for observation, and watched for 20 minutes, or as long as the surveyor has a visual on the individual. Caribou behaviours are recorded every time the focal individual changes its behaviour, or a potential stressor event is noted by the observer.

GENERAL REMARKS

Personnel:

There will ideally be 1 observer and 1 recorder. The observer will call out behaviour every four-minutes, and/or every stressor event during the survey, and the recorder will record that behaviour and/or stressor event, and record the corresponding time stamp with hour, minutes, and seconds (hh:mm:ss).

In the case where a stressor (e.g., vehicle) is encountered, the observers should note the stressor, the time it occurred, the duration of the stressor the minimum distance for which the stressor approached caribou herd, and continue to monitor that animal for up to 15 minutes following the stressor (or until animal returned to pre-stressor behaviour), even if the stressor occurred near the end of the 20-minute period.

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

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Appendix

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Work Instruction

EKA WI.2115.11 Caribou Scan Survey

Version:	1.0
Replaces:	N/A
Creation Date:	2013-11-25
Scheduled Review Date:	2023-10-31
Review Date:	2017-10-31
Document Team Members:	Wildlife Technicians, Environment Advisor – Wildlife, and Environment Projects - Team Leader
Document Owner:	Environment Advisor - Wildlife
Document Approver:	Environment Projects - Team Leader
Related Documents:	EKA WI.2105.10 Field Check-ins EKA WI.2105.04 Working in Remote Locations
Key Contacts:	Environment Advisor – Wildlife, Environment Projects – Team Leader
Change Requests:	Environment Advisor – Wildlife
Brief Description:	The document describes the process for monitoring and recording the behaviour of multiple caribou using a scan survey method. Individual caribou behaviour is known to be a function of herd behavior; the purpose of a scan survey is to capture the behaviour of caribou at the herd level.

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TASK DESCRIPTION:

The objectives of the caribou behaviour studies are to:

a) Monitor the effects of mine and mine-related activities on the dominant behaviours in a group (activity budget at the group level) over a period of time (e.g., time spent feeding, resting, walking, running, etc.); and;
b) Quantify the relative degree of responses to specific stressors by caribou (e.g., aircraft, vehicles, blasts).

It is important that we attempt to capture different demographics of caribou populations, whenever possible scan surveys should attempt to capture bachelor herds, nursery groups, mixed herds and rutting groups. Every attempt should be made to complete scan surveys at a variety of locations around site to monitor the potential impact of each area and its associated activities on herd behaviour.

HSE INFORMATION / SAFETY RISKS:

- **Heavy Equipment Traffic**
- **Wildlife Encounters**
- **Communication**

Approach: Contact the Environment Department every two hours while in the field. Wear PPE at all times, do not approach wildlife, and maintain a safe distance.

ADDITIONAL RESOURCES REQUIRED:

WORK PREPARATION:

Item	Task Description
1	Technician Skills: The identification of females, males and calves for the classification of individual behaviour; identification of incidental wildlife observations; identification of vegetation habitats; determination of directional movement of caribou; and GPS operation.
2	Both focal and scan sampling will be used to record the behaviour of individual caribou and groups of caribou, respectively. Please see the work instruction EKA WI 2115.12 for further information about Focal sampling.
3	For scan surveys, when first arriving on site, the observers will wait five minutes before commencing the surveys. During that time, surveys will record basic survey details, information on group location, weather, site location, and a herd composition count, as available on the data sheet. If parking on a haul road, announce stop on radio channel and contact dispatch to advise of expected duration of parking. Ensure truck is on with all lights on and cone is placed on roadway along with chocks.
4	Surveyors should work in teams of two with one person recording data/timing and the other person verbally calling changes in behaviour and potential stressors that are detected (visual or audio). Prior to beginning the work, both surveyors should familiarize themselves with the datasheet to ensure that all data is collected during the survey.

WORK EXECUTION STEPS:

Item	Task Description
1	Select a herd: Herds surveyed should ideally contain at least 10 individuals
2	**Before Scan:** a) When you have found a site with a caribou herd, wait 5 minutes to begin the focal survey. During this time, fill out the page one of the datasheet located on SharePoint under Forms (located here). (Date and Arrival Time, Weather, Description of location relative to mine, UTM Coordinate, Herd Composition Count/number). Weather data can be obtained from the airport (channel 8) or from CAM Building remote connection. b) Record GPS location (i.e., waypoint), use rangefinder to estimate distance to nearest mine structure. c) group. If group size exceeds 50 animals, observations should ideally be limited to 5 of either sex.
3	**Start Scan Survey:** a) The length of a scan survey is 32 minutes, and a scan observation will be conducted/recorded every four minutes. On groups up to 30 animals, all animals will be included in the scan. For larger groups, a sub-sample of 20-30 animals will be observed. Data may be supplemented with the use of video recordings. b) Observations will be conducted whenever possible, including during the northward migration/calving (May/June), post-calving (July/August), and southward migration (September/October) periods. For each individual, the following behaviours will be recorded: i. bedding (e.g., sitting with all four legs tucked under body, lying down, sleeping on the ground); ii. feeding (i.e., actively grazing, ruminating, chewing cud); iii. standing; iv. alert (e.g., quickly raising the head and orienting it toward a stimulus, pricking the ears and rotating them towards a stimulus, remaining motionless in an alarm posture); v. walking; vi. trotting; vii. running; and viii. other. c) If 'other' is recorded as the dominant behaviour, the 'other' behaviour should be described in the comments section of the datasheet. For each 4 minutes scan period, record the total number of animals surveyed as well as the number of each male, female, juvenile, calf, or unknown engaged in a given behaviour.
4	**Stressor Observations:** a) In the event that a stressor occurs at any point during a scan survey , the observers will record the time that the stressor occurred (i.e., the time that the stressor is first observed by surveyors), the duration of the stressor from start to finish, and the 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). The minimum distance from the stressor is also estimated by using a rangefinder, and recorded on the datasheet (i.e., the closest distance a stressor, e.g., a moving vehicle, comes to the herd) as is any behaviour change of a caribou from the first indication of the stressor is recorded. Stressors include aircraft (helicopter and airplane), three categories of vehicles (light [e.g., pick-up truck], medium [e.g., water truck, bus], and heavy truck [e.g., haul truck]), blasts from pits, wildlife (e.g., bears), and human presence (the observer is not a stressor unless they move during the survey). b) Observers will watch the animal(s) for up to 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

WORK EXECUTION STEPS:	
	being stressed. Following a stressor event, the scan survey will resume on the 4 minute interval; the duration between each scan observation will always be 4 min, regardless of the frequency or number of stressor events. Regardless of stressors, the survey will not extend beyond 60 min.
5	**Data Entry**: a) Data will be entered into the WEMP Data sheet in SharePoint.

GENERAL REMARKS

Survey Frequency:

Up to several times per week during field season (approximately late April to late September) when caribou are present within the study area.

Annual Timing Window:

Observations will be conducted whenever possible, including during the northward migration/calving (May/June), post-calving (July/August), and southward migration (September/October) periods.

Brief Study design summary for Scan Surveys:

Scan sampling of caribou groups (males, females, yearling, and calves) will be used to monitor caribou behaviour as function of distance from the mine and the Misery Road. The method will ideally involve two observers (one recorded and one observer). Caribou activity will be recorded for individuals within a group as feeding (includes walking with head down), bedding, standing, alert (may be standing or bedded with head up and ears pointed), walking, trotting, running, or other. GPS location will be recorded, with the direction and distance estimated to the caribou group. Group composition will be classified, the total herd size, and the number of animals in the group will be counted or estimated. During each observation session, the behaviour of 10-30 individuals should be recorded.

Survey Time Requirement:

Upon arrival, the observers will wait for 5 minutes before commencing the survey to allow the group to acclimate. During this time, the group composition should be classified (males, females, yearlings, calves). A proportion of the herd is then selected for observation, and watched for 32 minutes, or as long as the surveyor has a visual on the proportion of the herd being surveyed. Caribou behaviours are recorded every four minutes, and each time a stressor event is noted by the surveyor.

Personnel:

There will ideally be 1 observer and 1 recorder. The observer will call out behaviour every four-minutes, and/or every stressor event during the survey, and the recorder will record that behaviour and/or stressor event, and record the corresponding time stamp with hour, minutes, and seconds (hh:mm:ss).

In the case where a stressor (e.g., vehicle) is encountered, the observers should note the stressor, the time it occurred, the duration of the stressor the minimum distance for which the stressor approached caribou herd, and continue to monitor that animal for up to15 minutes (or until animal returned to pre-stressor behaviour) following the stressor, even if the stressor occurred near the end of the 32-minute period.

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

Appendix

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Work Instruction

EKA WI 2115.34 Camera Memory Card Programming and Downloading

Version:	1.1
Replaces:	1.0
Creation Date:	2022-04-04
Scheduled Review Date:	2027-04-04
Review Date:	N/A
Document Team Members:	Team Leader – Environment Operations Environment Advisor – Wildlife Environment Specialists
Document Owner:	Environment Advisor - Wildlife
Document Approver:	Team Leader – Environment Operations
Related Documents:	EKA WI.2115.16 Wildlife Camera Photo Processing EKA WI.2115.22 Camera Deployment and Check
Key Contacts:	Environment Advisor – Wildlife, Team Leader – Environment Operations
Change Requests:	Environment Advisor – Wildlife
Brief Description:	The Ekati Diamond Mine program monitors and records caribou and other wildlife activity near infrastructure using battery operated Reconyx wildlife cameras. Programmed memory cards determine the frequency, interval, and type of photos the cameras record. This work instruction provides details on how to program the camera memory cards and download data from the cards.

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TASK DESCRIPTION:

The Ekati Diamond Mine wildlife camera program monitors and records caribou and other large wildlife activity near infrastructure using battery operated RECONYX wildlife cameras. The frequency and type of photos recorded is dictated by how the memory cards are programmed. Programmed memory cards (SD cards) are inserted into the cameras. The camera are programmed to record two types of photos:

a) timed photos, where the camera takes a photo at timed intervals that are pre-programmed onto the memory card. The timed photos are important for determining camera effort.

b) motion-triggered photos, where the camera takes a series of photos each time that an object moves across the field of view of the camera. The number and frequency of motion-triggered photos taken are also pre-programmed onto the memory card.

Memory cards are programmed in the office and inserted into the cameras during regular camera checks (see EKA WI. 2115.22 Camera Deployment and Check for more details on camera checks).

HSE INFORMATION / SAFETY RISKS:

The camera card programming and downloading is done in the office, therefore there are no HSE concerns. If a trip to the cameras is required, a personal JHA that references the work instruction “EKA WI.2115.22 Camera Deployment and Check” is required.

ADDITIONAL RESOURCES REQUIRED:

- SD Cards (1 set per camera)
- Computer with Reconyx Professional Software or HyperFire 2 Professional Software (if programming for HyperFire 2 camera models) installed
- Computer with profile access to G: drive/Ekati/EnvPhotos for data downloading step

WORK PREPARATION:

Item	Task Description
1	Become familiar with the locations where cameras are set-up.
2	Install the RECONYX software called “Professional Settings” (http://www.reconyx.com/software/pro-settings) for HyperFire 1 camera models or “HyperFire 2 Professional Settings” (https://www.reconyx.com/software/pro-settings-hf2) for HyperFire 2 camera models.
3	If you do not already have read/write access to the G drive (\\ddc.int\data\Ekati\EnvPhotos), please contact IT to request access. Refer to the “Group Name: DDC-AzureEK-FileSyc-EnvPhotos-RW” in the request.
4	Understand how the cameras are programmed (may vary from year to year). The cameras are typically programmed to record photos when triggered by motion, in addition to recording a timed photo each day at noon that are useful for determining whether the camera is functional (up-right, screen cleared, capturing images). Understand how the cameras are programmed (may vary from year to year).

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WORK PREPARATION:	
5	Understand the file set-up on the hard drive or memory cards. The camera records the photos onto folders on a camera card. The first folder is named 100RECNYX and the camera fills up this folder until it hits photo # 9999, and then makes a new folder called 101RECNYX and so on. The photos are named in order that they are taken and are not separated into groups of motion or triggered photos.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	**Preparing SD Cards** Make sure the SD is not corrupted and is functioning properly. The data 'lock' switch on the top left side of the card should be in the upright 'unlocked' position. If there are any pictures on the card that have not been uploaded already, upload them to their respective location on the G drive (follow steps 5-7 below).  Typically, corrupt cards cannot be erased of past data, though they may appear to erase properly. To check whether cards have properly erased, delete photos, then eject the memory card, then re-insert the card and check whether there are still photos on the card OR use the tool 'Format…' to wipe the card clean (right click on memory card icon, click "Format' and click "Start". Ensure the cards are empty of all files prior to reprogramming.
2	**Labelling SD Cards** Physically label cards using the label marker found in the lab. The card number must match the camera number. There should be an A card and a B card for each camera. The A and B card are switched during camera checks. If labeled cards already exist, this step can be skipped.
3	**SD Card Set-up** Insert a blank memory card into the computer or card reader. ***For HyperFire 1 Camera Models:*** *Open the Reconyx software program called "Professional Settings"* a) A dialog box will pop up to request that the user select the SD memory card that you are intending to program. The default option is "Removable Disk (D:)", unless multiple memory cards are connected to your computer. This box opens every time you open the program, even if there is only one memory card inserted into your computer. *Click ok* to select the card b) The below dialog box for programming settings onto the card will open i. In the **"Triggers**" tab, select the following settings (Photo 1): - Quickset - ***Advanced***; - NearVideo: • When triggered take ***10*** pictures;

WORK EXECUTION STEPS:

- Waiting ***1*** seconds between pictures;

- Quiet Period:
  - Wait ***0*** seconds between triggers;
- Options:
  - Select - Use the internal motion trigger.

ii. In the **"Time Lapse**" tab, select the following settings (Photo 3):
- Time-lapse Interval:
  - **Select Hours** and change to **1** (for a 1 hour frequency);
  - **Click on View Schedule** and click on the 4 time slots between 12 PM 00:00 and 1 PM 00:00 to turn 'camera on' (Photo 4);
  - At the specified interval: **Select Take one picture.**

iii. In the **"Images**" tab, select the following settings (Photo 3):
- Options:
  - Label: **fill in text box** with unique camera number (i.e. "CM 07B") that pertains to the camera itself and the camera card (should be the same camera number as what's physically labelled on the card). **This number will need to be edited for every memory card that you program.** This is what sets the text on the border of the photo itself (i.e., see Photo 4). Note that the appropriate "A" or "B" identifier is included in this text box per SD card, downloading and labelling the photos later will be easier, however whether particular cameras require card A or B upon the next camera check is variable so attention to detail must be taken when labelling.
  - Temperature: **select** Celsius.
  - Time: **select** 24 hr.
  - All other settings can stay as is.

iv. In the "Cellular" tab, nothing needs to be changed in this dialogue box.

v. In the **"Other**" tab, nothing needs to be changed in this dialogue box.

c) Set the programming changes by **clicking OK button** at bottom of dialogue box.

i. A dialogue box called 'Information" will appear to let you know that the settings have been properly applied to the memory card (Photo 5).

ii. IMPORTANT – if this box does not appear, you will instead get an error message saying that the card could not be programmed. If you receive this error message, please set the memory card aside in a bag labelled 'error' and IT will trouble shoot the error with these cards at a later date.

iii. The settings applied to the memory card cannot be checked unless the card is placed into a camera and the photo captures are observed.

iv. See below instructions on downloading data following a camera check.

v. See EKA WI.2115.22 Camera Deployment and Check for details on deploying the programmed memory cards into cameras.

WORK EXECUTION STEPS:

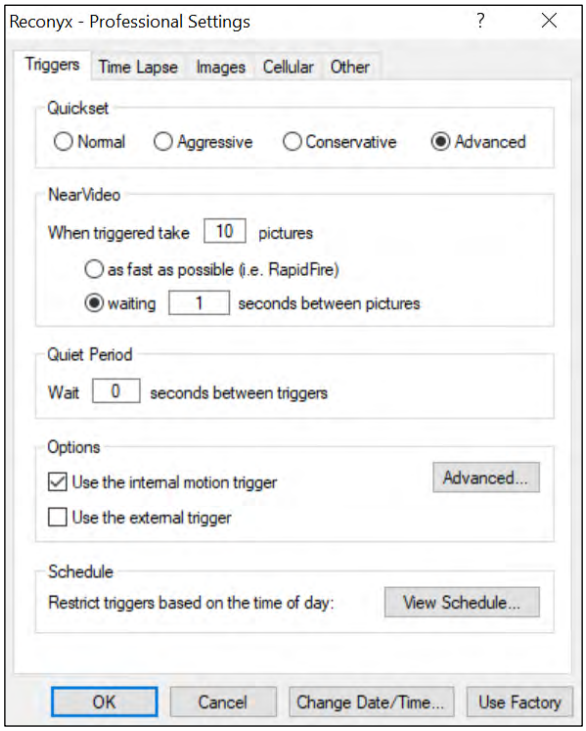

Photo 1: Settings for Triggers Dialogue Box in RECONYX – Professional Settings software.

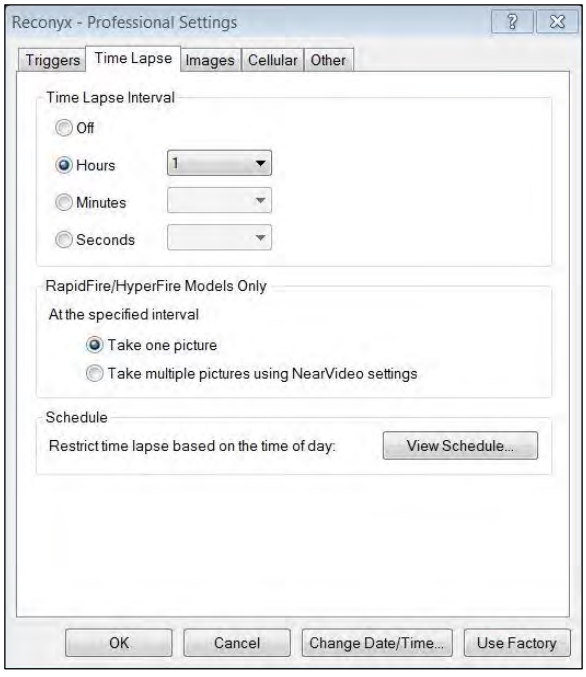

Photo 2: Settings for Time Lapse Dialogue Box in RECONYX – Professional Settings software.

WORK EXECUTION STEPS:

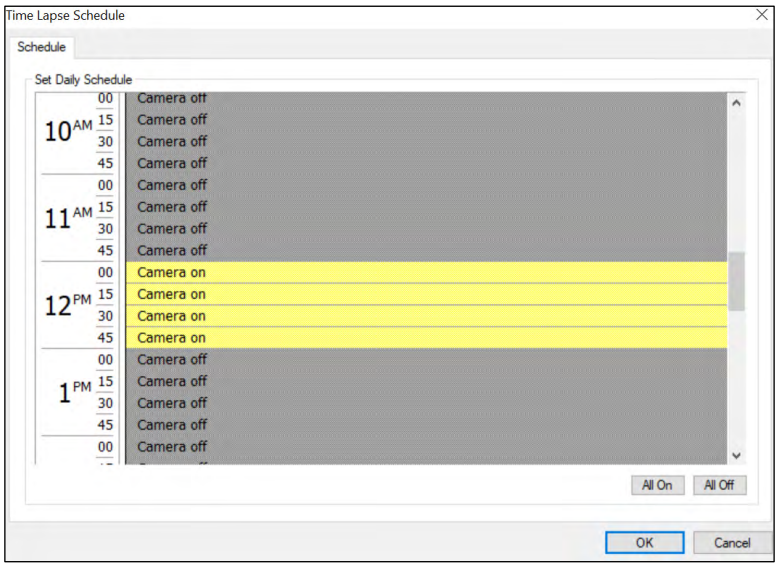

Photo 3: Settings for Time Lapse Schedule Dialogue Box in RECONYX – Professional Settings software

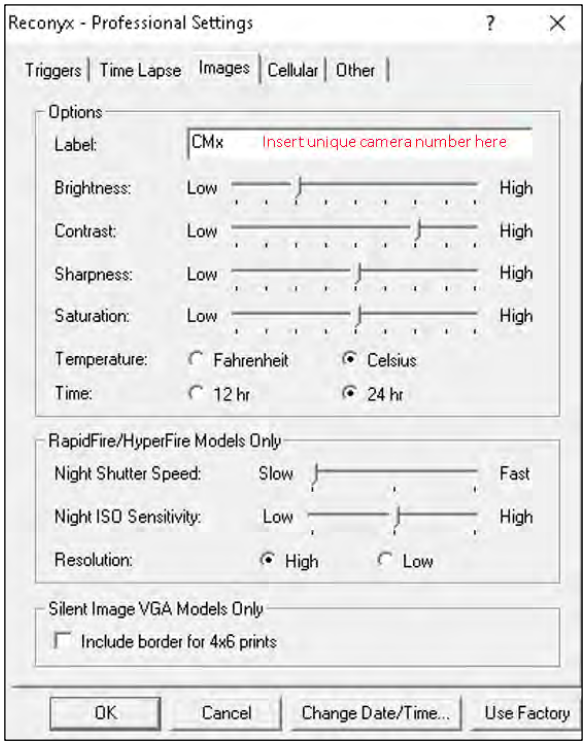

Photo 4: Settings for Images Dialogue Box in RECONYX – Professional Settings software.

WORK EXECUTION STEPS:

Photo 5: Information box that appears when the card has been successfully programmed.

For HyperFire 2 camera models:

Open the Reconyx software program called "HyperFire Professional Settings"

a) A dialog box will pop up to request that the user select the SD memory card that you are intending to program. The default option is "Removable Disk (D:)", unless multiple memory cards are connected to your computer. This box opens every time you open the program, even if there is only one memory card inserted into your computer. Click ok to select the card

b) The below dialog box for programming settings onto the card will open:

i. In the "**Motion"** tab, select the following settings (Photo 6):

- Motion pictures - **On**;
- External trigger pictures – **Off**;
- Number of pictures – **10**;
- Time between pictures – **1 second**;
- Motion videos – **Off**;
- External trigger videos – **Off**;
- Quiet period – **No delay**;
- Sensitivity – **High**.

ii. In the "**Time Lapse"** tab, select the following settings (Photo 7):

- Time lapse pictures – **On**;
- Number of pictures – **1**;
- Time lapse videos – **Off**;
- Time lapse interval – **1 hour**;
- Under **"Schedule"** click on Add Fixed and specify start time from 12:00 PM and stop time 1:00 PM with every day checked (Photo 8).

iii. In the "**Display**" tab, select the following settings (Photo 9):

- Label: **fill in text box** with unique camera number (e.g., "CM07B") that pertains to the camera itself and the camera card (should be the same camera number as what's physically labelled on the card). **This number will need to be edited for every memory card that you program.** This is what sets the text on the border of the photo itself. Note that the appropriate "A" or "B" identifier is included in this text box per SD card, downloading and labelling the photos later will be easier, however whether particular cameras require card A or B upon the next camera check is variable so attention to detail must be taken when labelling.
- Time format – **24 h**;

WORK EXECUTION STEPS:

- Temperature units – **Celsius**;
- Show logo – **Yes.**

iv. In the Day/Night and Other tabs, nothing needs to be changed.

c) Set the programming changes by **clicking OK button** at bottom of dialogue box.

i. A dialogue box called “Information” will appear to let you know that the settings have been properly applied to the memory card (Photo 10).

ii. **IMPORTANT –** if this box does not appear, you will instead get an error message saying that the card could not be programmed. If you receive this error message, please set the memory card aside in a bag labelled “error” and IT will troubleshoot the error with these cards at a later date.

iii. The settings applied to the memory card cannot be checked unless the card is placed into a camera and the photo captures are observed.

iv. See below instructions on downloading data following a camera check.

v. See EKA WI.2115.22 Camera Deployment and Check for details on deploying the programmed memory cards into the cameras.

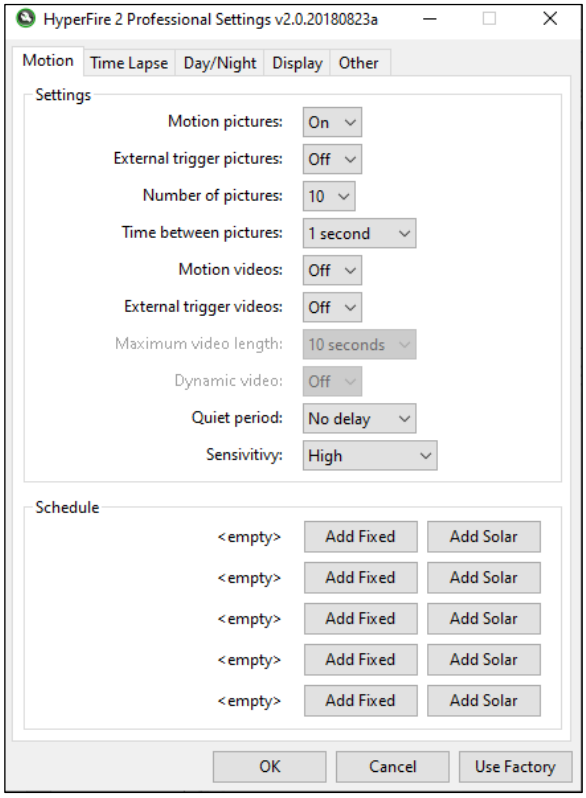

Photo 6: Settings for Motion Dialogue Box in RECONYX – HyperFire 2 Professional Settings software.

WORK EXECUTION STEPS:

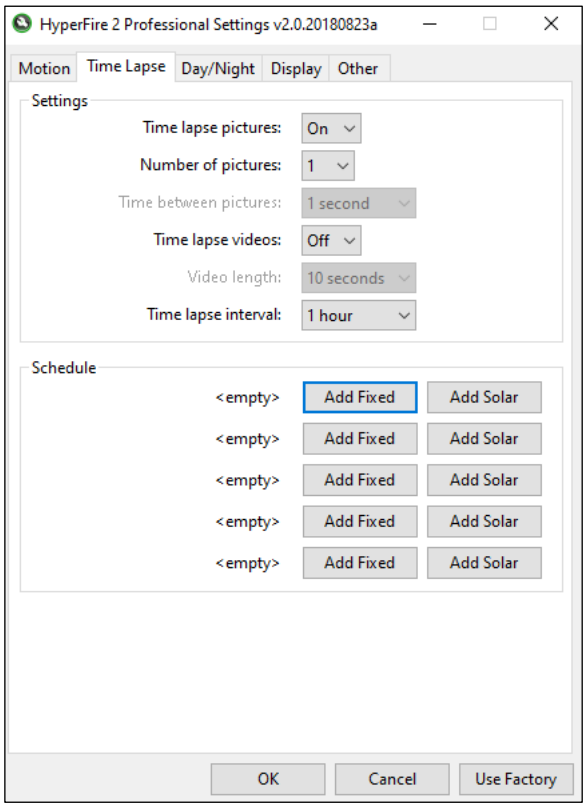

Photo 7: Settings for Time Laps Dialogue Box in RECONYX – HyperFire 2 Professional Settings software.

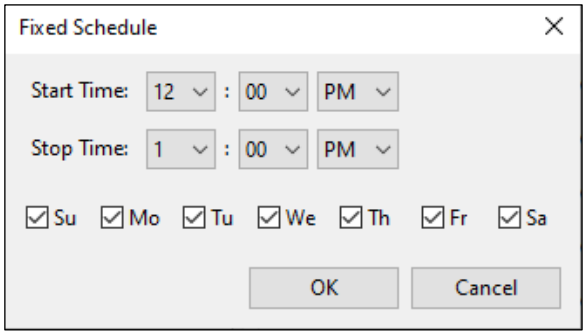

Photo 8: Settings for Add Fixed Schedule Dialogue Box in RECONYX – HyperFire 2 Professional Settings software.

WORK EXECUTION STEPS:

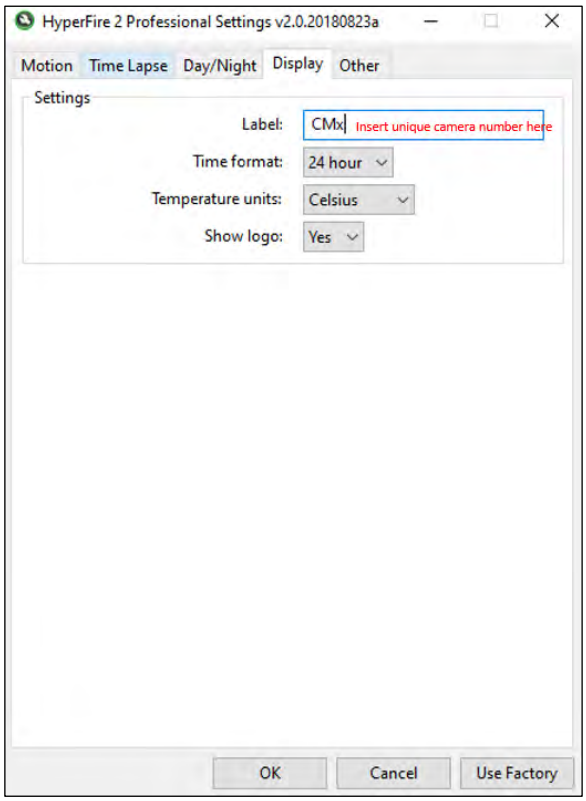

Photo 9: Settings for Display Dialogue Box in RECONYX – HyperFire 2 Professional Settings software.

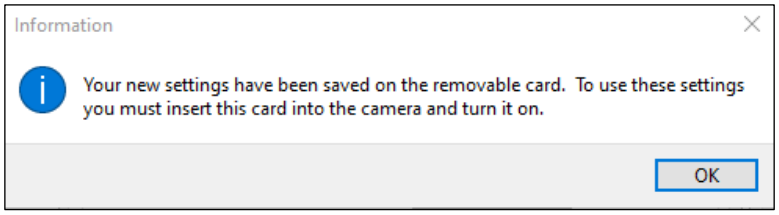

Photo 10: Information box that appears when the card has been successfully programmed.

4 Downloading Data from SD Card

After SD cards sets are removed from cameras and returned to the lab, the data must be downloaded from the cards and stored to the G Drive (G:\Ekati\EnvPhotos\Processing). This task should be completed in a timely manner (by the same shift that collected the memory cards) to ensure data is not, forgotten, lost or discarded as this would represent a big data loss for the camera program.

Insert the SD card. In Windows Explorer, navigate to the SD card folder. Copy the folders labelled as “100RECNX”, “101RECNX”, “102RECNX” and so on. Navigate to the G Drive ((G:\Ekati\EnvPhotos\Processing). On the G Drive, open or create the folder for the Camera ID you are downloading from (e.g., CAM 78) and create a subfolder with the name of the date the SD card was retrieved from the camera (e.g., 131021 for October 13 2021). Within this subfolder, create a folder for the SD card identifier (e.g., 78A) as well as a “Wildlife Photos” folder for photos of wildlife. Copy all photo

WORK EXECUTION STEPS:

folders from the SD card to the SD card identifier folder (e.g., 78A) and ensure that all photos have successfully copied from the SD card to the G drive by right clicking on the folder and checking respective file property sizes in each location. If all files copied over, file size properties should be the same between the SD card and the G Drive folder. See Photo 11 for an example of the file structure.

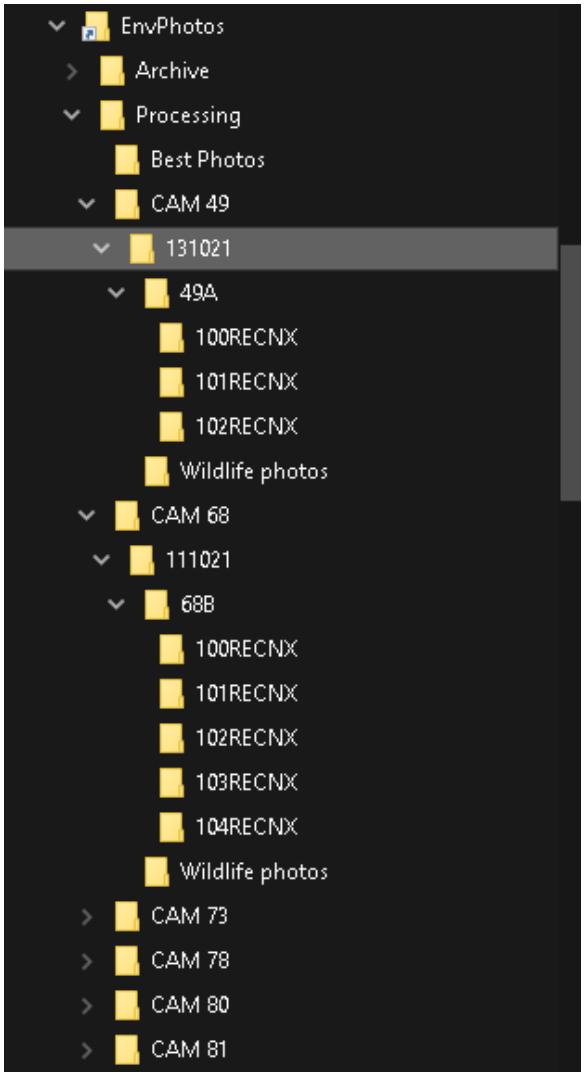

Photo 11: Example of the file structure on the hard drive that the photos are saved to.

GENERAL REMARKS

Frequency: Photos are processed continually as data becomes available from memory cards. Memory cards are programmed, deployed, and downloaded approximately 2-3 times per year, as weather conditions allow.

The downloading task (Work Execution Step 4) should be completed in a timely manner (by the same shift that collected the memory cards) to ensure data is not, forgotten, lost or discarded before being downloaded and backed up.

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

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Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER			
DOCUMENT OWNER			
DOCUMENT APPROVER			

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Work Instruction

EKA WI.2115.22 Camera Deployment and Check

Version:	1.0
Replaces:	n/a
Creation Date:	2020-04-10
Scheduled Review Date:	2023-04-10
Review Date:	n/a
Document Team Members:	Team Leader – Environment Operations Environment Advisor - Operations Environment Specialist - Compliance
Document Owner:	Environment Advisor – Wildlife
Document Approver:	Superintendent Environment
Related Documents:	EKA WI.2115.16 Wildlife Camera Photo Processing EKA WI.2115.34 Camera Memory Card Programming
Key Contacts:	Environment Advisor – Wildlife
Change Requests:	Environment Advisor – Wildlife
Brief Description:	The Ekati Diamond Mine program monitors and records caribou and other wildlife activity near infrastructure using battery operated Reconyx wildlife cameras. Programmed memory cards determine the frequency, interval, and type of photos the cameras record. This work instruction provides details on how to service the cameras for the current camera program.

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TASK DESCRIPTION:

Deployment of roadside cameras to monitor caribou behavior along Ekati mine roads. Frequent checks of the cameras, batteries and SD card to ensure that they are functioning properly.

HSE INFORMATION / SAFETY RISKS:

- **Wildlife Encounters**
- **Heavy Equipment Traffic**
- **Slips/Trips/Falls/Strains/Sprains**
- **Helicopter FRC**
- **BARS**
- **Blowing Debris**
- **Hearing Damage**
- **Helicopter Crash**
- **Loose rock on slope of road**
- **Back strain while lifting rocks onto camera stands**
- **Energized power line (if required to walk beneath power lines to access cameras, contact Electrical Services TL to arrange meeting with Linesman or Electrical Dept. Crew will receive orientation and then follow the direction of the linesman for any continued work after first meeting)**

ADDITIONAL RESOURCES REQUIRED:

- Hard Hat
- Steel-toed boots
- Reflective Vest
- GPS
- Compass
- Camera Placement Map
- Camera booklet (yellow binder with extra datasheets), Clipboard and Pencil
- Bear Deterrents / Bear Banger Kit
- Light Vehicle
- Helicopter
- Spare RECONYX Cameras (to replace any that are broken in the field)
- Lithium Batteries (12 per camera)
- Spare Bucket Posts with camera mounting brackets (to replace any that are broken in the field)
- Point and Shoot Camera
- Binoculars
- GPS with camera waypoints loaded

WORK PREPARATION:	
Item	**Task Description**
1	**Pre-Deployment** a) See WI EKA.2115.34 Camera Memory Card Programming and Downloading for instruction on programming memory cards. b) Load the camera location waypoints into the GPS, and print the Camera maps. Both items are saved to SharePoint (Wildlife\WEMP Data\Survey: Reconyx Camera\Year XXX). c) Make sure you have enough camera posts beforehand. Additional buckets can be purchased as a reservation through the warehouse. Stands (post and camera bracket mount) can be built by the Carpentry Dept. through a notification request. Take an example post to Carpentry.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete Personal JHA.
2	Working near Roads: a) Make sure you have enough posts and cameras for the day. Better to have too many and not need them rather than running out and having to come back to site to grab more. b) Drive to the furthest site first, for example if you're setting up cameras on Misery Rd drive to the end of the road and work your back towards site. This will save you time. c) Using the GPS navigate to your first site. d) Park as far off the road as possible, place you delineators and have your 4-ways on and inform the other drivers via radio of your location. Remember that you cannot walk across a haul road. e) If you're going to be crossing underneath an active powerline you will have to complete the powerline safety modules in Pavillion and complete a field orientation from Valard or Electrical Dept. member who can be reached on channel 5 prior to starting work.
3	Deploying Camera a) Cameras are deployed singularly at caribou crossings along Sable, Jay and at locations of interest along the Jay esker, and the Narrows. Cameras on Misery Road are paired; One roadside, one 30 m from road, and two cameras 60 m from road, on the tundra. The Roadside cameras are placed at caribou crossings and should be pointed DOWN the road as opposed to ACROSS, with the CB crossing in full view. Misery Road tundra Cameras should be pointed back at the road, except the farthest camera along Misery Road, which is pointed away from the road to increase the distance and space monitored. b) Bring some rocks with you out to the tundra camera just in case there aren't enough readily available this will save you time. c) Using the compass take a bearing of the direction the camera is facing. d) Next you will take 5 photos from the camera starting at North, East, West, South and then one from the direction that the camera is facing. Make sure you record the photo numbers in the field sheet. Photos should be saved to SharePoint. e) Fill out field sheet.

WORK EXECUTION STEPS:	
	f) Arm camera and wave your hand in front of it a few times just verify that it works before leaving. See step 5.4 e) if the camera does not start recording photos when triggered.
4	Camera Checks a) It is important to check the cameras periodically to swap out low batteries and full SD cards and to verify that the cameras are working properly. Condition of the cameras (whether upright or knocked over, broken, frosted over, covered in dust, etc.) are also recorded each time the camera is checked as this information can explain camera effort. If encountered, all of these situations should be rectified during the camera check. If erecting the camera into an upright position, ensure that the camera is pointing in the direction it was initially intended (check the camera binder for this information). b) It is important to check whether the memory cards have been working properly, taking the motion trigger images, and recording the timed photo. Opening the camera usually causes it to display the Battery Level and Number of photos (after the last motion photo is taken), but if not, click, “OK” button, “>”, and scroll to the menu option “Check Status” option which will give you all the information as well. Record the number of photos and battery level in the program binder as well as any status messages. If the memory card is full, the screen will indicate the date that the card was filled. Card error may also be displayed on the screen if the SD card is corrupt. c) If the batteries are below 70% swap them for new batteries. Indicate in the binder that batteries were changed. d) Change the desiccant package (absorbs moisture) and indicate in the binder that it was changed. e) Arm camera and wave your hand in front of it a few times to verify that it is working correctly before leaving. If the camera doesn’t trigger when you wave your hand or motion in front of the camera, it is possible that the SD card is not programmed to take motion photos. Program the SD card manually using the menus on the camera: i. Go to CHANGE SETUP press the OK button. ii. It should read QUICKSET with ADVANCED underneath it. If not cycle through the choices with the arrow keys until it does. If it is on ADVANCED already hit OK. iii. Select TRIGGER. At this point a prompt may come up saying that its using pc setting and you’ll have two options. GO BACK which will return you to the main menu or if you cycle right CONTNIUE which will send you the various options for the Motion Trigger. iv. The settings for the Motion Trigger are; MOTION SENSOR: ON, SENSITIVITY: HIGH, PICS PER TRIG: 10, PIC INTERVAL: 1 SEC, QUIET PERIOD: NO DELAY and FINISHED: OK. These should be the first options available if not cycle through with the arrow buttons and press OK. v. For changing the Time Lapse options first follow steps i &ii. vi. Once in ADVANCED settings press the arrow keys until you reach the TIME LAPSE option and hit OK. vii. Repeat step iii. The required settings for the Time Lapse are; AM PERIOD: OFF, START PM PERIOD: 12:00PM, END PM PERIOD: 14:00PM, PICTURE INTERVEL: 1 HOUR, FINISHED: OK. These should be the first options available if not cycle through with the arrow buttons and press OK.

GENERAL REMARKS
Make sure everything is ready to go before you head out. During the deployment phase it is advised to take an hour so at the end of the day to prep everything for the next day of work.
Make sure to bring rain gear, bug spray, sun screen, lots of water, food and warm clothing so that you can work in any conditions that may arise while out in the field.
Bring both bear bangers and bear spray and scan for wildlife often.
Getting to the away sites will have you walking over various types of ground conditions ranging from eskers to tussock fields. Take your time and watch where you're going.

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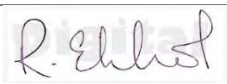
Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

Appendix

Approval Signatures Record

REVIEWER ROLE	NAME	SIGNATURE	DATE
Wildlife Advisor	Christine Rock		13-04-2020
Superintendent – Operations	Harry O'Keefe		
TL – Operations	Rich Ehlert		20MAY2020

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Work Instruction

EKA WI 2115.16 Reconyx Wildlife Camera Photo Processing

Version:	1.3
Replaces:	1.2
Creation Date:	2022-04-04
Scheduled Review Date:	2023-10-31
Review Date:	N/A
Document Team Members:	Team Leader – Environment Operations Environment Advisor – Wildlife Environment Specialists
Document Owner:	Environment Advisor - Wildlife
Document Approver:	Team Leader – Environment Operations
Related Documents:	EKA WI.2115.16 Wildlife Camera Photo Processing EKA WI.2115.22 Camera Deployment and Check
Key Contacts:	Environment Advisor – Wildlife, Team Leader – Environment Operations
Change Requests:	Environment Advisor – Wildlife
Brief Description:	The Ekati Diamond Mine wildlife camera program monitors and records caribou and other large wildlife activity near infrastructure. The program can generate millions of photos. This procedure ensures that photos do not get lost, mislabeled or otherwise confused. It also ensures that photos are sorted and described in a way that reduces future rework during report writing.

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TASK DESCRIPTION:

Reviewing the remote camera photos recorded by motion-triggered cameras and recording caribou and other large wildlife sightings (i.e., fox and larger), their behavior, and abundance to determine the level of activity and traffic along roads, responses to the road, and activity at other mine infrastructure and along historic movement corridors.

Due to the large number of photos being processed and the large amount of associated metadata, everything is tracked in an excel worksheet. This document will outline all of the relevant information that is required to be for each photo and how to properly store the photos once the relevant metadata has been entered into the worksheet.

HSE INFORMATION / SAFETY RISKS:

- **Extended periods working at a desk could cause eye strain, muscle strains and other repetitive motion strain related to poor posture and office ergonomics.**

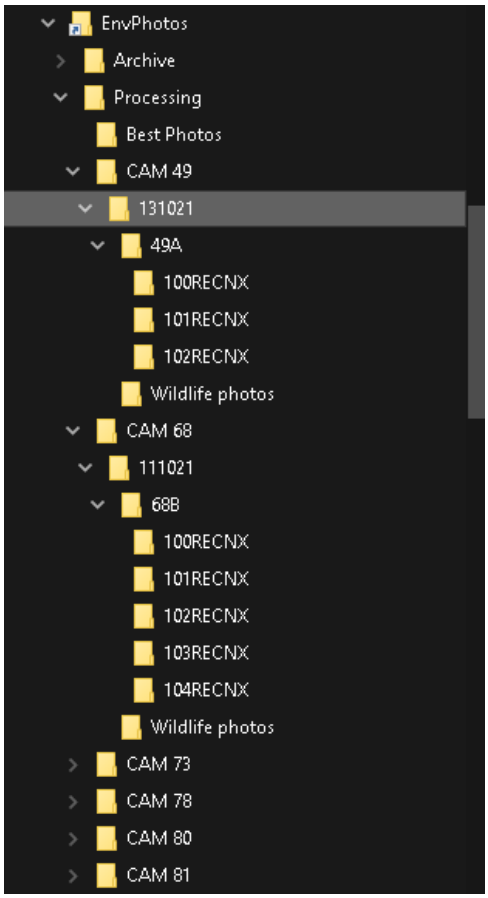
ADDITIONAL RESOURCES REQUIRED:

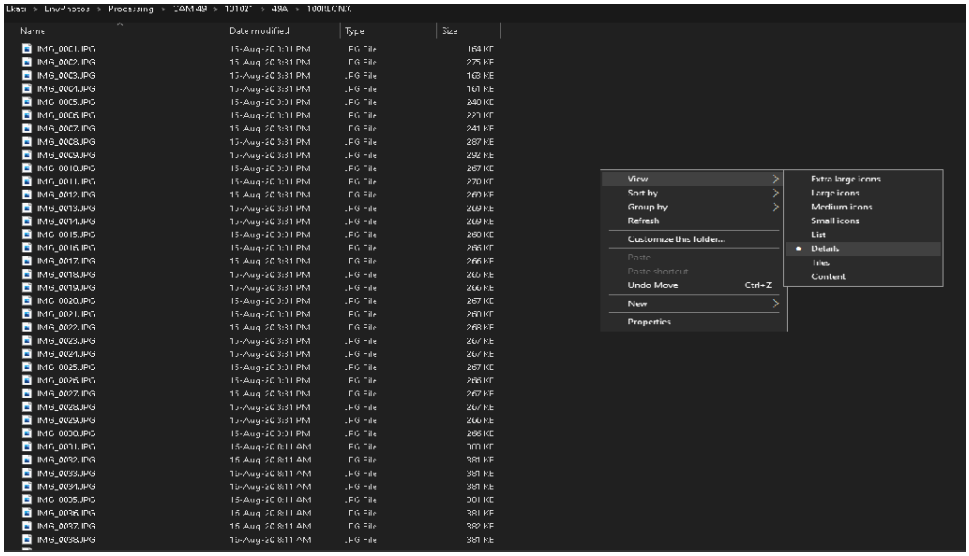
- Current map indicating camera locations and camera ID
- External hard drive and memory cards that contain photos
- Computer with access to SharePoint for data input into excel file

WORK PREPARATION:

Item	Task Description
1	Become familiar with the locations where cameras were set-up and recording wildlife.
2	Understand how the cameras are programmed (may vary from year to year). The cameras are typically programmed to record photos when triggered by motion, in addition to recording a timed photo each day at noon that are useful for determining whether the camera is functional (up-right, screen cleared, capturing images).
3	Understand the file set-up on the hard drive or memory cards. The camera records the photos onto folders on a camera SD card. The first folder is named 100RECNYX and the camera fills up this folder until it hits photo # 9999, and then makes a new folder called 101RECNYX and so on. The photos are named in order that they are taken and are not separated into groups of motion or triggered photos.
4	Be familiar with the species of wildlife that you are likely to encounter on the photos, specifically medium to large mammals, i.e., caribou, grizzly bear, moose, wolf, wolverine, and foxes (Arctic, cross or red fox). You need to be comfortable identifying caribou herd composition (cow, bull, yearling, juvenile) and wildlife behavior to complete the photo processing.
5	If you are not comfortable with the above requirements, wildlife reference sheets found in the wildlife office can be used for reference, as can your colleagues!

WORK EXECUTION STEPS:

Item	Task Description
1	Complete a PSC describing all risks and the steps taken to eliminate these risks.
2	Open the folder for the camera photos you have been tasked with processing (e.g., CAM 49→131021). Within the folder should be two subfolders: one named according to the camera and SD card ID (e.g., 49A), which will contain all the RECNYX folders that contain the photos and one called “Wildlife Photos” to where you will copy any images of wildlife you find as you process the photos. Please note, that if you come across a high quality wildlife image (i.e., report worthy), please save a copy those to the “Best Photos” folder located at G:\Ekati\EnvPhotos\Processing\Best Photos. See Photo 1 for an example of the photo folder structure.  *Photo 1: Example of the file structure on the G drive that the photos are saved to.* The photos are contained within the folders labelled RECNYX, and are saved in a consecutive order according to the date they were taken. photo, labeled IMG_0001. Each photo will contain the following information: a) The camera number; b) Date and time the photo was taken; c) Type of trigger (motion or timed); and d) Motion triggered photos will also indicate the number of photos in the series.

WORK EXECUTION STEPS:	
3	Open the “Camera Program Data” workbook on SharePoint. In this file you will enter relevant information regarding the camera photos you are processing.
4	**Camera Setup Info sheet** First step is to enter the camera check date for the photos you are processing. This date is entered on the sheet “Camera Setup Info” for the pertinent camera row next to the previous camera check date and will correspond to the date identified in the folder name you are working in (e.g., 131021 for October 13 2021).This is the only entry you need to make in the “Camera Setup Info” sheet.
5	**Effort** The next step is to record the camera effort (how many days the camera was operational per year). This information is important for calculating the camera program effort (the number of days that the camera was active). Several scenarios can influence whether the camera is operational, including whether the camera was set-up and turned on, had battery power to take photos, had space on the memory cards to record images, remained standing upright and taking photos in the desired direction (vs. knocked over by machinery, wildlife, or humans), or were obscured by fog or snow. On the Effort sheet, find the pertinent camera column and highlight with green fill the date when the camera was checked (again, will correspond to the date identified by the folder name and in Step 4) and use the dropdown options to fill in the appropriate code for each day: - 0 → Camera deployed but not recording photos properly, e.g., due to snow cover or knocked over - 1 → Camera deployed and recording photos properly - B/E → Camera deployed but ran out of battery or error caused the camera to stop recording - X → Camera not deployed (e.g., could have been stolen or was being relocated) Consequently, in between green fill cells (i.e., camera checks) there should be no blank cells in the camera column when you are done entering the Effort information. The easiest way to extract this information for the Effort sheet may be to switch your folder view to Details and only review the photos taken by timelapse each day at noon (see Photo 2). However, if your computer network connection is fast enough, perhaps viewing large or extra large icons is the quicker approach.  *Photo 2: Switching folder view to Details may make processing of Effort information quicker.*

WORK EXECUTION STEPS:

6 **Wildlife Photo Data**

The next step is to review the photos for wildlife. Start at the first photo and scroll through the photos using your computer's photo viewer. Scroll through the photos in each of the RECNYX folders sequentially in order to identify a target species, which include medium to large mammals species (i.e., fox or larger).

When you see a target species, record the following information in the "Wildlife Photo Data" sheet:

Camera Specifics:

a) Camera #: enter the identification number of the camera that the photos were downloaded from;
b) Card label: enter the card label if marked on the photos; A or B or unknown, and
c) Camera folder number: enter the 3 digits of the folder being sorted. For example, if you are sorting folder 100RECNYX, you would enter 100.

Photo Information:

a) Date: enter the date the photo was taken using the format (ddmmyy), not the date from the file metadata;
b) Start Time: the time that appears on the first photo that captured the animal.
c) End Time: the time on the last photo in which the animal is captured.
d) Start Photo #: each photo will always have IMG_ and a 4 digit number stamp; record the first photo # the animal was observed in.
e) End Photo #: the photo label of the last photo the animal was observed in.
f) # of Photos: is calculated automatically, so you can ignore this entry.

Wildlife Information:

a) Species of wildlife: use drop down menu to identify target species.
b) # of adult males, females, yearling/calf/juveniles, or unknowns.
c) Total # is calculated automatically, so you can ignore this entry.
d) Previously Counted?: Determine whether the wildlife was previously counted (i.e., recorded in a previous photo or group of photos). Assume that caribou herds were previously counted if they were recorded in a previous photo, less than 30 minutes ago and you can't be certain they are a new observation based on e.g., antler shape etc.
e) Wildlife behaviour: It is important to note the behavior of wildlife. For cameras near infrastructure (i.e., roads), it is important to note behavior in relation to the infrastructure and potential stressors (i.e., vehicles passing by. Secondary behaviors are also noted.
f) Behaviour 1, 2, 3: record the dominant behaviour in the Behaviour 1 column; if the animal appears to have two separate behaviours record the second behaviour in the Behaviour 2 column. If there is a group of the same sex, record their dominant collective behaviour in the 1st column and so on. The "Behavior -1 column" is reserved for behaviors related to mine infrastructure and potential stressors. Signs of distress, including alert behavior (directed gaze, erect tail, sniffing, erect ears, stiff posture with spread hind legs), deflections (hesitating or changing path of motion at road) from the road or hesitation in crossing are important to note.
g) Alert/ Deflected (Y/N/U): record Y=yes, N=no or U=unknown (See "Column Explanations" sheet for clarification).
h) Vehicle Present (Y/N): Y=yes if a vehicle was seen in the frame or seconds before/after

WORK EXECUTION STEPS:	
	QAQC Information: a) Record whether the data entry requires review (due to uncertainty of the entry) and the data enterer's initials. If you are unable to determine the animal group/species, identify the location and brief description of animal blob. Include your own assumptions if possible. **Note:** While entering photo data into the Excel spreadsheet remember to save the document frequently to prevent loss of data. It should be noted that everyone uses the same database for the photo sorting, but only one person at a time can do edits on the spreadsheet. IMPORTANT! If the main spreadsheet is accidently deleted on the database, it stays deleted!
7	Copy any photos with wildlife into the "Wildlife Photos" folder.
8	If you come across a high quality wildlife image (i.e., report worthy), please save a copy those to the "Best Photos" folder located at G:\Ekati\EnvPhotos\Processing\Best Photos.
9	When you have completed processing the camera data you were tasked with, be sure to inform your Team Lead and the Wildlife Advisor for record keeping of camera photos still outstanding for processing.

GENERAL REMARKS

- **Frequency**: Photos are processed continually as data becomes available from memory cards. Memory cards are downloaded approximately 2-3 times per year, as weather conditions allow.
- Take frequent breaks to stretch and rest the eyes to avoid strain during long hours at the computer. Use the 20/20/20 rule: Every 20 minutes, stand up, stretch, and focus on an object 20 feet away for 20 seconds.
- Be sure to practice ergonomically correct posture while being seated at the computer.

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

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Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER			
DOCUMENT OWNER			
DOCUMENT APPROVER			

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Work Instruction

EKA WI.2115.03 Long Lake Containment Facility Wildlife Survey

Version:	1.1
Replaces:	N/A
Creation Date:	2013-07-26
Scheduled Review Date:	2020-12-15
Review Date:	2015-12-15
Document Team Members:	Wildlife Technician, Wildlife Advisor & Environment Projects Team Leader
Document Owner:	Wildlife Advisor
Document Approver:	Environment Projects Team Leader
Related Documents:	N/A
Key Contacts:	Wildlife Advisor, Environment Projects Team Leader
Change Requests:	Wildlife Advisor
Brief Description:	Protocol for monitoring and recording wildlife activity on and adjacent to the Long Lake Containment Facility (LLCF)

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TASK DESCRIPTION:

Scan the Long Lake Containment Facility (LLCF) and record all wildlife sightings and signs of wildlife (e.g., scat and tracks) to determine if present mitigation measures effectively minimize the potential risks associated with LLCF to wildlife.

HSE INFORMATION / SAFETY RISKS:

- **Equipment Interactions**
- **Wildlife Encounters**
- **Slips, Trips, and Falls**

ADDITIONAL RESOURCES REQUIRED:

- Light Vehicle
- Radio for Communication with the Environment Department and Heavy Vehicles operating
- Binoculars & Spotting Scope with tripod
- GPS and spare batteries
- Camera
- Bear Banger Kit
- LLCF Wildlife Survey Form, Clipboard and Pencil
- Peterson's Field Guide to Animal Tracks; Sibley's Field Guide to Birds

WORK PREPARATION:

Item	Task Description
1	Become familiar with the LLCF road and dyke Area.
2	Be familiar with the species of wildlife that you are likely to encounter on any given day including migratory birds and species defined as valued ecosystem components in the Environmental Agreement (Grizzly Bear, Wolverine, Caribou and Wolves). You need to be comfortable identifying caribou herd composition, wildlife behaviour and habitat identification to complete this survey.
3	If you are not comfortable with the requirements above you can bring the wildlife and habitat reference sheets posted in the wildlife office.

WORK EXECUTION STEPS:	
Item	**Task Description**
1	Complete a JHA describing all risks and the steps taken to eliminate these risks.
2	The LLCF is surveyed at two different frequencies based on the function of each area: a) Cells A, B and C are predominantly settling areas and thus contain the majority of processed kimberlite discharged and is the main area of community and regulatory concern. These cells must be monitored at least 4 times a rotation. b) Cell D & E are polishing ponds, water is kept until it meets discharge criteria. This area is only included on ever second LLCF survey or 3 times per rotation. There is reduced survey effort in these areas because there are no exposed sediments or processed kimberlite flats creating potential risks to wildlife health such as ingestion, entrapment or barriers to movement.
3	Ensure that you check Environment Canada's website and record the current weather data and record it on the survey form. Slowly drive all roads and dykes of the LLCF scanning both sides of the road/dyke for wildlife or wild life signs. **Note**: Survey should only be conducted on one leg of the trip. Do not continue the survey on the return trip as you are likely to double record some wildlife. However the presence of large mammals or VEC species that have not been noted early in the survey should be recorded.
4	When wildlife or signs of wildlife activity are observed, record the following information: a) Date, start time, observers. b) Species of wildlife, type of sign (visual or track/scat), number of animals and sex. If caribou are present record the composition of the herd. c) Location (e.g. on road or dyke, tundra, with the LLCF basin), grid map number (taken from map in the appendix which is also on the back of the survey form; e.g.H5 if in the basin of cell B at the most northern tip). d) Dominant behaviour (e.g. B = Bedded, F = Feeding, W = Walking; see survey form for a list of behaviour codes) and any signs of distress (e.g. sinking or stuck in the basin of the LLCF). Immediately report any signs of distress to Wildlife Advisor or Team Leader. e) Comments should contain a note if any photos were taken and any pertinent comments related to unusual behaviour or anything else out of the ordinary. Take photos of interesting wildlife/wildlife sign observations and all wildlife in distress. Save only the best or most representative photo on SharePoint with the following naming conventions yyyy-mm-dd Cell X Subject (e.g. wolf track).
5	Return to the Wildlife Technician office and enter data collected into the corresponding Excel spread sheet on SharePoint. Have the Wildlife Tech who did not enter the data complete QA/AC and scan the completed form and save on SharePoint.

GENERAL REMARKS

Small particle processed kimberlite from the process plant is deposited in the LLCF. The kimberlite enters the LLCF suspended in water and eventually settles out and dries, taking on the consistency of fine, hard sand. Concern has been expressed that wildlife may become trapped in the processed kimberlite or sick form ingesting processed kimberlite.

Specific objectives are to determine:

- To document the presence of wildlife on or adjacent to the LLFC and any behaviours being exhibited.
- To determine relative presence of wildlife on and around the LLCF and any indications of how they are using the LLCF.

Time Requirements: 2 hours

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

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Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
DOCUMENT OWNER	Laura Corey		2017-11-16
DOCUMENT APPROVER	Harry O'Keefe		2017-10-31

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Work Instruction

EKA WI.2115.18 Active Pit Bird Monitoring

Version:	1.2
Replaces:	1.1
Creation Date:	2022-03-09
Scheduled Review Date:	2024-03-09
Review Date:	N/A
Document Team Members:	Team Leader – Environment Operations Environment Advisor – Wildlife
Document Owner:	Wildlife Advisor
Document Approver:	Wildlife Advisor
Related Documents:	N/A
Key Contacts:	Team Leader – Environment Operations Wildlife Advisor
Change Requests:	Wildlife Advisor
Brief Description:	Monitoring Active Pits to Identify and Prevent Nesting Activity

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TASK DESCRIPTION:

Monitor active pits and the surrounding location to document, track and deter all bird activity including nesting activity, resting or hunting. Every effort must be made to identify and deter any bird investigating active pits. This region should be made as unwelcoming to ravens and raptor species as possible. This is done through the use of physical barriers to high quality habitats and pyrotechnic devices (flares) and non-pyrotechnic devices (bangers & screamers).

HSE INFORMATION / SAFETY RISKS:

- Working in Active Mining Area
- Working at Heights (on or near the Pit high wall)
- Wildlife encounters
- Heavy equipment and other traffic
- Blasting
- Operating Deterrent Devices
- Aggressive birds
- Poor Communication
- Fatigue management H
- Hearing or Vision damage

ADDITIONAL RESOURCES REQUIRED:

- Binoculars
- Spotting scope and tripod
- Grid map of the pit
- SLR camera with zoom lens
- GPS
- Tablet
- Bird identification field guide
- PPE
- Ear protection
- Digital camera / video camera
- Bear bangers and screamers/flares
- Ropes with flagging tape
- Metal mesh netting
- Radio
- Eagle effigies

WORK PREPARATION:	
Item	Task Description
1	Know the cliff nesting bird species that you may encounter during a survey. Historically, birds found nesting on the pit walls are the: rough-legged hawk (RLHA; *Buteo lagopus*), peregrine falcon (PEFA; *Falco peregrinus tundrius*), gyrfalcon (GYRF; *Falco rusticolus*), and common raven (CORA; *Corvus corax*). Other species that may be encountered are: golden eagle (GOEA; Aquila chrysaetos), bald eagle (BAEA; *Haliaeetus leucocephalus*), merlin (MERL; *Falco columbarius*) and American kestrel (AMKE; *Falco sparverius*). The wildlife office has Bird Identification books for carrying into the field along with lamented bird photos. There is also a PPT show on SharePoint that is good for becoming familiar with the key species.
2	Review work instructions for the different deterrents you may be required to use (as listed in the 'Additional Resources Required' section) and obtain sign off for use when necessary.
3	Review and sign off on completed Group JHA for Pit wall monitoring. Specifically, the JHA should outline the process to fire deterrents at the pit (inside or on perimeter) as it relates to the significant risk around loaded blasting patterns. The Superintendent of Surface Mining must have signed off on this Group JHA

WORK EXECUTION STEPS:	
Item	Task Description
1	Be familiar with the locations of the pits and other mining infrastructure that may host nesting birds and the standard protocol on how to access these locations.
2	Complete a Personal Safety Card for bird monitoring including the possible use of deterrents. Upon entering the active pit or at Impact Meeting, speak with Pit Team Leader about your schedule for the day and discuss any concerns with applying deterrents in and around the pit during the day. The Pit Team Leader must sign off on the employees PSC if deterrents are used. Follow the direction of the Pit Team Leader as well as the process to use deterrents in and around the pit referenced in the Group JHA. The pit Team Leader may request that you are escorted through the high traffic areas of the Pit.
3	Travel to the survey locations specified. Stop at vantage points around the top of the pits. Get out of vehicle to make initial observations / scans of the pit, ensure to keep at least 2m from the edge of the pit and never cross over berms.
4	Continuously monitor for bird activity with a focus on identifying potential nests and any suspected nesting activity. Potential nesting activity includes a bird that stays around the pit or a nest site. Nesting activity includes defensive behaviour, carrying food or sticks, prospecting for sites, and a nesting bird on a nest or a ledge. ***Beware:*** *Once the birds start collecting sticks, it will not take long before a nest is complete and thus protected, potentially jeopardizing mining operation. In the case of peregrine falcons, they do not even collect sticks, but lay their eggs on the cliffs and thus achieving protection even faster. Hence diligent monitoring of bird activity is essential for timely intervention!*

WORK EXECUTION STEPS:

5 **Nest Identification and buffer determination applied to active nests within a pit**

Identify and record the grid number for a potential nest using the map. One way to locate a nest is to look for white wash on the walls or follow a flying bird to their nesting location. Use of a spotting scope is recommended when a potential nest is found. For identification purposes, use a scope when a bird is spotted perched on a pit wall.

1. Understand that the “buffer” is applied vertically and horizontally from the point of where the potential nest is on pit wall.
   a. Ravens sometimes have food caches along pit walls – ensure enough monitoring time has been put in to determine if they are in fact food caches or if they are starting to look for and build nest in that area.
   b. Common signs are carrying sticks/nest building materials in mouth – they may use a nest built from previous years, birds will sometimes sit for periods of time in a certain area.
2. Once you have a location of an area that the bird has been showing lots of interest in, try to determine whether that nest will be in a potential “blast” zone.
   a. Take a photo of that area, showing identifying rock features, certain benches etc. This will help the surveyors determine exactly where the possible nest site is within the pit.
   b. If possible, take a zoomed in photo of the “nest site” this can help scalers when they are up close to ensure accuracy of placing the fencing on the wall.

   c. On maps, place an x where you think the exact nest is on the pit wall. If not completely sure circle the area you think the nest could be. This can help scalers pinpoint the nest. Use grid lines to plot on map and then narrow down on map within the grid quadrants.
   d. When marking the maps in the field use different color markers – ensure that you mark the date and species of possible nest sites. This helps with tracking and data management.
   e. Save pictures with dates and species codes in SharePoint (WEMP Photos→ Pit Wall Nest Monitoring).

3. Communicate with workers within the pit if there has been lots of bird activity, especially when nesting season starts to pick up with the nicer weather. Enviro team members may not be able to get out to the pit every day so this can help identify hot spots faster.
4. Move around the pit to get better vantage points – look for possible crevices
   a. Peregrine falcons like flat benches 200-300 m off ground, used to create “scrapes” and may sometimes use old raven nests.
   b. Gyrfalcon will use old raven nests, eagle nests and “scrapes”.
   c. The falcons do not build nests, rather they use old existing structures/spots.
   d. Ravens will use a variety of materials to build nests – fine twigs, fur, bark, rags, feathers, wool, metal wires, rope, plant fibers and paper. They may show a lot of interest in the back of pick up trucks and

WORK EXECUTION STEPS:	
	other equipment that may be working in the pit. So be mindful of them hovering around vehicles as this may be a good indicator of them looking for nest building materials, not just food.
6	Take photos of potential nesting sites. Ensure to identify the location on the grid map and, if possible, capture landmarks in the photograph so that cross-shifts and scalers can easily locate where the photograph was taken from.
7	When a potential nest or suspected nesting activity is observed, use one of the available deterrent methods (as listed in the 'Additional Resources Required' section). Use of all deterrents should be minimized and restricted to use when birds are in the pit or outside of the pit, and their use should be discontinued once birds react and leave the pit or area around the pit. Birds are likely to become desensitized to deterrents when deterrents are overused because birds no longer perceive them as a threat. Record all deterrent use on the datasheet as well as if/how the bird responded to the deterrent (i.e., whether it fly out of the pit, off the potential nesting ledge etc.). For use of deterrents (bear bangers/screamers/flares), use the below instructions: a) Communication: Notify the Pit Team Leader prior to each use of deterrents and ensure you are approved to deploy in a given area (e.g., no safety concerns due to loaded blast pattern). b) Preparing the equipment: Have ear protection ready. c) Visually assess area for people working in the area. d) Control direction of deterrents and never point towards people. e) NEVER use deterrents from inside a vehicle.
8	Record all bird activity within or near the pit (focus on birds showing interest in the pit) including active nests, along with the other required information as outlined in the Pit Monitoring survey form using the tablets. For details on tablet data entry, please refer to the Pit Monitoring Data Entry Cheat Sheets (located here).
9	Report all nesting activity to the Environment Team Leader and once back in the office upload data from the tablet, complete the daily email summary for pit monitoring with a **focus** on potential problems for mine operation, e.g., nesting/nesting behaviour, and actions for solving them, i.e., deterrent application, scaler activity. a) Open email template found here b) Update date in Subject line c) Enter high-level summary of your collected data today - We only send one daily email so be sure that you have information/data for both Pigeon and Sable pit - Fill out the two pit tables by summarizing your findings of the day focusing on active nests identified or behaviour of concern - Add/delete columns to the table(s) as needed - If no active nests or behaviours of concern were identified during the day, you can just replace the table(s) with a quick sentence stating as much d) Press Send The daily email is sent to distribution list "DL-DDC-ENVIRO-BIRD-MONITORING <DL-DDC-ENVIRO-BIRD-MONITORING@arcticcanadian.ca>" and provides information to the Environment Dept., Surface Mining, and the Geo Techs about daily bird activity, deterrent use, as well as scaler and Geotech needs for scaling work as part of nesting deterrence.

WORK EXECUTION STEPS:

10	Video Recording of Active Nests: If an active nest is observed, ensure the Pit Team Leader is notified immediately. Eggs cannot be disturbed once located in a nest. Depending on the location, it may impact blasting activities. Next ensure the Environment Team Leader is notified of the active nest and its location. Once an active nest is observed it may be necessary to video tape the nest during a blast. Two video cameras are available in the Environment Lab to complete video monitoring. The object is to record the active nest for a short period prior to, during and for a short duration following a blast. The location to film should be scouted out well in advance and in discussion with the Pit Team Leader. Ideally the camera should be protected during the blast using the pit blasting bell often located on the pit ring road at an accessible viewing location. Also, it is recommended to record a brief video of the nest and review the location to ensure it will be suitable for monitoring (i.e., the zoomed in frame extent and other filming considerations). The Camera should have a full battery and ensure video camera settings are set to record for at least one hour after deployment of video camera. Generally, the camera should be turned on to record fairly close to the point at which the pit is to be cleared for the blast. It is essential the crew doing the filming is in close contact with the Pit Team Leader to establish these time lines, but should not go past the time given to clear the blast zone. Once the camera is on and the crew is clear of the blast zone, contact the Pit Team Leader to relay your location and status. Once the blast has been initiated and the pit cleared for re-entry, the video camera may be retrieved. Review of the video from the monitoring should occur quickly (on the day or following day) and the details provided to the Environment Team Leader and Wildlife Advisor. Ensure the camera battery is recharged following any camera work as well as the card being cleared for the next recording session. The video should be downloaded to an approved location that is backed up (contact Environment Team Leader and or Wildlife Advisor for more information).

GENERAL REMARKS

In natural habitats peregrine falcons, gyrfalcons, rough-legged hawks, and common ravens nest on ledges and precipitous cliff faces. Open pit walls at Ekati resemble steep sided ledges and offer attractive nesting locations. Cliff nesting birds have also been observed nesting on ledge-like structures such as cairns, towers, mining dredges and bridges. Attracting cliff nesting birds to pit walls is a concern, particularly for birds that have conservation status, such as the peregrine falcon.

If a nest with eggs is established, all deterrent use on those birds must immediately stop.

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Versioning and Revision Tracking

REVISION NUMBER	PAGE NUMBER	CHANGE EFFECTED	DATE OF CHANGE	WHO MADE THE CHANGE

Appendix

Approval Signatures Record

ROLE	NAME	SIGNATURE	DATE
REVIEWER			
DOCUMENT OWNER			
DOCUMENT APPROVER			

Appendix B Data Entry Forms

Appendix B1: Landfill Monitoring Data Form

Date (YYYY-MM-DD)	**Amount of Attractant** CODES: **A**=none; **B**=low (1 piece); **C**=medium (2-5 pieces); **D**=high (6-10 pieces); **E**=very high (>10 pieces)							**Attractant Removed** (Y/N/X = no attractant)	**Wildlife Sign** (**V**=visual, **SC**=scat, **T**=track, **C**=chew, **H**=hair or **O**=other, X=No sign)	**Species** (**WV**=wolverine; **WF**=wolf; **GB**=grizzly; **RF**=red fox; **AF**=arctic fox; **SF**=silver fox; **CF**=cross fox; **UF**=unknown fox; **CORA**=common raven; **GULL**=unknown gull; **AH**=hare; **U**=unknown, **X**=No data)	**Number of Animals** (Number or U=unknown)	**Behaviour** (Provide details about what the animal was doing; body condition; abnormal behaviour)	**Describe Attractants**	**Describe Actions to Address Problem. If reported, name of person issue was reported to and general comments**	**Photos Taken** (Y/N)	**Data Entered by:**	**QC/QA by:**
	Food	**Food Packaging**	**Oil Product Containers** (Oil Products)	**Oil Impacted Waste** (Oily Rags)	**Aerosol Cans**	**Batteries**	**Other** (define in comments)										

Appendix B2: Waste Bin Wildlife Attractant Data Form, Page 1 of 2

2021WASTE BIN PART I (Part II on next sheet)		Attractant Summary (NOTE: one line for each bin observed with attractants)																Data Entry	
												Wildlife Observations							
Location (E=EKATI M=Misery, S=Sable)	**Date** YYYY-MM-DD	**Bin Location (PP=Process Plant; UG=Underground; SB=SB Building; PH=Power House; TS=Truck shop; FFF=Fox Fuel Farm M=Misery MFF=Main Fuel Farm KH=Koala Heavy Haul CS=Carpenter Shop**	**Bin Type** (M=Metal, OR=Oily Rags, L=Landfill, A=Aerosol, FW=Food Waste, PWP=Paper/Wood/Plastics, CSO=Contaminated Soil, CSN-Contaminated Snow, P=Plastics)	**Food**	**Food Packaging**	**Oil product Containers**	**Oil Impacted Waste**	**Aerosol Cans**	**Plastics**	**Other** (i.e., cig pack, washer fluid container, etc.)	**Attractant Removed** (Y/N/X)	**Wildlife Sign** (V=Visual, T=Track, S=scat, X=no sign)	**Species**	**No.**	**Behavior** (e.g. anything animal is feeding on, unusual behavior; X=no data)	**Photo Taken** (Y/N)	**Comments:** e.g. Describe any other action taken to address problem (employee education, notice, etc.), describe wildlife signs	**Data Entered by:**	**QC / QA**

Appendix B2: Waste Bin Wildlife Attractant Data Form, Page 2 of 2

Location (E=EKATI M=Misery, S=Sable)	Date	Total Number of Bins Surveyed												Total Number of Bins with Attractants											
	YYYY-MM-DD	Metal	Oily Rags	Landfill	Aerosol	Food Waste	Paper, Wood, Plastic	Contam. Soil	Contam. Snow	Batteries	Plastics (washer fluid Containers)	Dangerous Goods	Bulbs	Total	Metal	Oily Rags	Landfill	Aerosol	Food Waste	Paper, Wood, Plastic	Contam. Soil	Comtam. Snow	Plastics (washer fluid Containers)	Bulbs	Batteries	Dangerous Goods	Total

Appendix B3: Wildlife Incident Data Form, Page 1 of 2

Date YYYY-MM-DD	**Time** (hh:mm)	**Species**	**No. #**	**Age**	**Condition** (H=healthy; P=poor condition; W=wounded; U=Unknown, X= No Data)	**Sex** (**M**=male, **F**=female, **MF**=male and female, **FF**=female and female, **U**=unknown, **UUU** = 3 unknown, etc., X=no data	**Dominant Behaviour**	**Deterrent Used?** (Y/N)	**Type of Incident** (**INT**=interaction with field crew; **V**=vehicle; **A**= aircraft; **MIF**=mine infrastructure; **M=**Wildlife Mortality, **X**=No Incident)	**Type of Deterrent**	**# of deterrents used** (**X**=No deterent used)	**Describe Incident** (i.e., events leading up to interaction or deterrent use, distance from animal to deterrents, distance moved after deterrent use)	**ENR, Wildlife Advisor or Team Leader's Direction?**

Appendix B3: Wildlife Incident Data Form, Page 2 of 2

Date YYYY-MM-DD	**Time** (hh:mm)	**ENR contacted?** (Y/N)	**Work Stoppage** (Y/N)	**Duration Work Stopage** (hh:mm)	**Photo Taken** (Y/N)	**Location** (name of location or grid cell)	**UTM East**	**UTM North:**	**Outcome?**	**Comments** (i.e., unusual observation; health of animal; reported to Team Leader?)	**Data entered by:**	**QC/QA by:**

Appendix B4: Wildlife Mortality Data Form

Date (YYYY-MM-DD)	**Species** (WF=Wolf; WV=Wolverine; GB=Grizzly Bear; FX=fox; AH=Arctic Hare; CB=Caribou; MO=Moose; if bird provide 4 letter species code)	**Number**	**Age**	**Sex**	**Location** (name or grid cell)	**UTM East:**	**UTM North:**	**Cause of Death** (N=natural; P=predator; H=human caused, U=unknown)	**Vehicle Related Morality (Y/N or U (unknown)**	**Photo (Y/N)**	**General Comments** (any relevant information: e.g. caller ID, time, circumstances)	**Follow-up** (reported to ENR,WL Advisor and or TL etc,)	**Data entered by:** (initials)	**QC/QA:** (initials)

Appendix B5: Accommodation Skirting Data Form

Date (YYYY-MM-DD)	**Location: E** (EKATI) or **M** (Misery)	**Holes in skirting** (Y/N)	**Hole or Track location** (**EKATI**: A, B, C, D, E, F, G, H Wings, gym, cafeteria, STP, first aid) (**MISERY**: Accommodation Wings, Rec area, first aid, kitchen), **X**=no data	**Tracks Observed** (Y/N)	**Species of Animal** (**WV**=wolverine; **WF**=wolf; **GB**=grizzly; **RF**=red fox; **AF**=arctic fox; **SF**=silver fox; **CORA**=common raven; **CF**=cross fox; **UF**=unknown fox, or X=No Data)	**Photo**	**Reported (Y/N/NA)**	**Comments: I.e Photos, reported to, follow-up. Coordinates of hole or damage**	Data Entered by:	QC/QA by:

Appendix B6: Fence Inspection Data Form

Date YYYY-MM-DD	**Fence Surveyed** A=Airport M=Misery	**Damage Observed** (Y/N)	**Damage Repaired** (Y/N)	**Damage Reported** (Y/N/NA)	**Wildlife Sign** (**V**=visual, **SC**=scat, **T**=track, **CH**=chew, **H**=hair, **D**=digging, **O**=other **X**=No sign)	**Species** (**CB=** Caribou**, WV**=wolverine; **WF**=wolf; **GB**=grizzly; **RF**=red fox; **AF**=arctic fox; **SF**=silver fox; **CF**=cross fox; **UF**=unknown fox; **AH**= arctic hare; use 4 letter code for birds; **U**=unknown, **X**=No Data)	**Number of Animals** (Number or U for unknown)	**Comments:**Details, photos taken, who damage was reported to, followup, coordinates of damage	**Data entered by (Initials)**	**QC/QA by**

Appendix B7: Wildlife Management Tracking Data Form

Date (YYYY-MM-DD)	Time	Species	Activity (Site Wide Notification, Signage Posted, Road Closure, Presentation, Blast Postponed, Blast Cancellation, Training)	Description of Notice/Signage/Road Closure (who, what, where, why, how)	Date Removed (if applicable)	Time Removed (if applicable)	Length of Time	Photo Taken (Y/N)	Photo File Name YYYY/M M-DD-location-subject	Additional Comments (problems, improvements opportunities, etc.)	Entered by:	QA/QC by:

Appendix B8: Incidental Caribou and Mammal Observation Data Form, Page 1 of 2 - Caribou

Date (YYYY-MM-DD)	**Total Number**	**Bulls**	**Cows**	**Calves**	**Yearling**	**Unknown**	**Location** (grid cell or infastructure name)	**UTM East:** (if no GPS location, must provide grid cell)	**UTM North:**	**Distance to sighting from waypoint** (m)	**Direction to sighting from waypoint** (N E S W SE SW NE NW)	**Corrected UTM EAST**	**Corrected UTM North**	**Dominant Behaviour** (**B**=bed; **BA**=bedded alert; **F**=feed; **S**=stand; **SA**=stand alert; **W**=walk; **T**=trot; **R**=run **U=**Unknown, **H**=Hunting, **X**=No Data)	**Caribou Behaviour Survey Completed** (Y/N)	**Photo Taken** (Y/N)	**Comments**	**Wildlife Incident/ Accident Report Filed** (Y/N) If YES, complete ***Wildlife Incident Form***	**Data entered by:**	**QC/QA by:**	**Photo Name**

Appendix B8: Incidental Caribou and Mammal Observation Data Form, Page 2 of 2 - Other Mammal

Date (YYYY-MM-DD)	**Species**	**Number**	**Sex** (**M**=male, **F**=female, **MF**=male and female, **FF**=female and female, **U**=unknown, **UUU** = 3 unknown)	**Age** (**A**=adult; **C**=cub; **AC**=adult and cub; **CC**=cub and cub; **U**=unknown; etc. **X**= No data	**Location** (if no location name or grid cell must provide UTM Coordinate)	**UTM East:**	**UTM North:**	**Distance to sighting from waypoint** (m)	**Direction to sighting from waypoint** (N E S W SE SW NE NW)	**Dominant Behaviour** (**B**=bed; **BA**=bedded alert; **F**=feed; **S**=stand; **SA**=stand alert; **W**=walk; **T**=trot; **R**=run **U**=Unknown, **H**=Hunting, **X**=No Data)	**Condition** (**H**=healthy; **P**=poor condition; **W**=wounded; **U**= unknown, **X**= no data)	**Photo Taken** (Y/N)	**Photo Name**	**Comments** (i.e., unusual observation; health of animal; reported to Team Leader?)	**Wildlife Incident/ Accident Report Filed** (Y/N) If YES, complete ***Wildlife Incident Form***	**Data entered by:**	**QC/QA by:**

Appendix B9: Road Monitoring Data Form

Date (YYYY-MM-DD)	**Surveyor**	**Start Time**	**End Time**	**Road Name** (**M**=Misery, **S**=Sable, **L**=Lynx, **J**=Jay/Lac du Sauvage **LDS**)	**Direction of Travel** (**S=southbound, N=northbound**)	**Wildlife Sign** (**V**=visual, **T**=caribou track)	**Feature** (**R**= Road, **T**=Tundra, **O**=Other, **X**=No Data)	**UTM EAST**	**UTM NORTH**	**Distance** (m) **and Direction** (N, SE, etc)	**No. of Animals**	**Bull**	**Cow**	**Calf**	**Yearling**	**Unk**	**Within 500 m of Road (Y/N)**	**Signs of Distress (Y/N)** (e.g., deflection hesitation etc)	**Dominant Behavior** (B=bedded, BA=alert, F=feeding, R=running, S=standing, SA=standing alert, T=trotting, W=walking)	**Caribou Behavior survey completed** (Y/N)	**Photo (Y/N)**	**Comments**	**Data entered by (Initials)**	**QC/QA by**

Appendix B10: Caribou Behaviour Monitoring Data Form - Focal Survey, Page 1 of 2

Date (yyyy-mm-dd)	**Arrival time** (24 hr clock)	**Observer**	**Recorder**	**Cloud (%)**	**Temp (ºC)**	**Precip.** (none, light mist, rain, snow)	**Wind speed** (km/hr)	**Wind direction** (N E S W SE SW NE NW)	**Snow cover (%)**	**# of head shakes**	**# of skin shudders**	**# of scratches**	**Describe other evidence of insect harassment**	**Habitat (HT=Heath Tundra, BO=Boulder, EC=Esker Complex, SW=Sedge Wetland, DS=Disturbed Site)**	**Nearest mine related structure (R=Road; P=Pit; T=Tailings; A=airstrip; B=building; O=other)**	**Name of Structure** (if known)	**Distance to Mine Related Structure (R, pit, etc.) (m)**	**Location UTM east**	**Location UTM north**	**Distance to caribou** (m)	**Direction to caribou** (N E S W SE SW NE NW)	**Total Group Size** (#)	**Cows**	**Bulls**	**Yearling**	**Calves**	**Unknown**	**Animal #**	**Sex (M/F)**	**Age (adult, juv, calf)**

Appendix B10: Caribou Behaviour Monitoring Data Form - Focal Survey, Page 2 of 2

Date (yyyy-mm-dd)	**Arrival time** (24 hr clock)	**Observer**	**Recorder**	**Start Time**	**End Time**	**Survey Completed (Y/N)** (minimum 20 min. if no stressors)	**Time of observation**	**Feed**	**Walk**	**Alert**	**Stand**	**Trot**	**Run**	**Bed**	**Other**	**Stressor**	**Time Stressor Started** (min)	**Time Stressor Ended** (min)	**Distance to stressor** (m)	**Comments**	**Reason(s) why survey not completed**	**Survey Type (Focal or Scan)**	**Focal Animal**	**Data entered by** (initials)	**QC/QA by** (initials)	**Behavourial Survey #**

Appendix B10: Caribou Behaviour Monitoring Data Form - Scan Survey, Page 1 of 2

Date (YYYY-MM-DD)	**Arrival time** (24 hr clock)	**Observer** (first, last name)	**Recorder** (first, last name)	**Cloud (%)**	**Temp (ºC)**	**Precip.** (none, light mist, rain, snow)	**Wind speed** (km/hr)	**Wind direction** (N E S W SE SW NE NW)	**Snow cover (%)**	**# of head shakes**	**# of skin shudders**	**# of scratches**	**Describe other evidence of insect harassment**	**Habitat**	**Nearest mine related structure** (**R**=road; **P**=pit; **T**=tailings; **A**=airstrip; **B**=building; **O**=other)	**Name of Structure** (if known)	**Distance to Mine Related Structure** (road, pit, etc.) (m)	**Location UTM east**	**Location UTM north**	**Distance to caribou** (m)	**Direction to caribou** (N E S W SE SW NE NW)	**Corrected UTM east**	**Corrected UTM north**	**Total Group Size** (#)	**Cows**	**Bulls**	**Yearling**	**Calves**	**Unknown**	**Group #**	**Animal # Surveyed**

Appendix B10: Caribou Behaviour Monitoring Data Form - Scan Survey, Page 2 of 2

Date (YYYY-MM-DD)	**Arrival time** (24 hr clock)	**Observer** (first, last name)	**Recorder** (first, last name)	**Sex (M/F/U)**	**Age (adult, juv, calf)**	**Start Time**	**End Time**	**Duration (minutes)**	**Survey Completed (Y/N)** (minimum 32 min. if no stressors)	**Time of observation**	**Feed**	**Walk**	**Alert**	**Stand**	**Trot**	**Run**	**Bed**	**Other**	**Stressor**	**Time Stressor Started (min)**	**Time Stressor Ended (min)**	**Distance to stressor** (m)	**Reaction to Stressor (Y/N)**	**Comments**	Data entered by (initials)	QC/QA by (initials)	Behavioural Survey #

Appendix B11: LLCF Wildlife and Bird Survey Data Form, Page 1 of 3 - Mammals

Date (YYYY-MM-DD)	**Species of Animal** (**CB**=caribou; **WV**=wolverine; **WF**=wolf; **GB**=grizzly; **FX**=fox; **UF=UNK FOX**; **AH**=Arctic Hare **Use 4 letter code for Birds**)	**Number of Animals** (# or X=no data, U=unknown)	**Wildlife Sign** (**V**=visual, **T**=track, **X**=No Sign)	**Cell where animal Observed** (A, B, C, D or E, **X**=No Data)	**Feature** (**D** = On Dyke, **B** = In Basin, **R** = Road, **T** = Tundra, **O** = Other, **X**=No Data)	**Grid Map Number**	**UTM East**	**UTM North**	**Distance to sighting from waypoint** (in meters; X=no data)	**Direction to sighting from waypoint** (N, E, S, W, SE, SW, NE, NW, X=No data)	**Dominant Behavior** (**B**=bed; **BA**=bedded alert; **F**=feed; **S**=stand; **SA**=stand alert; **W**=walk; **T**=trot; **R**=run or **X**=No data)	**Signs Distress** (Y/N or X=No data; if YES explain in comments)	**Photo Taken** (Y/N)	**Comments**	**Data entered by:**	**QC/QA by:**

Appendix B11: LLCF Wildlife and Bird Survey Data Form, Page 2 of 3 - Caribou

Survey Date (YYYY-MM-DD)	**Wildlife Sign** (**V**=visual, **T**=track, **X**=No Sign)	**Cell where animal Observed** (A, B, C, D or E, **X**=No Data)	**Feature** (**D** = On Dyke, **B** = In Basin, **R** = Road, **T** = Tundra, **O** = Other, **X**=No Data)	**Grid Map Number**	**UTM East**	**UTM North**	**Distance to sighting from waypoint** (m)	**Direction to sighting from waypoint** (N E S W SE SW NE NW, X=No data)	**Number of Animals** (# or X=no data, U=unknown)	**Group Composition of Caribou**					**Signs Distress** (Y/N or X+ No data if Y explain)	**Dominant Behavior** (**B**=bed; **BA**=bedded alert; **F**=feed; **S**=stand; **SA**=stand alert; **W**=walk; **T**=trot; **R**=run or **X**=No data)	**Caribou Behaviour Survey Completed Y/N**	**Photo Taken** (Y/N)	**Comments**	**Data entered by:**	**QC/QA by:**
										Bull	**Cow**	**Calf**	**Yearling**	**Unk**						

Appendix B11: LLCF Wildlife and Bird Survey Data Form, Page 3 of 3 - Birds

Survey Date (YYYY-MM-DD)	**Species of Bird:** Use 4 letter code for Birds; see incidental bird data sheet	**Number of Adults** (# or X=no data, U=unknown)	**Cell where animal Observed** (A, B, C, D or E, **X**=No Data)	**Feature** (**D** = On Dyke, **B** = In Basin, **R** = Road, **T** = Tundra, P=Pond, **O** = Other, **X**=No Data)	**Grid Map Number**	**UTM East**	**UTM North**	**Distance to sighting from waypoint** (m)	**Direction to sighting from waypoint** (N E S W SE SW NE NW, X=No data)	**Dominant Behavior** (**F**=feed; **FL**=Fly; **S**=stand; **W**=walk; **SW**=Swim, **R**=rest or **X**=No data)	**Breeding Activity (Y/N)**	**Brood (Y/N)**	**Brood Size**	**Photo Taken** (Y/N)	**Comments**	**Data entered by:**	**QC/QA by:**

Appendix B12: Incidental Bird Observation Data Form, Page 1 of 2

Date (YYYY-MM-DD)	**Species** (see Species Codes on next sheet)	Number #	Description of Location	Map Grid Cell	UTM Easting	UTM Northing	Habitat (**BE**=bedrock, **BO**=boulders>80%, **DS**=Disturbed Site, **EC**=esker complex, **HT**=heath tundra, **IC**=ice, **LA**=lake, **RB**=riparian birch, **SF**=spruce forest, **ST**=snow covered tundra, **SW**=sedge wetland)	Breeding Evidence (**C**=copulation, **DD**=distraction display, **DI**=display, **FC**=food carry, **FL**=fledgling, **MC**=material carry, **NF**=nest found, **PA**=pair, **N**=none, **TE**= Territorial)	Behaviour (**Br**=breeding, **For**=forage, **Fly**=flying, **Hunt**=hunting, **Nest**=nesting, **Rest**=resting, **Swim**=swimming)	Photo Taken (Y/N)	Comments	**Data entered by:**	**QC/QA by:**

Appendix B12: Incidental Bird Observation Data Form, Page 2 of 2 - Species Key

Birds In the EKATI Study Area			
Waterfowl		**Waders**	
American Black Duck	ABDU	American Golden Plover	AGPL
American Wigeon	AMWI	Baird's Sandpiper	BASA
Black Scoter	BLSC	Least Sandpiper	LESA
Blue-winged Teal	BWTE	Lesser Yellowlegs	LEYE
Brant	BRAN	Pectoral Sandpiper	PESA
Bufflehead	BUFF	Red-necked Phalarope	RNPH
Cackling Goose	CACG	Ruddy Turnstone	RUTU
Canada Goose	CAGO	Semipalmated Plover	SEPL
Canvasback	CANV	Semipalmated Sandpiper	SESA
Common Goldeneye	COGO	Spotted Sandpiper	SPSA
Common Loon	COLO	Stilt Sandpiper	STSA
Common Merganser	COME	White Rumped Sandpiper	WRSA
Greater Scaup	GRSC	Wilson's Snipe	WISN
Greater White-fronted Goose	GWFG	**Passerines**	
Green-winged Teal	GWTE	American Pipit	AMPI
Lesser Scaup	LESC	American Robin	AMRO
Long-tailed Duck	LTDU	American Tree Sparrow	ATSP
Mallard	MALL	Blackpoll Warbler	BPWA
Northern Pintail	NOPI	Common Redpoll	CORE
Northern Shoveler	NSHO	Eastern Kingbird	EAKI
Pacific Loon	PALO	Grey-Cheeked Thrush	GCTH
Red-necked Grebe	RNGR	Harris's Sparrow	HASP
Red-throated Loon	RTLO	Hoary Redpoll	HORE
Redhead	REDH	Horned Lark	HOLA
Snow Goose	SNGO	Lapland Longspur	LALO
Surf Scoter	SUSC	Lincoln's Sparrow	LISP
Tundra Swan	TUSW	Orange-Crowned Warbler	OCWA
White-winged Scoter	WWSC	Savannah Sparrow	SAVS
Birds of Prey		White-Crowned Sparrow	WCSP
American Kestrel	AMKE	Yellow Warbler	YWAR
Bald Eagle	BAEA	Yellow-Rumped Warbler (Myrtle - MYWA)	YRWA
Golden Eagle	GOEA	**Seabirds**	
Great Horned Owl	GHOW	Herring Gull	HEGU
Gyrfalcon	GYRF	Long-tailed Jaeger	LTJA
Merlin	MERL	Parasitic Jaeger	PAJA
Northern Goshawk	NOGO	**Other**	
Northern Harrier	NOHA	Common Raven	CORA
Peregrine Falcon	PEFA	**Grouse and Cranes**	
Red-tailed Hawk	RTHA	Rock Ptarmigan	ROPT
Rough-legged Hawk	RLHA	Sandhill Crane	SACR
Short-eared Owl	SEOW	Unknown Ptarmigan	PTAR
Snowy Owl	SNOW	Willow Ptarmigan	WIPT

Appendix C WMMP Revisions Tracking Table

Appendix C: WMMP Revisions Tracking Table

Title of Document	Author	Date Submitted to GNWT	Version	Comments
Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan	Prepared for Dominion Diamond Ekati Corporation by Golder Associates Ltd.	March 2017	1	
Ekati Diamond Mine Wildlife Management and Monitoring Plan	Arctic Canadian Diamond Company	March 2023	3	

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