

**APPENDIX 25 2023 TERRESTRIAL ENVIRONMENT MANAGEMENT  
AND MONITORING PLAN REPORT**

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**REPORT**

**Agnico Eagle Mines Limited - Meliadine Division**

*2023 Terrestrial Environment Management and Monitoring Plan Annual Report*

Submitted to:

**Agnico Eagle Mines Limited**

Attention: Sara Savoie

Submitted by:

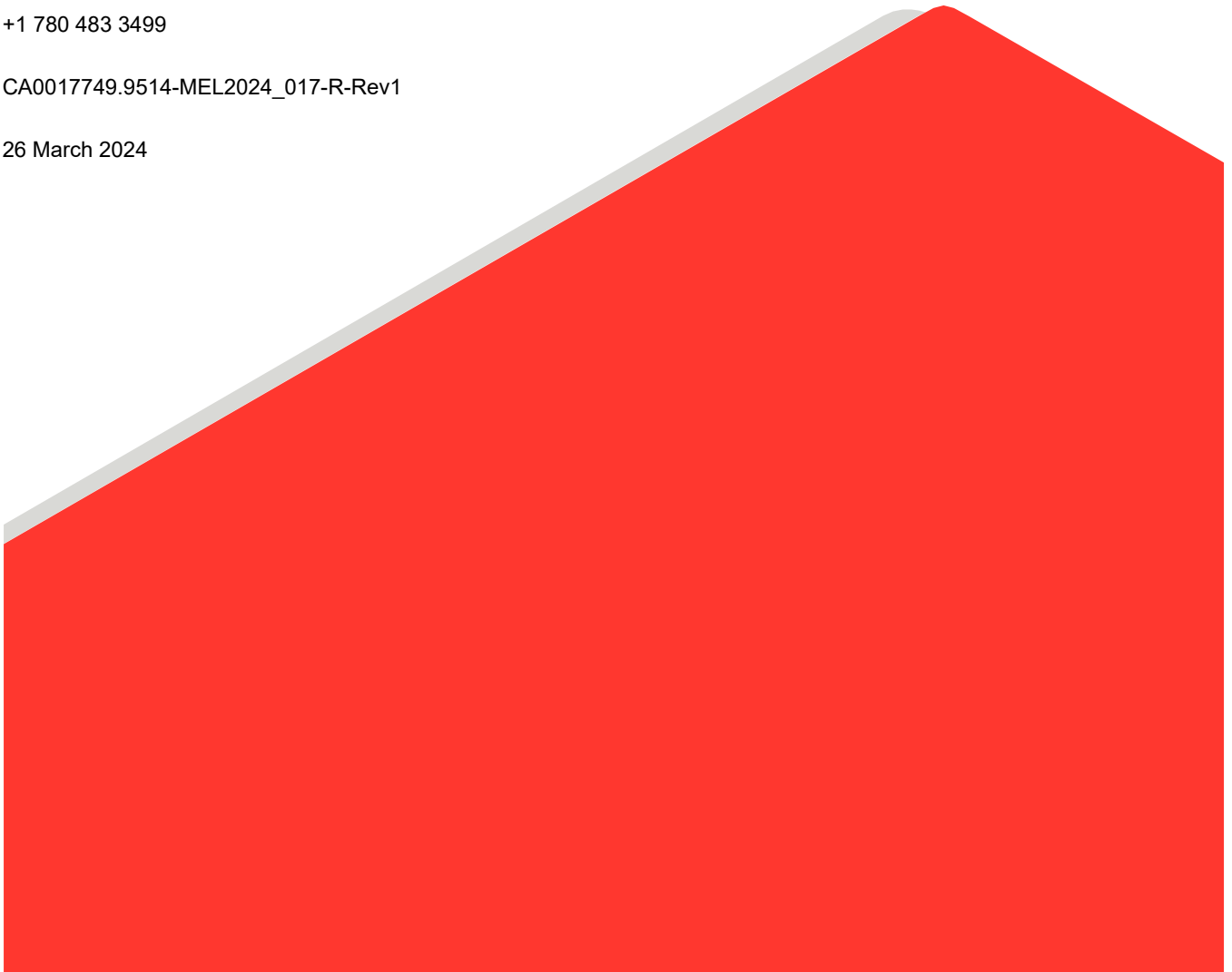
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26 March 2024



## Distribution List

1 Electronic Copy - Agnico Eagle Mines Limited

1 Electronic Copy - Nuqsana Golder

## Study Limitations

On behalf of Agnico Eagle Mines Limited (Agnico Eagle), Nuqsana Golder Engineering and Environmental Inc. (Nuqsana Golder) has prepared this Terrestrial Environment Management and Monitoring Plan (TEMMP) Annual Report for the 2023 Monitoring Period at the Meliadine Gold Mine near Rankin Inlet, Nunavut.

This report was prepared, based in part, on information obtained from Agnico Eagle and other external information sources. In preparing the report, WSP has relied in good faith on the information provided. We accept no responsibility for any deficiency or inaccuracy contained in this report because of our reliance on the aforementioned information.

The findings and conclusions documented in this report have been prepared for the specific application to this Project and have been developed in a manner consistent with that level of care normally exercised by environmental professionals currently practicing under similar conditions in the jurisdiction.

With respect to regulatory compliance issues, regulatory statutes are subject to interpretation. These interpretations may change over time and should be reviewed regularly.

If new information is discovered during future work, the conclusions of this report should be re-evaluated, and the report amended, as required, prior to any reliance upon the information presented herein.

## Executive Summary

The Agnico Eagle Mines Limited (Agnico Eagle) Meliadine Gold Mine (the Project or the Mine), received a Project Certificate (No. 006) from the Nunavut Impact Review Board (NIRB) in February 2015, and was amended in February 2019 (Amendment No. 001) and in March 2022 (Amendment No. 002). A Terrestrial Environment Management and Monitoring Plan (TEMMP) for the Project was prepared for submission with the Project Final Environmental Impact Statement (FEIS; Golder 2014, 2015) and forms a component of the documentation series produced in accordance with the Project, updated and submitted to the NIRB in April 2022 (TEMMP Version 4; Agnico Eagle 2022b). This report addresses requirements of the Terms and Conditions of the NIRB Project Certificate (No. 006), as relevant to the TEMMP.

The objectives of the TEMMP Annual Report are to summarize annual data collected from wildlife and vegetation monitoring programs, and to describe natural variation and potential Project-related effects to wildlife populations within and adjacent to the Project. The data was collected according to procedures and sampling or monitoring intervals outlined in the Project's Standard Operating Procedures (SOPs) and the TEMMP. The 2023 TEMMP Annual Report describes monitoring objectives and methods, 2023 survey results, mitigation activities, and management recommendations (i.e., adaptive management). The following summary documents monitoring information collected for the 2023 TEMMP for the Meliadine Project located in the Kivalliq Region of Nunavut.

### Incorporation of Inuit Qaujimaqatugangit

- In 2023, Inuit Qaujimaqatugangit (IQ) was collected during ten meetings, two site visits, and two cultural activities. Four local field assistants worked on site in 2023.

### Direct Habitat Loss

- Direct habitat loss is assessed every three years and was last assessed in 2021. The next assessment is scheduled for 2024.

### Indirect Habitat Loss

- Indirect habitat loss for caribou and wildlife habitat (soils and vegetation) is assessed every three years and was last assessed in 2022. The next full assessment is scheduled for 2025.

### Soil and Vegetation Monitoring

- Soil and vegetation health monitoring (dust and metals survey) is assessed every three years and was last assessed in 2022. The next full assessment is planned for 2025.

### Non-native Plants

- Non-native plant surveys were completed along the AWAR; no non-native plant species were detected.

## Environmental Variables

- The maximum annual temperature of 27.0°C was recorded on 5 August 2023 and the minimum annual temperature of -39.8°C was recorded for 4 days in January (27, 28, 29, and 30 January) and for 12 days in February (1, 2, 3, 5, 6, 17, 18, 19, 20, 21, 22, and 23 February) 2023. The mean annual temperature was -7.8°C. Total recorded annual precipitation was 188.8 mm and snowmelt began 8 May 2023 when the average daily air temperature exceeded 0°C. The green-up date for the RSA was estimated between 26 June and 12 July 2023, based on normalized difference vegetation (NDVI) values averaged across the RSA (obtained from MODIS VI satellite).

## Birds

### Shoreline Surveys

- A total of 36 nests of 13 species were detected in 2023.

### Point Counts

- Point count surveys could not be completed in 2023 due to road closures during the post-calving caribou migration. Point count surveys will be conducted in 2024.

### PRISM

- Only one PRISM survey plot was completed in 2023 due to road closures during the post-calving caribou migration. PRISM surveys will be continued in 2024.

### Raptors

- Arctic Raptors conducted a formal survey and analysis for all known raptor nesting sites in the entire regional study area (RSA) in 2023. The study design included two surveys: one to assess the location of occupied territories during the pre-incubation and incubation periods, and one to assess site productivity during the late brood rearing period. Occupancy models were used to determine influence of disturbance on nest occupancy for peregrine falcons and rough-legged hawks. The analyses did not find an effect of distance to disturbance on nest occupancy for either species.

### Pre-Clearance Surveys

- Nests from seven different bird species were observed during pre-clearance surveys. When applicable, a setback perimeter was applied.

## Wildlife Observations

### Wildlife Sighting/Track Surveys

- Wildlife sighting/track surveys were completed by Agnico Eagle personnel along the All-Weather Access Road (AWAR) and Mine infrastructure throughout the year.
- A total of 8,303 individuals from 16 identified wildlife species and 5 unidentified wildlife species groups (e.g., duck species [spp.], gull spp., loon spp., merganser spp., and ptarmigan spp.) were recorded during surveys along the AWAR in 2023.
- A total of 985 individuals from 12 identified wildlife species and 6 unidentified wildlife species groups (e.g., bird spp., duck spp., gull spp., loon spp., ptarmigan spp., and scaup spp.) were recorded during surveys at Mine infrastructure other than the AWAR in 2023.

### **Wildlife Incidentals**

- There were 142 incidental observations recorded, representing 242 individuals of 14 species and one species group (i.e., duck spp.), around the Mine site (including the camp area) and the AWAR in 2023.

### **Den Sites**

- Surveys were completed for the Project between May and August 2023 to locate dens of Arctic fox, grey wolf, polar bear, grizzly bear, and wolverine.
- Seven historical fox dens were revisited; no sign of activity was observed. A total of four new fox den locations were found in 2023. Of these dens, three were active with Arctic fox and one was active with Arctic ground squirrel (sik sik).

### **Bird Nests**

- Six incidental bird nests were observed on the Mine site or along the AWAR in 2023.

### **Incidents and Mortalities**

- A total of eight mortalities across six different species were reported at the Project from 9 June to 19 September 2023; all of these mortalities were suspected or confirmed to be caused as a direct result of Project activities. No caribou mortalities were reported in 2023.

### **Wildlife Deterrents**

- Wildlife deterrents (i.e., propane cannons and deterrent balloons) were implemented at five locations to deter birds from nesting on site. Active deterrence, including hazing of incidental observations of wildlife, were also completed by environmental technicians; all activities were successful.

### **Barren-ground Caribou**

#### **Caribou Behaviour Monitoring**

- Statistical analyses of 2020 to 2023 data found that caribou farther from infrastructure (i.e., greater than 300 m) displayed lower proportions of response behaviours.
- The proportion of response behaviours in caribou groups increased following disturbances, but behaviours usually returned to baseline levels within two sampling periods (i.e., within six minutes).
- Caribou displayed a greater likelihood of walking, alert, or running behaviours in surveys where there were disturbances such as vehicle traffic.

#### **Caribou Remote Camera Study**

- Between 2020 and 2023, a study was conducted using motion-triggered cameras to study caribou interactions with the Project infrastructure during their annual migration, focusing on the AWAR.
- The cameras were successful at capturing many caribou crossing the AWAR, with peak caribou passage occurring three weeks earlier in 2023 versus 2022, which was consistent with patterns of inter-annual variability observed in caribou global positioning system (GPS) collar data. Caribou crossing timing and locations in 2023 were consistent with locations identified from 2020 to 2022, and with locations identified by IQ from Inuit Elders and community members.

- Physical attributes of the road did not appear to influence crossing locations. More caribou were observed on cameras on the northern half of the road. Esker material is more common as a substrate on the northern half of the road, which might suggest caribou prefer crossing on esker material. However, it is more likely that this is due to broad scale caribou movement patterns.
- Caribou were detected in the Mine and Discovery areas throughout the study period, with small groups around the mine and larger migratory groups along the proposed Discovery Road.

### ***Collared Caribou Inventory***

- Individuals from the Qamanirjuaq herd have been present in the RSA for 16 of the 31 years where collar data are available. Since 2011, collared Qamanirjuaq caribou have typically entered the RSA in late June to mid-July and have remained in the RSA for 1 to 5 days.
- Individuals from the Qamanirjuaq herd have been present in the LSA for 15 of the 31 years where collar data are available. Collared caribou typically enter the LSA in early to mid-July and leave the LSA on the same day; some individuals enter the LSA several times over the course of one summer but remain in the LSA for a day or less during each interaction. The length of time Qamanirjuaq caribou are spending in the LSA has not varied since collared caribou began interacting with the LSA in 2006.
- Fewer than 30% of Qamanirjuaq caribou come within 5 km of the Project and 99% of caribou that came within 5 km of the AWAR or Mine for a specific year remained for less than 24 hours. In consideration of these results, impacts to the Qamanirjuaq herd due to the Project have the potential for limited transboundary effects.

### ***Caribou Advisory***

- Surveys to monitor migration of the Qamanirjuaq herd through the Project were performed from 16 January through 23 January and 30 May through 25 July. Closure of the Mine site and/or AWAR was triggered between 20 January and 21 January and between 11 June to 11 July.
- Shutdowns affecting different components of the Mine were implemented to facilitate the safe migration of caribou through the Project. The AWAR was closed for 386 hours across 26 days. Vehicle traffic on site and open pit operations were restricted for 281 hours across 20 days. Activities at the Exploration Camp were restricted for 81 hours across 5 days. Activities at the Main Camp were restricted shutdown for 264 hours across 18 days. Waterline work was cancelled for 296 hours across 28 days.
- Eleven flights were cancelled to mitigate disturbance to caribou on 19, 20, 21, 26, and 27 June as well as 6 and 7 July.

## Hunter Harvest

- The 2023 Hunter Harvest Study included 56 participants amongst which 37 reported harvesting caribou. A total of 483 caribou were reported as harvested in 2023.
- A total of 14 muskox, 3 wolverine, and 4 wolves were harvested in 2023. Other reported harvested terrestrial mammals included 1 Arctic hare and 4 polar bears. In the marine environment, beluga (45 individuals) was the most common species harvested followed by ringed seal (29 individuals), bearded seal (5 individuals), narwal (2 individuals), and walrus (2 individuals).
- More birds were harvested by Rankin Inlet participants in 2023 (202 birds) than in 2022 (136 birds), but fewer than in 2021 (394 birds). In 2023, Canada goose and snow goose were harvested at the highest levels and made up 45% of all harvest bird species. Common eider, gull spp., ptarmigan, sandhill crane, northern pintail, and tundra swan were also harvested.
- Arctic char (2,525 fish), lake trout (122 fish), and Arctic cod (54 fish) were the most common species caught by fisherman. Relatively small numbers of Arctic grayling (3 fish), lake whitefish (6 fish), and burbot (1 fish) were caught in 2023.

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## Acronyms

Acronym	Full Term
AI	Artificial Intelligence
AIC	Akaike Information Criterion
ATV	All Terrain Vehicle
AWAR	All-Weather Access Road
CCME	Canadian Council of Ministers of the Environment
CESCC	Canadian Endangered Species Conservation Council
ECCC	Environment and Climate Change Canada
ERM	ERM Consultants Canada Ltd.
FEIS	Final Environmental Impact Statement
GIS	Geographic Information System
GLM	Generalized Linear Model
GN	Government of Nunavut
GN DoE	Government of Nunavut Department of Environment
GNWT ENR	Government of Northwest Territories Department of Environment and Natural Resources
GPS	Global Positioning System
HHS	Hunter Harvest Study
HTO	Hunters and Trappers Organization
IOL	Inuit Owned Lands
IQ	Inuit Qaujimagatuqangit
KEAC	Kivalliq Elders Advisory Committee
KHTO	Kangiqliniq Hunters and Trappers Organization
KivIA	Kivalliq Inuit Association
LSA	Local Study Area
MOU	Memorandum of Understanding
N/A	Not Applicable
NIRB	Nunavut Impact Review Board
NRV	Natural Range of Variability
NWMB	Nunavut Wildlife Management Board
PRISM	Program for Regional and International Shorebird Monitoring
QA	Quality Assurance
QC	Quality Control
RPD	Relative Percent Difference
RIBR	Rankin Inlet Bypass Road
RSA	Regional Study Area
SARA	Species At Risk Act
SLRA	Screening Level Risk Assessment
SNU	Statues of Nunavut

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Acronym	Full Term
SOP	Standard Operating Procedures
spp.	Species
SQG	Soil Quality Guidelines
UAS	Unmanned aircraft system
UTM	Universal Transverse Mercator
TAG	Terrestrial Advisory Group
TBD	To Be Determined
TEMMP	Terrestrial Environment Management and Monitoring Plan
TEMMP Report	Terrestrial Environment Management and Monitoring Plan Annual Report
TK	Traditional Knowledge
ToR	Terms of Reference
VEC	Valued Ecosystem Component
WRSA	Waste Rock Storage Area
WSP	WSP Canada Inc.

## 1.0 INTRODUCTION

### 1.1 Background

The Agnico Eagle Mines Limited (Agnico Eagle) Meliadine Gold Mine (the Project), located in the Kivalliq Region of Nunavut (Figure 1), received a Project Certificate (No. 006) from the Nunavut Impact Review Board (NIRB) in February 2015 (with Amendment 001 in February 2019 for saline discharge activities and with Amendment 002 in March 2022 for saline discharge activities and the Waterlines proposal). The subsequent Water Licence and leases allowed for the construction of a gold mine and ancillary facilities including an All-weather Access Road (AWAR), barge unloading facilities, lay-down area, and a fuel tank farm in Rankin Inlet. A conceptual Terrestrial Environment Management and Monitoring Plan (TEMMP) for the Mine was prepared for submission with the Project Final Environmental Impact Statement (FEIS; Golder 2014, 2015). The TEMMP will be reviewed and updated on an as-needed basis as the Mine proceeds from detailed design and construction through operations, closure, and post-closure. The TEMMP was updated in April 2022 and was issued to the NIRB (TEMMP Version 4; Agnico Eagle 2022b). Version 5 of the TEMMP is currently being drafted and has not yet been issued to the NIRB; as such, Version 4 of the TEMMP (Agnico Eagle 2022b) remained in effect during 2023.

This report addresses requirements of Project Certificate No. 006, which were first included in the 2017 Annual TEMMP Report (Golder 2018) and are listed in Table 1 of this report. The 2023 TEMMP Annual Report (this document) is the sixth of a series of annual TEMMP summary reports for the Mine and captures the fourth year of operations (Mine operations commenced in 2019). The purpose of this report is to summarize the 2023 data collected from wildlife and vegetation monitoring programs, and to describe natural variation and potential Project-related changes in wildlife populations within and adjacent to the Mine. The 2023 Annual Report describes monitoring objectives and methods, annual results, mitigation activities, and management recommendations (i.e., adaptive management). The Mine is anticipated to be operational through to 2027, with closure and post-closure activities continuing until 2037.

### 1.2 Project Description

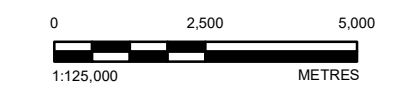
The Project is located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. Situated on the western shore of Hudson Bay, the Project site is located on a peninsula between the east, south, and west basins of Meliadine Lake (63°1'23.8" N, 92°13'6.42"W), on Inuit Owned Lands (IOL).

Mine facilities on surface include a plant site and accommodation buildings, ore stockpiles, a tailings storage facility (TSF), two waste rock storage facilities (WRSFs), an incinerator, landfarms (A and B), a landfill, a water management system that includes collection ponds, water diversion channels, retention dikes/berms, and water treatment plants.


Environmental baseline studies were completed in the Project area prior to Project approval and integrated into the current project design according to the TEMMP (Agnico Eagle 2022b). Vegetation and wildlife Valued Ecosystem Components (VECs) were identified in consultation with regulatory agencies, the Kivalliq Inuit Association (KivIA), and the Kangiqliniq Hunters and Trappers Organization (KHTO). Vegetation VECs include plant populations and communities, listed (rare) plant species, and traditional use plant species. Wildlife VECs include ungulates (caribou [*Rangifer tarandus groenlandicus*] and muskox [*Ovibos moschatus*]), carnivores (grey wolf [*Canis lupus*] and polar bear [*Ursus maritimus*]), raptors, waterbirds, and upland birds (including migratory birds). Further details on VEC selection can be found in the FEIS (Golder 2014) and the TEMMP (Agnico Eagle 2022b).



- LEGEND**
- MINE INFRASTRUCTURE (2023)
  - MINE FOOTPRINT (2023)
  - APPROVED PROPOSED TERRESTRIAL LOCAL STUDY AREA (LSA)
  - ALL-WEATHER ACCESS ROAD (AWAR)
  - RANKIN INLET
  - WATERCOURSE
  - WATERBODY
  - TERRITORIAL PARK




- REFERENCE(S)**
1. BASE DATA OBTAINED FROM AGNICO EAGLE LIMITED.
  2. DATUM: NAD83 PROJECTION: UTM ZONE 15

CLIENT  
 **AGNICO EAGLE MINES LIMITED**

**AGNICO EAGLE**  
 PROJECT  
**MELIADINE GOLD PROJECT  
 NUNAVUT**

TITLE  
**PROJECT LOCAL STUDY AREA**

CONSULTANT	YYYY-MM-DD	2024-03-20
	DESIGNED	JW
	PREPARED	CDB
	REVIEWED	MB
	APPROVED	CDLM

PATH: Y:\mining\CAD-GIS\client\Agnico\_Eagle\_Mines\_Ltd\Meliadine\_Gold\_Project\09\_PROJECTLOCAL\_StudyArea.mxd PRINTED ON: 2024-03-20 AT 4:56:28 PM

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### 1.2.1 Concordance with Terms of Reference

Concordance with Terms and Conditions of NIRB Project Certificate No. 006 (Amendment 2) is reflected in Table 1. NIRB recommends the following related to standardization of data for monitoring programs:

*“all monitoring plans should be designed so that results from these programs can be coordinated with ongoing regional initiatives or programs with relevant government organizations, or regional authorities.” NIRB guidelines, Section 9.3, page 78-79.*

*“When designing data collection or baseline studies, it is recommended that the Proponent coordinate with ongoing programs with relevant developments, government organizations, regional authorities, and researchers. This recommendation applies to data collected for the Nunavut General Monitoring Program (NGMP), as per Article 12 of the Nunavut Land Claims Agreement (NLCA), the Proponent’s project-specific monitoring programs, as well as any regional monitoring initiatives in which the Proponent will participate. The Proponent is expected to coordinate on any initiatives undertaken by government organizations in respect to the NGMP and to liaise with the NGMP Secretariat whenever possible.” NIRB guidelines, Section 7.7.1, page 40-41.*

Agnico Eagle will comply with these principles and has already established several programs that involve collaborations with regional initiatives and contribute to monitoring cumulative effects. These include:

- **Caribou Collar Program:** Support the Government of Nunavut’s (GN) caribou satellite-collaring program for the Qamanirjuaq herd (and other herds in the Kivalliq Region that may interact with the Mine), facilitating monitoring of cumulative effects at the herd level (Agnico Eagle 2022b; Sections 2.2 and 4.7).
- **Regional Muskoxen Surveys:** Agnico Eagle has provided the GN Department of Environment (DoE) with in-kind contributions and support for previous muskoxen surveys and will continue to do so when requested.
- **Hunter Harvest Program:** Agnico Eagle renewed its Collaboration Agreement with the KHTO to develop and implement a methodology to document harvesting around the Meliadine Mine, and to participate in Mine site studies and monitoring. This will contribute to an understanding of cumulative effects by increasing understanding of the regional distribution and seasonality of hunting (Agnico Eagle 2022b; Sections 2.2 and 4.8).
- **Raptor Monitoring Program:** Agnico Eagle, in collaboration with the Arctic Raptor Project, implemented a raptor monitoring program (Agnico Eagle 2022b; Section 4.9). This will directly align monitoring efforts at Meliadine with this long-term regional research program, which involves government, non-government, Indigenous communities, and academic partnerships.
- **Waterfowl and Shorebird Monitoring:** Agnico Eagle, in collaboration with Environment and Climate Change Canada (ECCC), agreed to implement the Program for Regional and International Shorebird Monitoring (PRISM) (Agnico Eagle 2022b; Section 4.11). This will directly align monitoring efforts at Meliadine with other Agnico Eagle properties for waterfowl and shorebirds.
- **Wildlife Surveys:** Agnico Eagle conducts wildlife surveys along the AWAR and around the Mine site with Environmental Technicians (Agnico Eagle 2022b; Section 4.3) and also receives monthly wildlife reports for along the AWAR from KHTO. This will contribute to an understanding of cumulative effects in the region by collecting routine wildlife survey data (including caribou) and assist in anticipating large herd migrations, communicating with the KHTO, KivIA, and managing mine activities during migration events.

**Table 1: Concordance Table with Nunavut Impact Review Board Project Certificate No. 006 (Amendment 002) Terms and Conditions**

Term	Condition	Annual Report Section
37	The Proponent shall incorporate protocols for monitoring for the potential introduction of invasive vegetation species (e.g., surveys of plant populations in previously disturbed areas) into its Terrestrial Environment and Monitoring Plan. Any introductions of non-indigenous plant species must be promptly reported to the Government of Nunavut Department of Environment (GN DoE).	7.0
38	The Proponent shall conduct sampling to determine baseline levels for metals in soils found in areas with berry-producing plants near the Project area and shall update relevant vegetation sections within the Terrestrial Management and Monitoring Plan to incorporate ongoing monitoring of these parameters prior to commencing operations.	6.0
39	The Proponent shall develop and establish an on-going monitoring program to determine the distribution, abundance, and health of vegetation species used as caribou forage (such as lichens) near Project areas, prior to commencing operations.	5.1, 6.0
40	The Proponent shall review, on an annual basis, all monitoring information and the vegetation mitigation and management plans developed under its Environmental Management Plan and Terrestrial Environment Management and Monitoring Plan (TEMMP) and adjust such plans as may be required to effectively prevent or reduce the potential for significant adverse project effects on vegetation abundance, diversity and health, taking into account lessons learned at other northern mining developments where appropriate.	5.1, 6.0
44	In consultation with the Government of Nunavut (GN) and other relevant parties, such as the Terrestrial Advisory Group, the Proponent shall further develop its Terrestrial Environment Management and Monitoring Plan (TEMMP) to include increased caribou monitoring across the regional study area and additional details on the scope and design of monitoring programs. The Proponent shall also demonstrate consideration for contributing to existing and planned regional monitoring initiatives associated with terrestrial wildlife and wildlife habitat and the incorporation of Inuit Qaujimaningit, Inuit Qaujimajatuqangit, Traditional and Community Knowledge, as appropriate. Monitoring should be adequate to test impact predictions, monitor impact thresholds and trends over time, and to support implementation of mitigation measures as proposed in the Final Environmental Impact Statement and any subsequent Addenda submitted by the Proponent. The Proponent in consultation with the Terrestrial Advisory Group shall revise the 2021 Technical Memorandum entitled "Collared Caribou Meliadine All-Weather Access Road Interactions" describing the crossings and deflections of caribou in relation to the all-weather access road as assessed using caribou collar data and shall provide a copy to the NIRB prior to construction/installation of the waterlines.	3.0
45	The Proponent shall demonstrate consideration for cooperating with existing and planned regional and/or community-based monitoring initiatives associated with terrestrial wildlife and wildlife habitat that produce information pertinent to mitigating project-induced impacts. The Proponent shall give special consideration for supporting regional studies of population health and harvest programs for Qamanirjuaq caribou which help address areas of uncertainty for Project impact predictions.	3.0
46	The Proponent shall update its Terrestrial Environment Management and Monitoring Plan (TEMMP) for the Project to include a detailed harvest study prepared in consultation with the Government of Nunavut (GN) and other affected parties. The design of the harvest study should demonstrate consideration for the following: a. Hiring of a dedicated local survey coordinator through local Hunters and Trappers Organizations (HTOs) and provision of adequate resources for the HTOs to run the program; b. The potential effects on caribou populations and on caribou behaviour resulting from increased human access caused by the all-weather access road and associated roads and trails; and, c. Increasing local knowledge of the project development areas, including establishing baseline harvesting levels prior to unrestricted public access on the all-weather access road.	13.0
47	The Proponent shall share information with the Government of Nunavut (GN) relating to the migration of caribou and include the GN as a party respecting caribou monitoring and movement through Project development areas, including the all-weather access road and associated roads and trails.	12.0
52	The Proponent shall undertake periodic surveys and a habitat assessment for muskoxen in the regional study area by partnering with, or complementing, the existing regional muskox monitoring programs.	11.0
53	Prior to construction of Project infrastructure including the waterlines and Phase 2 of the all-weather access road, the Proponent shall conduct a survey that is sufficient to locate any dens of foxes, bears or wolverines that could be damaged or destroyed during construction or operation of the Project.	9.3
54	The Proponent shall ensure that road safety barriers, or berms, or waterline coverings associated with Project infrastructure, all-weather access road and associated roads/trails and the waterlines are constructed to allow for the safe passage of caribou and other terrestrial wildlife while achieving the objective of separating public road use with Project-related mine traffic or transport of saline effluent.	9.0, 12.4

**Table 1: Concordance Table with Nunavut Impact Review Board Project Certificate No. 006 (Amendment 002) Terms and Conditions**

Term	Condition	Annual Report Section
55	In consultation with the Government of Nunavut (GN) and other affected parties, the Proponent shall set thresholds for direct mortality of wolf, grizzly bear, polar bear, wolverine, and fox to ensure monitoring and mitigation for the Project is responsive to undesirable rates of mortality. The Proponent shall reach an agreement with the appropriate Designated Inuit Organization regarding compensation or any direct mortality of wildlife resulting from the Project.	9.5
56	The Proponent shall report annually to the NIRB regarding its terrestrial environment monitoring efforts, with inclusion of the following information: <ul style="list-style-type: none"> <li>a. Description of all updates to terrestrial ecosystem baseline data;</li> <li>b. A description of the involvement of Inuit in its monitoring programs;</li> <li>c. A detailed presentation and analysis of the distribution relative to Project infrastructure and activities for caribou and other terrestrial mammals observed during surveys and incidental sightings;</li> <li>d. Results of the annual monitoring program, including field methodologies and statistical approaches used to support conclusions drawn; and,</li> <li>e. An assessment and presentation of annual environmental conditions including timing of snowmelt, green-up, as well as standard weather summaries.</li> </ul>	1.2.1, 3.0, and 4.0, 9.0, and 12.0
57	Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: <ul style="list-style-type: none"> <li>a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting;</li> <li>b. A detailed analysis of wildlife responses to operations with emphasis on wildlife behaviour, mortalities and displacements (if any), responses to operations of the all-weather access road and associated access roads/trails, and the waterlines;</li> <li>c. A demonstration and description of how the monitoring results, including the all-weather access road and associated access roads/trails, and waterlines contribute to cumulative effects of the project; and,</li> <li>d. Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program.</li> </ul>	8.1, 8.2, 9.1, and 12.1
59	If Species at Risk or their nests and eggs are encountered during Project activities or monitoring programs, the primary mitigation measure must be avoidance. The Proponent shall establish clear zones of avoidance based on the species-specific nest setback distances outlined in the Terrestrial Environment Management and Monitoring Plan.	9.4
61	Prior to bird breeding season, the Proponent shall either conduct clearing activities or identify and install nesting deterrents (e.g., flagging) to discourage birds from nesting in areas likely to be disturbed by construction/clearing activities. If clearing is to take place during the nesting season, a nest survey should take place to identify nests and any identified nests must remain undisturbed until the young have fledged or left the nest. Any nests identified shall be included as part of the annual reporting for the Terrestrial Environmental Management and Monitoring Plan (TEMMP).	8.4, 10.0
62	The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its Terrestrial Environment Management and Monitoring Plan (TEMMP), until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird's nests and their young are protected.	9.4, 10.0
71	The Proponent shall develop detailed and robust mitigation and monitoring plans for migratory birds, reflecting input from relevant agencies, the Kivalliq Inuit Association and communities.	8.0
72	The Proponent shall continue to develop and update relevant monitoring and management plans for migratory birds under the Proponent's Environmental Protection Plan and Terrestrial Environment Management and Monitoring Plan (TEMMP) prior to construction. The key indicators for follow up monitoring under this plan will include upland birds (including migratory birds), waterbirds, raptors, and seabirds including migration and wintering.	8.0
73	The Proponent's monitoring program shall assess and report, on annual basis, the extent of terrestrial habitat loss due to the Project to verify impact predictions and provide updated estimates of the total Project footprint.	5.1
74	The Proponent's Terrestrial Management and Monitoring Plan (TEMMP) shall include mitigation measures implemented to prevent the use of water attenuation ponds by waterfowl and waterbirds and monitoring that assesses whether the mitigation measures are working or revised, or further deterrent measures are required.	8.0, 10.0
75	The Proponent shall implement mitigation measures and monitoring programs to limit the attraction of predators and scavengers to Project facilities in the TEMMP and other plans such as the Landfill and Waste Management Plan as appropriate.	9.1, 9.2, 9.5, 10.0
105	The Proponent is strongly encouraged to consider incorporating information obtained from local outfitting and guiding businesses into its Hunter Harvest Survey where possible, and to include these organizations as potential respondents to surveys undertaken.	13.0

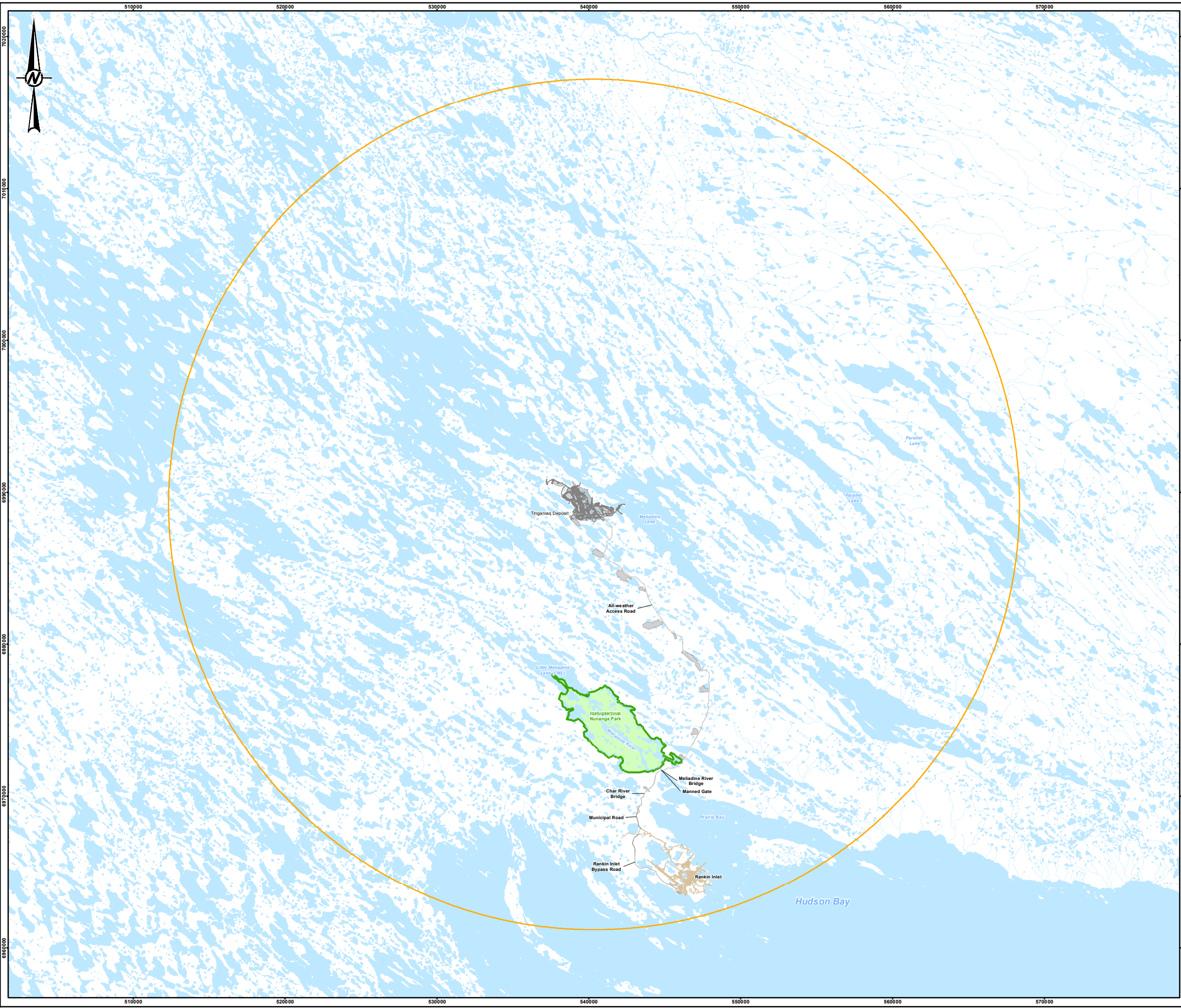
**Table 1: Concordance Table with Nunavut Impact Review Board Project Certificate No. 006 (Amendment 002) Terms and Conditions**

Term	Condition	Annual Report Section
118	The Proponent shall include in an updated Terrestrial Wildlife Management and Monitoring Plan (TEMMP), plans for increased caribou monitoring efforts including weekly winter track surveying and summer and fall surveys undertaken on foot twice per month. These results shall be reported to the NIRB with the Proponent's annual reporting requirements. The Proponent shall, in consultation with the Terrestrial Advisory Group or appropriate parties, develop a decision tree outlining mitigation and monitoring steps to be implemented when caribou in specified group sizes are observed within specified distances of the Project's AWAR and waterlines.	TEMMP (Agnico Eagle 2022b, Section 3.1.8, 4.2, 4.3, 4.4, 5.0 and Appendix II) 9.1, 12.5
119	The Proponent shall include within its updated Terrestrial Wildlife Management and Monitoring Plan (TEMMP), a commitment to establishing deterrents along the all-weather access road (AWAR) at any areas where it is observed that caribou are attracted to the AWAR and their presence may present a risk of collisions with traffic along the AWAR (such as areas where caribou are utilizing the AWAR to facilitate movement, areas where caribou may be licking minerals/road salt from the road, areas where caribou are gathering to avoid insects, etc.). Prior to the waterlines becoming operational, the Proponent shall specify within the TEMMP and/or Spill Contingency Plan measures that will be implemented to prevent caribou from accessing or being exposed to water spilled, or otherwise released from the waterlines.	TEMMP (Agnico Eagle 2022b, Appendix II and Appendix III)
132	The Proponent shall, in consultation with the groups listed as Responsible Parties above, and any other parties considered by the Group to be necessary, establish a Terrestrial Advisory Group (TAG). The TAG shall hold its first meeting prior to any construction/installation of the waterlines. The central mandate of the TAG will be to continually review and refine impact management, mitigation, and monitoring details within the Terrestrial Environment Management and Monitoring Plan (TEMMP). The TAG Members will collaborate to share and consider methods, results, and analysis from caribou and terrestrial environment studies and monitoring Inuit Qaujimaningit, Inuit Qaujimajatuqangit, Traditional and Community Knowledge shared by knowledge holders, and other terrestrial environment monitoring data as it becomes available. The Proponent will consider the information shared by the TAG Members for incorporation into the Project's impact management, mitigation, and monitoring measures related to the protection of terrestrial wildlife and wildlife habitat as appropriate. Agnico Eagle shall be responsible for demonstrating how the information shared and considered by the TAG has been incorporated into the Project's impact management, mitigation, and monitoring measures related to the protection of terrestrial wildlife and wildlife habitat as appropriate.	3.0

### 1.3 Study Area Boundaries

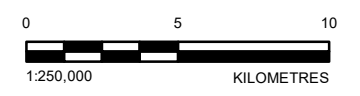
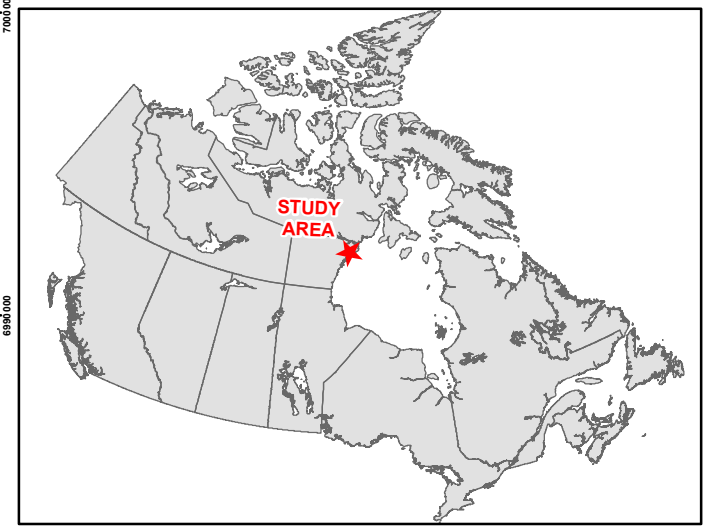
The Local Study Area (LSA) includes a 500-m buffer around the Project footprint and includes a 1,000-m buffer around the AWAR and the Rankin Inlet Bypass Road. The total area of the LSA is 10,598 hectares (ha) (Figure 1). The Regional Study Area (RSA) encompasses an area that includes a 28-km radius centered around the Project, including Rankin Inlet, for a total area of 246,300 ha (Figure 2). Further details on the justification for study area sizes can be found in the FEIS (Golder 2014) and the TEMMP (Agnico Eagle 2022b).

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**LEGEND**

- MINE INFRASTRUCTURE (2023)
- MINE FOOTPRINT (2023)
- REGIONAL STUDY AREA (RSA)
- ALL-WEATHER ACCESS ROAD (AWAR)
- RANKIN INLET
- WATERCOURSE
- WATERBODY
- TERRITORIAL PARK



**REFERENCE(S)**

1. BASE DATA OBTAINED FROM AGNICO EAGLE LIMITED.
2. DATUM: NAD83 PROJECTION: UTM ZONE 15

**CLIENT**

**AGNICO EAGLE MINES LIMITED**

**PROJECT**

**MELIADINE GOLD PROJECT  
NUNAVUT**

**TITLE**

**PROJECT REGIONAL STUDY AREA**

	<b>CONSULTANT</b>	YYYY-MM-DD	2024-03-20
	DESIGNED	JW	
	PREPARED	CDB	
	REVIEWED	MB	
	APPROVED	CDLM	

PROJECT NO. CA0017749.9514	CONTROL 3000/3200	REV. 0	FIGURE <b>2</b>
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## 1.4 Monitoring Approach

Wildlife monitoring is an essential tool in protecting and maintaining wildlife in the vicinity of the Project. A comprehensive monitoring strategy has been implemented and is adapted to meet the objectives of the management strategy and methods set out in the TEMMP (Agnico Eagle 2022b), as required. Monitoring programs evaluate the effectiveness of mitigation measures and assess Project-related effects predictions. For all wildlife monitoring programs there is a certain level of uncertainty or unpredictability; therefore, residual effects identified during monitoring may require implementation of adaptive management strategies. Outcomes of adaptive management may include increasing, decreasing, or no change to mitigation and/or monitoring, or implementing special studies to further understand Mine-related effects.

To evaluate the accuracy of effects predictions, a series of quantitative monitoring indicators have been developed within the broad categories of habitat distribution, wildlife distribution, wildlife richness, wildlife diversity, wildlife abundance, and environmental health. Previous monitoring was conducted during the construction phase and continued into the operations phase. Some of the objectives below may not be answered at this time or will be addressed qualitatively until more data under operations is obtained.

## 1.5 Objectives

The primary objectives of this 2023 TEMMP Annual Report include:

- Collecting information that will assist Agnico Eagle to determine if there are effects on the terrestrial environment and if these effects were accurately predicted in the FEIS.
- Reporting the results of the 2023 monitoring programs.
- Summarizing the monitoring strategy implemented over the course of the year.
- Evaluating the function and validity of implemented monitoring strategies.
- Summarizing adaptive management strategies.
- Providing management recommendations for 2024.
- Allowing regulators to contribute advice for improving monitoring and management.

## 1.6 Report Organization

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

## 2.0 REVIEW OF IMPACT PREDICTIONS

A summary of the impact predictions proposed in the updated TEMMP (Agnico Eagle 2022b) is provided in Table 2. If Project impacts exceed the thresholds, an internal review of mitigation is triggered and adaptive management is implemented where applicable. The corresponding sections of this TEMMP Annual Report, where monitoring indicators are discussed, are listed.

**Table 2: Summary of Predicted Effects, and Accuracy of Impact Predictions**

Monitoring Indicator	Proposed Thresholds	Surveyed in 2023?	Exceeded in 2023?	Monitoring Methods	Frequency of Data Collection	Annual Report Section Reference
<b>Vegetation (Wildlife Habitat)</b>						
Habitat Loss	No greater than: Terrestrial – 2,951 ha Aquatic – 515 ha	No	N/A	Aerial photographs, satellite imagery, ground surveys, GIS analysis	Every 3 Years	5.0
Habitat Degradation by Contamination	No effects to plant health from dust deposition SLRA – TBD	No	N/A	Vegetation and Soil Samples	Every 3 Years	6.0
Habitat Reclamation following Mine Closure	N/A	No	N/A	Ground Surveys, Vegetation Plots, Mapping	Once pre-construction baseline (2017) and 3 times Post-Closure	N/A
Habitat Degradation by Contamination	No non-native plant species established	No	No	Invasive Plant Survey of AWAR	Annually	7.0
<b>Ungulates</b>						
Habitat Loss and Degradation	No greater than 2,951 ha of terrestrial habitat loss	No	N/A	Aerial photographs, satellite imagery, ground surveys, GIS analysis	Every 3 Years	5.0
Sensory Disturbance	<10% caribou deflections from AWAR	No	N/A	Caribou satellite collar data	Daily / Weekly	N/A
Vehicle Collisions	No more than 1 ungulate/year	Yes	No	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	Daily	9.5
Hunting by Rankin Inlet Residents	TBD after 3 years of data collection, in collaboration with the GN <sup>(a)</sup>	Yes	TBD	Hunter Harvest Study	Collected throughout the year and reported annually	13.0
Other Project-related Mortality	No more than 1 ungulate/year	Yes	No	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	Daily	9.5
Exposure to Contaminated Water or Vegetation	SLRA – TBD	No	N/A	Vegetation and Soil Samples	Every 3 Years	6.0

**Table 2: Summary of Predicted Effects, and Accuracy of Impact Predictions**

Monitoring Indicator	Proposed Thresholds	Surveyed in 2023?	Exceeded in 2023?	Monitoring Methods	Frequency of Data Collection	Annual Report Section Reference
<b>Predatory Mammals</b>						
Project-related Mortality	20 Arctic fox/year	Yes	No	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance.	Daily	9.5
<b>Raptors</b>						
Disturbance of Nesting Raptors	To be determined in consultation with GN and Alastair Franke, related to occupancy and productivity.	Yes	No	Active Nest Monitoring	Nests within 200 m – Daily Nests from 200 to 1,000 m – Weekly	8.2
Project-related Mortality	No more than 1 raptor/year	Yes	No	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	Mine Site-Daily AWAR – 2x/Week	9.5
<b>Waterbirds</b>						
Habitat Loss and Degradation	No more than 515 ha of aquatic habitat	No	N/A	Aerial photographs, satellite imagery, ground surveys, GIS analysis	Every 3 Years	5.0
Disturbance of Nesting Waterfowl	TBD once NRV is established through consultation with ECCC and GN	No	N/A	Shoreline Surveys	Annually	9.4
Exposure to Contaminated Water or Vegetation	SLRA – TBD	No	N/A	Vegetation and Soil Samples	Every 3 Years	6.0
Project-related Mortality	No more than 1 waterbird/year	Yes	No	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	Mine Site-Daily AWAR – 2x/Week	9.5

**Table 2: Summary of Predicted Effects, and Accuracy of Impact Predictions**

Monitoring Indicator	Proposed Thresholds	Surveyed in 2023?	Exceeded in 2023?	Monitoring Methods	Frequency of Data Collection	Annual Report Section Reference
<b>Other Breeding Birds</b>						
Habitat Loss and Degradation	No greater than 2,951 ha of terrestrial habitat loss	No	N/A	Aerial photographs, satellite imagery, ground surveys, GIS analysis	Every 3 Years	5.0
Exposure to Contaminated Water or Vegetation	SLRA – TBD	No	N/A	Vegetation and Soil Samples	Every 3 Years	6.0
Changes in Breeding Bird Populations	TBD once NRV is established through consultation with ECCC	No	N/A	Breeding Bird Plots and Transects, PRISM	Breeding Bird – Every 3 Years PRISM – Plots surveyed over 2 years every 5 Years	8.0

**Notes:** AWAR = All-Weather Access Road; ECCC = Environment and Climate Change Canada; GN = Government of Nunavut Department of Environment; NRV = Natural Range of Variability; PRISM – Program for Regional and International Shorebird Monitoring; SLRA = Screening Level Risk Assessment; TEMMP = Terrestrial Environment Management and Monitoring Plan (Agnico Eagle 2022b); ha = hectares; m = metres; N/A = not applicable; TBD = to be determined.

(a) Proposed thresholds will be established in collaboration with the GN and other relevant parties, such as TAG members.

### 3.0 INCORPORATION OF INUIT QUAJIMAJATUQANGIT

In 2021, Agnico Eagle established the Kivalliq Inuit Elders Advisory Committee (KEAC), which is a group that provides invaluable guidance to Nunavummiut and Nunavut operations teams. Comprised of 21 Elders from the communities of Baker Lake, Chesterfield Inlet, Rankin Inlet, Whale Cove, and Arviat, the KEAC keeps local communities informed about Agnico Eagle’s mining activities and future plans, and also provides Inuit Qaujimajatuqangit (IQ), a body of Inuit traditional knowledge, Inuit Societal Values (ISV), and a set of guiding community principles. Agnico Eagle acknowledges that IQ is continually learnt and continues to glean IQ from the KEAC through various conversations related to the Meliadine Mine. A Terrestrial Advisory Group (TAG) was formed in 2022 and formalized via creation of the Terms of Reference in 2023 as a collaborative forum to discuss the application of IQ, Traditional Knowledge (TK), and western science to mitigation and monitoring programs for caribou movement in the Project area.

In 2023, IQ was collected during ten meetings, two site visits, and two cultural activities with the KEAC, between March and November (Table 3). Field programs were guided by IQ, including from local field assistants whenever possible. Four local field assistants worked on site in 2023.

**Table 3: Inuit Qaujimajatuqangit captured for Meliadine in 2023**

Month	Topic	Participants	Venue	Inuit Qaujimajatuqangit
February	Mental health and cultural counselling at Meadowbank Complex and Meliadine Mine sites (cultural activity)	<ul style="list-style-type: none"> <li>Elders</li> <li>Agnico Eagle employees</li> </ul>	Meadowbank Complex and Meliadine mine sites	<ul style="list-style-type: none"> <li>Through discussions with the Committee, Agnico Eagle came to recognize the need for more mental health and cultural counselling tailored to Inuit employees. At the end of February, Agnico Eagle hosted Elders from Baker Lake and Rankin Inlet, who visited the Meadowbank Complex and Meliadine mine sites to provide mental health and cultural counselling to employees through appointment and walk-in sessions.</li> </ul>
March	International Women’s Day Conference (cultural activity)	<ul style="list-style-type: none"> <li>Mrs. Rosie Oolooyuk</li> <li>Agnico Eagle employees</li> </ul>	Meliadine Mine	<ul style="list-style-type: none"> <li>On March 8, to celebrate International Women’s Day, Agnico Eagle hosted a conference featuring Mrs. Rosie Oolooyuk, an Elder from Rankin Inlet, who shared some of her knowledge and life experience with Meliadine Mine employees.</li> </ul>
March	General update for members	<ul style="list-style-type: none"> <li>Annual Executive Members</li> </ul>	Rankin Inlet	<ul style="list-style-type: none"> <li>The KEAC gained a better understanding of employment and recruitment initiatives done through the Sanajiksanut program.</li> <li>During discussion on the importance of green energies, Elders mentioned interest to join the Raglan Mine Windfarm site visit.</li> </ul>
May	Overview of Water Management at the Meliadine Mine site	<ul style="list-style-type: none"> <li>Meliadine Environment Staff</li> <li>KEAC Members</li> </ul>	Rankin Inlet	<ul style="list-style-type: none"> <li>Agnico Eagle provided an overview of Water Management at the Meliadine Mine site. The meeting included a site visit of water management infrastructure, as well as tea tasting.</li> <li>The KEAC recommended that Agnico Eagle investigate why the tea colour changes from time to time.</li> </ul>

**Table 3: Inuit Qaujimagatuqangit captured for Meliadine in 2023**

Month	Topic	Participants	Venue	Inuit Qaujimagatuqangit
June	Annual General Meeting	<ul style="list-style-type: none"> <li>KEAC Members</li> </ul>	Rankin Inlet	<ul style="list-style-type: none"> <li>Validated that snow bridges could be installed.</li> <li>Presentation of Cyanide transportation and shipping</li> <li>Review of IQ collection.</li> </ul>
June	Raglan Mine Windfarm Visit	<ul style="list-style-type: none"> <li>KEAC Members</li> <li>Agnico Eagle staff from various departments</li> </ul>	Raglan Mine Windfarm (site visit)	<ul style="list-style-type: none"> <li>The purpose was to visit a windfarm in similar conditions to Meliadine Mine, which would provide valuable knowledge for all parties involved in the Meliadine Extension regulatory process (now withdrawn).</li> <li>Questions from participants were answered during the site visit.</li> </ul>
August	Tea Color Activity	<ul style="list-style-type: none"> <li>KEAC Members</li> <li>Agnico Eagle Permitting and Environment staff</li> </ul>	Rankin Inlet	<ul style="list-style-type: none"> <li>Following the May recommendation from the Committee, Agnico Eagle hosted a water and tea colour activity to discuss water chemistry through interaction with tea leaves.</li> <li>An experiment was designed along with a botanical expert to better understand the chemical interaction between different water sources (tap water, bottled water, and lake water) and tea leaves. Participants enjoyed the activity and reported a better understanding of how tea infusion colour may differ from time to time.</li> </ul>
October (three meetings)	Winter Travel Routes	<ul style="list-style-type: none"> <li>KEAC Members</li> </ul>	Baker Lake	<ul style="list-style-type: none"> <li>The Elders have identified that important winter travel routes were in the vicinity of the Meadowbank Complex. They suggested that the routes should be marked between Baker Lake, Garry Lake, Back River, and Gjoa Haven and mark historic camp sites and graves around camping locations.</li> <li>The Baker Lake Kivalliq Advisory Group members started discussing the routes and concluded that a subsequent meeting should be organized with a blank map to mark traditional winter travel information.</li> </ul>
November	Agnico's Reconciliation Action Plan	<ul style="list-style-type: none"> <li>KEAC Members</li> </ul>	Rankin Inlet	<ul style="list-style-type: none"> <li>The purpose was to discuss Agnico's Reconciliation Action Plan.</li> <li>A focus was placed on encouraging the younger generation to work with Agnico Eagle.</li> </ul>
November (three meetings)	Winter Trail Mapping from Baker Lake to Gjoa Haven	<ul style="list-style-type: none"> <li>KEAC Members</li> </ul>	Baker Lake	<ul style="list-style-type: none"> <li>Elders have identified that the winter travel routes between Baker Lake, Garry Lake, Back River, and Gjoa Haven are of high cultural value and wanted to mark historic camp sites and graves around camping locations on a blank map.</li> <li>Elders marked on a map culturally important area related to winter travel routes.</li> </ul>

**Notes:** IQ= Inuit Qaujimagatuqangit; KEAC = Kivalliq Elders Advisory Committee.

## 4.0 ENVIRONMENTAL VARIABLES

A summary of climate conditions collected on site in 2023 are presented in Table 4. Data was collected from 1 January to 31 December 2023 through the on-site meteorological station and rain gauges.

**Table 4: Climate Conditions Recorded in the Project Area (2023)**

Environmental Variable	Value <sup>(a)</sup>
<b>Temperature (°C)</b>	
Mean Annual Temperature	-7.8
Maximum Annual Temperature	27.0
Minimum Annual Temperature	-39.8
<b>Precipitation (mm)</b>	
Total Annual Precipitation	188.8 <sup>(b)</sup>

**Notes:** °C = Celsius; mm = millimetre.

(a) Values reported from 1 January to 31 December, collected by Agnico Eagle staff from the on-site weather station. Weather data is missing for some dates due to issues encountered with the weather station (e.g., weather station damaged from lightning strike).

(b) Measured using Geonor Precipitation Gauge.

The maximum annual temperature of 27.0°C was recorded on 5 August 2023 and the minimum annual temperature of -39.8°C was recorded for 4 days in January (27, 28, 29, and 30 January) and for 12 days in February (1, 2, 3, 5, 6, 17, 18, 19, 20, 21, 22, and 23 February) 2023. The mean annual temperature was -7.8°C (Table 4). Total recorded annual precipitation was 188.8 mm and snowmelt began 8 May 2023 when the average daily air temperature exceeded 0°C. Total precipitation includes both rain and snowfall. The green-up date for the RSA was estimated between 26 June and 12 July 2023, based on normalized difference vegetation (NDVI) values averaged across the RSA (obtained from MODIS VI satellite). Environmental variables will continue to be monitored on an on-going basis.

## 5.0 HABITAT LOSS

### 5.1 Direct Habitat Loss

The vegetation component of the TEMMP (Agnico Eagle 2022b) outlines how Agnico Eagle plans to reduce Project-related effects to vegetation populations and communities and, consequently, wildlife habitat.

The monitoring plan includes both environmental and follow-up monitoring. The objective of this component of the TEMMP Annual Report is to determine if direct vegetation/habitat loss due to the Project footprint stays within impact prediction of 2,951 ha (Golder 2014).

Direct habitat loss was reported in the 2021 TEMMP Annual Report (Agnico Eagle 2022a). As of January 2022, a total area of 633 ha has been altered due to Project construction, representing 38% of the 2012 Project Approved footprint (1,682 ha) and 21% of the predicted Project Footprint (2,951 ha; Golder 2014). The footprint that was analyzed included all developments being completed as part of the construction phase. Follow-up monitoring occurs at three-year intervals, with the next scheduled for 2024. The follow-up monitoring is used to provide feedback to Mine operations to determine if the goals and objectives are being met. Depending on the results, actions may be considered such as modifying and/or implementing additional mitigation.

## 5.2 Indirect Habitat Loss

Indirect effects to wildlife are associated with changes in habitat that can alter the movement and behaviour of individuals in the vicinity of the Project as a result of sensory disturbance. Indirect effects are addressed through several of the monitoring programs per the TEMMP.

Caribou behaviour monitoring is presented in Section 12.1 of this report. Across all years studied (i.e., 2020, 2021, 2022, and 2023), caribou groups tended to show greater response behaviours (i.e., running, alert) when in smaller groups or within 300 m of a road (ERM 2024a).

For nesting birds, site-specific nest management plans may be required if birds are within the Project footprint.

Indirect Project effects are assessed through soils and vegetation monitoring every three years, to align sampling years with the first year of construction in 2017. Soil and vegetation monitoring were last completed in 2019 and in 2022; the next full assessment is scheduled for 2025.

## 6.0 SOIL AND VEGETATION MONITORING

The scope of the landscape component of the TEMMP Annual Report is to report on levels of metals in berry producing plants, sedges, lichen, and soil chemistry potentially affected by the Mine. To evaluate the potential for adverse health effects to terrestrial life associated with changes in environmental quality due to chemical releases from the Project, the existing (or baseline) conditions of the environment must first be understood. Soil and vegetation monitoring was first conducted in 2017 to inform the baseline conditions. Monitoring is completed on a three-year interval, first initiated in 2019 (first year of operations). The last soil and vegetation assessment was completed in 2022 (Agnico Eagle 2023); the next complete soil and vegetation assessment is expected in 2025.

Local vegetation cover is predominantly characterized by heath tundra, and lichen-heath communities. Low-lying areas between the drumlins and eskers are dominated by sedge wetlands, shallow ponds, and various shallow and deep-water lakes. The main change from the Mine on the landscape is direct disturbance, which will be a long-term effect as the recovery of vegetation is slow in Arctic environments (Burt 1997).

## 7.0 NON-NATIVE PLANT SURVEYS

The spread of non-native species across the landscape is a concern for the Inuit. Construction equipment and operation activities can result in the introduction of, or spread of, non-native vegetation species. Thus, Project Certificate No. 006 includes T&C 36 and 37 to prevent and minimize the introduction of non-native plants during pre-construction, construction, operations, temporary closure and maintenance, closure and post-closure. Pre-construction surveys were completed during the baseline studies completed during 1998, 2008, and 2009 surveys (Volume 6, SD 6-5; Golder 2014).

This section includes the methods, results, and mitigation measures to minimize the spread of non-native invasive plant species resulting from Mine activities. The GN and ECCC define a non-native species as 'an organism that is not normally found in a region' (CESCC 2010). Additionally, according to Section 91 of *The Wildlife Act*, Statutes of Nunavut (SNU) 2003, c 26, invasive species shall not be released into a habitat in which that species does not belong or never naturally occurred. Any introductions of non-native plant species must be promptly reported to the GN DoE. Non-native plant monitoring surveys occurred in 2018 prior to Mine operations initiation and in 2019, when Mine operations commenced.

## 7.1 Methods

Non-native plant surveys were completed along the length of the AWAR from 21 to 28 August 2023 (Figure 3; ERM 2024c). The AWAR was divided into 91 segments, which were surveyed from vehicles travelling at approximately 3 km/hr. A 10-m buffer was assessed during road surveys. Every third segment was surveyed on foot to ensure there were no discrepancies in detection rates between foot and vehicle survey types. Data collection was completed using ArcGIS Field Maps and Survey123. Survey123 forms were informed by Invasives BC (formally Invasive Alien Plant Program [IAPP]) standard data fields and included the following fields:

- Species and location
- Abundance (i.e., percent cover) in grid cell
- Distribution in grid cell
- Density per patch
- Life stage/phenology

## 7.2 Results

There were no non-native invasive species detected along the AWAR in 2023 (ERM 2024c).

## 7.3 Mitigation

The 2023 survey was the fifth consecutive year of non-native species monitoring for Meliadine since operations commenced.

The early detection of non-native invasive plant species is important, as preventing these species from becoming established is the most effective mitigation that can be employed. Invasive plants identified as a concern by the GN DoE will be reported to the GN, including location of the species (i.e., global positioning system [GPS] coordinates and map), species identification and photographs of the species in question.

In addition, due to the early detection of non-native invasive species, the following mitigation measures have been implemented by Agnico Eagle during Project operation, per the TEMMP (Agnico Eagle 2022b):

- Where possible, utilize existing access trails and roads.
- Limit the width of access roads and the size of workspaces.

Inspect and clean new equipment arriving to site from the ship loading area prior to entering the Project area. Shipping inspection sheets from 2023 are provided in Appendix A.

- Complete non-native invasive plant monitoring surveys every year during operations to identify problem areas. Surveys should be targeted for areas with a high potential of occurrence such as along the AWAR, Project footprint, and ship loading areas.

## 7.4 Accuracy of Impact Predictions

No non-native invasive plant species occurrences were observed in the Project Area. A summary of the effects predictions proposed in the TEMMP (Agnico Eagle 2022b) is provided in Table 5. Specific thresholds for vegetation and wildlife habitat monitoring are outlined in Table 5.

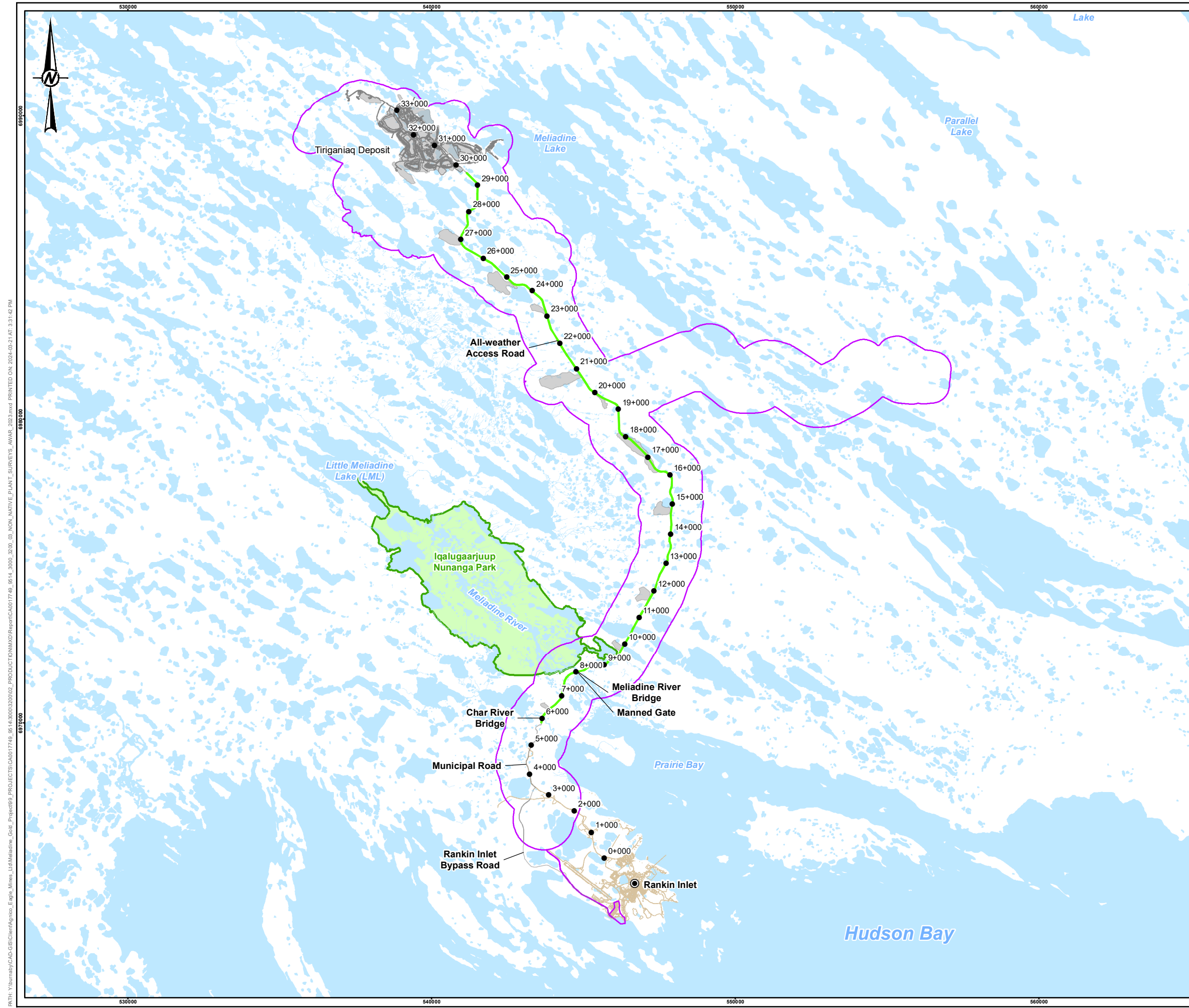
**Table 5: Accuracy of Effects Predictions – Vegetation**

Monitoring Indicators	Threshold	Exceeded in 2022?	Adaptive Management	Monitoring Method	TEMMP* Section
Habitat Degradation by Contamination	No non-native invasive plant species established	No	See Section 7.3	Non-native invasive Plant Survey of AWAR, and Project site	7.0
Habitat Reclamation following Project Closure	N/A	N/A	Not Currently Identified	Ground Surveys, Vegetation Plots, Mapping	5.0

TEMMP = Terrestrial Environment Management and Monitoring Plan (Agnico Eagle 2022b), AWAR = All-weather Access Road.

## 7.5 Recommendations

The CESSC (2010; Appendix B) has developed posters that show non-native species and invasive species in Nunavut. These can continue to be easily displayed at the Mine site and incorporated into on-boarding materials. If any non-native and invasive species are incidentally observed on site, they should be eradicated through mechanical control such as hand pulling, as practical for the terrain on site. If hand pulling with a shovel, the plant material should be collected in bags and disposed of at an offsite location. A vegetation ecologist should be consulted prior to removal. Chemical herbicide treatments are not recommended to be used at this point as the native vegetation/habits in the tundra are very sensitive to impacts.



- LEGEND**
- KM MARKER
  - MINE INFRASTRUCTURE (2023)
  - MINE FOOTPRINT (2023)
  - APPROVED PROPOSED TERRESTRIAL LOCAL STUDY AREA (LSA)
  - COMPLETED NON-NATIVE PLANT SURVEY
  - ALL-WEATHER ACCESS ROAD (AWAR)
  - RANKIN INLET
  - WATERCOURSE
  - WATERBODY
  - TERRITORIAL PARK



**REFERENCE(S)**  
 1. BASE DATA OBTAINED FROM AGNICO EAGLE LIMITED.  
 2. DATUM: NAD83 PROJECTION: UTM ZONE 15

CLIENT  
**AGNICO EAGLE MINES LIMITED**

PROJECT  
**MELIADINE GOLD PROJECT  
 NUNAVUT**

TITLE  
**NON-NATIVE PLANT SURVEYS CONDUCTED ALONG ALL-WEATHER ACCESS ROAD IN 2023**

CONSULTANT	YYYY-MM-DD	2024-03-21
	DESIGNED	MB
	PREPARED	CDB
	REVIEWED	MB
	APPROVED	CDLM

PROJECT NO. CONTROL REV. FIGURE  
 CA0017749.9514 3000/3200 0 3

PATH: Y:\Burmah\CAD-Client\Agnes\_Eagle\_Mines\_Lit\Meliadine\_Goat\_Project\03\_PRODUCT\MAXDREPORT\CA0017749\_9514\_3000\_3200\_03\_NON\_NATIVE\_PLANT\_SURVEYS\_AWAR\_2023.mxd PRINTED ON: 2024-03-21 AT: 3:31:43 PM

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

## 8.0 BIRDS

Three survey methods were employed in 2023 for monitoring waterfowl, waterbirds, and upland birds: shoreline surveys, PRISM surveys, and pre-clearance surveys. Due to road closures during post-calving caribou migration between 15 and 30 June 2023, point count surveys could not be completed. Further, only one PRISM plot could be completed. As caribou moved out of the Mine area by the end of June, it was possible to complete most of the waterbird shoreline surveys. The following sections are a summary of the 2023 Bird Surveys and PRISM Plots Summary Report (Appendix C; Agnico Eagle 2024a). The Arctic Raptors Research Program is described in Section 8.3.

### 8.1 Shoreline Surveys

#### 8.1.1 Methods

The shorelines of all waterbodies within 200 m of the Project were surveyed by two observers, on foot, to locate and identify nesting waterbirds. Observers walked along the edge of each waterbody. Specifically, one observer walked 5 m from the water's edge while the second observer walked 15 m from the water's edge. If a nest was found, nest stage (e.g., egg laying, incubating, nestlings etc.) and nest productivity (i.e., the number of offspring) were recorded. If a nesting bird showed signs of distress, the nest was not approached to avoid nest abandonment. Shoreline survey methods are described in greater detail in the TEMMP (Agnico Eagle 2022b).

#### 8.1.2 Results

Due to a significant number of road closures during post-calving caribou migration, not all shoreline surveys could be completed in 2023. Appendix C presents additional information on survey timing and weather conditions, as well as survey results by location.

A total of 36 nests of 13 bird species were observed within 200 m of the Mine and AWAR while conducting shoreline surveys in 2023. Of these 36 nests, 31 nests were from the ten most encountered species, summarized in Table 6. Of these 31 nests, the number of young (e.g., eggs or juveniles) could be determined for 9 nests, totalling 37 young (Table 6). An additional five nests were detected for three other species: one common raven (*Corvus corax*) nest, two red-throated loon (*Gavia stellata*) nests, and one semipalmated sandpiper (*Calidris pusilla*) nest. The number of young could not be determined for these additional five nests.

A total of 32 bird species, of which 18 species were waterbirds, were recorded during 2023 waterbird shoreline surveys (Appendix C). The top three most encountered bird species were horned lark (*Larus argentatus*), sandhill crane (*Antigone canadensis*), and American pipit (*Anthus rubescens*). The three most encountered waterbird species were herring gull (*Larus argentatus*), Canada goose (*Branta canadensis*), and least sandpiper (*Calidris minutilla*). All birds observations of birds and nests made during shoreline surveys are presented in Appendix C.

**Table 6: Summary of Nests and Young (Eggs or Juveniles) Observed during Shoreline Surveys, 2018 to 2021 and 2023**

Common Name	Scientific Name	2018		2019		2020		2021		2023	
		Young <sup>(a)</sup>	Nests	Young <sup>(a)</sup>	Nests	Young <sup>(a)</sup>	Nests	Young <sup>(a)</sup>	Nests	Young <sup>(a)</sup>	Nests
American Pipit	<i>Anthus rubescens</i>	0	0	0	0	0	0	13	2	5	2
Cackling Goose	<i>Branta hutchinsii</i>	4	3	18	4	6	2	48	16	0	0
Canada Goose	<i>Branta canadensis</i>	18	16	39	14	14	6	25	6	11	4
Cackling/Canada Goose <sup>(b)</sup>	<i>Branta</i> spp.	0	0	0	0	0	0	Unk. <sup>(b)</sup>	2	0	0
Greater White-fronted Goose	<i>Anser albifrons</i>	0	0	3	1	0	0	0	0	0	0
Herring Gull	<i>Larus argentatus</i>	0	0	0	1	0	0	0	0	Unk. <sup>(b)</sup>	4
Horned Lark	<i>Eremophila alpestris</i>	4	1	0	0	3	1	0	0	0	0
Lapland Longspur	<i>Calcarius lapponicus</i>	2	4	5	1	4	1	9	3	Unk. <sup>(b)</sup>	1
Least Sandpiper	<i>Calidris minutilla</i>	0	2	0	0	4	2	16	4	2	8
Long-tailed Duck	<i>Clangula hyemalis</i>	0	0	0	0	0	0	Unk. <sup>(b)</sup>	1	8	1
Northern Pintail	<i>Anas acuta</i>	0	0	0	0	0	0	8	1	0	0
Pacific Loon	<i>Gavia pacifica</i>	0	0	0	0	0	0	2	1	0	0
Peregrine Falcon	<i>Falco peregrinus</i>	0	2	0	1	0	0	0	0	0	0
Sandhill Crane	<i>Grus canadensis</i>	0	0	2	2	0	0	Unk. <sup>(b)</sup>	1	1	2
Savannah Sparrow	<i>Passerculus sandwichensis</i>	0	0	0	0	11	2	0	0	Unk. <sup>(b)</sup>	2
Semipalmated Plover	<i>Charadrius semipalmatus</i>	0	0	4	1	0	1	32	8	4	5
Tundra Swan	<i>Cygnus columbianus</i>	2	1	0	0	0	0	0	0	6	3
Willow Ptarmigan	<i>Lagopus lagopus</i>	0	5	1	1	0	0	0	0	0	0
<b>Total</b>		<b>30</b>	<b>34 (20)<sup>(c)</sup></b>	<b>72</b>	<b>26 (20)<sup>(c)</sup></b>	<b>35</b>	<b>15 (13)<sup>(c)</sup></b>	<b>121</b>	<b>45 (40)<sup>(c)</sup></b>	<b>37</b>	<b>31 (9)<sup>(c)</sup></b>

(a) Eggs, nestlings, or fledglings were counted to observers' best ability while minimizing disturbance to nests.

(b) Used when nest inaccessible (i.e., on island in waterbody) and identification could not be confirmed; Unk. = Unknown.

(c) Number in parentheses refers to the number of nests for which an egg count could be determined.

## 8.2 PRISM

The PRISM is a standardized method for monitoring shorebirds in the Canadian Arctic (Bart et al. 2015). PRISM surveys are designed to document population numbers of Arctic breeding shorebirds, describe the distribution and habitat associations of shorebirds, and monitor trends in population size (Bart et al. 2005). The PRISM surveys conducted as part of monitoring for the Project will contribute to regional knowledge in an effort to set population targets and assist with management and conservation of these species (EC 2012). All PRISM data will be submitted to ECCC for inclusion in their regional database.

As per recommendations from ECCC, Agnico Eagle has committed to completing PRISM surveys over 2 years, every 5 years (Agnico Eagle 2022b). A total of 16 plots were chosen by ECCC at the Meliadine Mine. Ten plots were surveyed by Golder (now WSP) in June 2018 and 16 plots were surveyed in June 2019. Due to significant road closures during post-calving caribou migration between 15 and 30 June 2023, one PRISM plot was completed in 2023 (Appendix C). PRISM plot surveys will continue in 2024.

### 8.2.1 Methods

One pre-determined 300-m x 400-m plots PRISM plot (i.e., MELI-IND11) was surveyed by two qualified field personnel. Field personnel walked transects spaced 25 m apart and used GPS geolocation to orient along transect lines. Field personnel documented all birds (i.e., absolute abundance) occurring within the plot, as well as breeding status and habitat conditions.

### 8.2.2 Results

The MELI-IND11 PRISM plot was surveyed on 22 June 2023 between 16:00 and 17:20 (Appendix C). Two bird species (common raven and herring gull) were observed within the plot and two bird species (Canada goose and horned lark) were observed incidentally, outside the plot. Species numbers, behaviours, nests, and other details have been recorded in the PRISM plot data spreadsheets and will be provided to ECCC.

## 8.3 Arctic Raptors Research Program

The following is a summary of the 2023 Arctic Raptors Research Program, completed by Arctic Raptors (Appendix D; Arctic Raptors 2024). The Arctic Raptors Research Program is designed to address the following monitoring indicators for nesting raptors are outlined in the TEMMP (Agnico Eagle 2022b):

- Monitoring Indicator 1; Disturbance of nesting raptors — To be determined in consultation with GN and Alastair Franke, related to occupancy and productivity.
- Monitoring Indicator 2; Projected-related mortality — To be determined in consultation with GN and Alastair Franke.

The TEMMP requires the protection of species at risk during the breeding season (T&C 59 and 60) and requires that disturbance to birds is minimized through consistent monitoring (T&C 59, 71, and 72), including nest-specific mitigation where necessary (T&C 61 and 62). Peregrine falcons (*Falco peregrinus*) were assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November of 2017, and were ranked “Not at Risk”. The responsible Minister rendered a decision on the recommendation made by COSEWIC, and peregrine falcons are no longer considered to be threatened. This report meets the T&Cs outlined by NIRB by documenting and mapping raptor nesting sites within 1.5 km of the Project infrastructure, including minimum “no disturbance” buffers.

### 8.3.1 Methods

Two structured surveys were conducted in 2023. The focus of these surveys was to search known nesting sites for the presence of cliff-nesting raptors. In addition to the structured surveys, favourable habitat was searched opportunistically when ferrying between known sites, camps, or other Mine infrastructure and when raptors or signs of site use (e.g., whitewash, orange-colored lichen, and unused nests) were observed. Sites were considered occupied if one or more adults displayed territorial or reproductive behaviour (e.g., vocalization and/or flight behaviour associated with defense of breeding territory or presence of nest building, nest, or eggs). Locations with partially built or unused nests without detection of breeding aged adults were noted as such (e.g., old stick nest; no birds detected). Raptor monitoring in 2023 involved two helicopter surveys (i.e., 25 – 29 May, 15 – 18 August), and ground monitoring of potential nesting habitat (e.g., natural cliffs, quarries, and borrow pits) in coastal areas using snowmobile in May and boat in August.

In any given year, the status of a nesting site is limited to one of only two outcomes: occupied or not occupied. Although estimation of nesting site occupancy can serve as a metric of population status, detection of nesting pairs is imperfect, and estimating the proportion of occupied sites without accounting for detection error can lead to underestimation of true occupancy. Occupancy modelling estimates parameters that influence occupancy and simultaneously accounts for imperfect detection (Appendix D).

In addition, environmental covariates can be added to an occupancy model to test whether they influence the above parameters using a logit link function. Multi-year occupancy was calculated in *R* (R Core Team 2019) using the *unmarked* package (Kellner et al. 2023). When appropriate, data were standardized.

Occupancy was analyzed separately for peregrine falcons and rough-legged hawks (*Buteo lagopus*). No gyrfalcons (*Falco rusticolus*) were detected. To analyze occupancy, the total number of nesting sites was filtered to include only those nesting sites that were occupied at least once between 2022 and 2023 for both species. Two candidate models were selected *a priori* to estimate the effect of distance to anthropogenic disturbance on detection probability ( $p$ ) and occupancy ( $\psi$ ). Candidate models were fit and selected using Akaike Information Criterion (AIC).

### 8.3.2 Results

Monitoring for breeding raptors has occurred consistently in the area associated with the Meliadine Project infrastructure for decades. Surveys have focused on searching for, documenting, and mapping nesting sites for three raptor species (i.e., peregrine falcons, rough-legged hawks, and gyrfalcons). The study design included two surveys: one to assess the location of occupied territories during the pre-incubation and incubation periods, and one to assess site productivity during the late brood rearing period.

Throughout the Rankin Inlet region surveyed by Arctic Raptors, nesting raptors have been detected at 247 nesting sites. Of these nesting sites, 119 have been occupied by only rough-legged hawks and 84 by only peregrine falcons. An additional 24 nesting sites have been occupied by either peregrine falcons or rough-legged hawks, resulting in a total of 143 known rough-legged hawk nesting sites and 108 known peregrine falcon nesting sites. Six nesting sites have been occupied by common raven, two by snowy owl (*Bubo scandiacus*), and one each by gyrfalcon and short-eared owl (*Asio flammeus*).

Within the RSA, nesting raptors have been detected at 203 nesting sites. Of these nesting sites, 105 have been occupied by only rough-legged hawks and 60 by only peregrine falcons. An additional 20 nesting sites have been occupied by either peregrine falcons or rough-legged hawks, resulting in a total of 125 known rough-legged hawk nesting sites and 80 known peregrine falcon nesting sites. Five nesting sites have been occupied by common raven, and one each by gyrfalcon, snowy owl, and short-eared owl.

Fourteen peregrine falcon nesting sites were deemed alternates (i.e., nest within a nesting territory that is not used in the current year), resulting in a total of 66 known peregrine falcon nesting territories. Of the 66 nesting territories surveyed, evidence of breeding was detected at 34 nesting territories (observed proportion = 0.52). Twenty-five rough-legged hawk nesting sites were deemed alternates, resulting in a total of 100 known rough-legged hawk nesting territories. Ninety-four rough-legged hawk territories were fully surveyed, of which, evidence of breeding was detected at 21 nesting territories (observed proportion = 0.22).

The null occupancy model (i.e., model that did not test the influence of distance to anthropogenic disturbance on occupancy or detection) best explained probability of occupancy among peregrine falcons ( $\psi = 0.58 \pm 0.07$  [predicted occupancy  $\pm$  standard error]) and rough-legged hawks ( $\psi = 0.31 \pm 0.88$ ).

## 8.4 Pre-Clearance Surveys

The following is a summary of the 2023 pre-clearance surveys, completed by Agnico Eagle Environmental staff and consultants (Appendix C; Agnico Eagle 2024a). Pre-clearance surveys are conducted during the active bird breeding window to determine in any active nests will be disturbed by proposed activities. Observers survey the entire proposed clearance area and document all bird activity, including nesting activity.

### 8.4.1 Methods

Surveys were conducted during the breeding season, between 15 May and 15 August 2023. Proposed construction areas were surveyed at least four days before any disturbance (e.g., construction or borrow pit activity). Surveys were conducted during fair weather (i.e., not raining, low winds, and temperatures below 5°C). A minimum of two people walked straight-line transects through each proposed construction area, spaced by a maximum of 10 m. An additional 30 m on all sides of the proposed construction area was also surveyed. In areas with ponds and lakes, circular transects spaced by a maximum of 25 m were completed. Locations and photos were taken when a nest was found.

### 8.4.2 Results

Nests from seven different bird species (i.e., Lapland longspur [*Calcarius lapponicus*], least sandpiper, white-crowned sparrow [*Zonotrichia leucophrys*], northern pintail [*Anas acuta*], semipalmated plover [*Charadrius semipalmatus*], horned lark, and savannah sparrow [*Passerculus sandwichensis*]) were observed during pre-clearance surveys (Table 7). An additional nine and six bird species were observed on 29 June 2023 and 30 June 2023, respectively, but not identified to the species level (Appendix C). When applicable, a setback perimeter was applied to the nest in accordance with the TEMMP (Agnico Eagle 2022b).

**Table 7: Bird Nesting Activity and Nests Identified during Pre-Clearance Surveys in 2023**

Date	Bird Species (Number Observed)	Details and Mitigation Actions Taken
5 June 2023	Lapland longspur (1)	Nest with no eggs found; no action taken.
6 June 2023	Lapland longspur (1)	Nest being built; nest removed at very early stage.
8 June 2023	Least sandpiper (1)	Least sandpiper adult incubating 4 eggs; construction not permitted on designated road section.
29 June 2023	White-crowned sparrow (2)	White-crowned sparrow pair displaying nesting behaviour; 50 m buffer zone established.
30 June 2023	Northern pintail (1); semipalmated plover (1)	Northern pintail female on 7 eggs; semipalmated plover adult showing nesting behaviour; 50 m buffer zone established
8 July 2023	Semipalmated plover (1)	Semipalmated plover nest with 2 eggs and 2 hatchlings; 50 m buffer zone established
10 July 2023	Horned lark (1); savannah sparrow (2)	Savannah sparrow adult with fledgling; no action taken.
12 July 2023	Semipalmated plover (1)	Semipalmated plover nestling; 100 m buffer zone established
13 July 2023	Horned lark (1)	Horned lark nestling; 100 m buffer zone established
14 July 2024	Semipalmated plover (1); savannah sparrow (3)	Semipalmated plover adult showing nesting behaviour; at least 1 young horned lark; 100 m buffer zone established.

Notes: m = metres.

## 8.5 Recommendations

In 2024, PRISM plots surveys, bird transect and point counts, waterbird shoreline surveys, and pre-clearance bird nest surveys will continue during the summer, subject to environmental constraints including severe weather and caribou movements. In the future, a subset of shorelines could be surveyed twice, potentially as part of nest re-checks, to identify potential observer effects on nest detection. Alternatively, pre-determined transects in areas where nests have previously been located could be established, to allow accurate comparison of effort across years, nest-finding ability, and changes in nest density related to different locations.

The analyses completed for the Arctic Raptors Research Program indicated no effect of distance to disturbance on occupancy, which is consistent with studies elsewhere in the Arctic (Coulton et al. 2013). The potential of detecting mine-related anthropogenic disturbance will be challenging in light of the presence of roads, trails, cabins, travel routes, and activities on the sea/sea-ice and lake ice associated with the community of Rankin Inlet. Multi-year surveys conducted at the scale of the RSA were recommended in 2022, and the 2023 program satisfies this recommendation. Further survey effort was also undertaken in the northern portion of the RSA to fill a previous gap; several unknown nesting sites in the northern portion of the RSA were observed and will be surveyed on an on-going basis (Appendix D).

Population trends between 2022 and 2023 for both focal raptor species suggest a decline in occupancy; however, this finding should be interpreted with caution until additional years can be considered. Given that no evidence of an effect of distance to disturbance on occupancy was found, and assuming that the apparent decline is real, other causes for raptor decline should be considered. A potential mechanism is Highly Pathogenic Avian Influenza, which spiked in 2022; therefore it is recommended that any found-dead raptors be submitted for disease testing.

## 9.0 WILDLIFE OBSERVATIONS

Agnico Eagle's Environment Technicians conduct site surveillance monitoring and road surveillance monitoring regularly of the AWAR and within the Project footprint. In addition to planned surveys, all supervisors ask their employees to report wildlife sightings. In November 2021, a new way to report wildlife sightings on site via text message was introduced to all employees. The text messaging was replaced by a QR Code in April 2023.

In previous TEMMP annual reports, observations from wildlife surveys and wildlife incidental observations were pooled and compared with previous years. Combined survey observations and incidentals from 2023 were slightly higher than other years (2018: 7,198 individuals; 2019: 880 individuals; 2020: 2,650 individuals; 2021: 4,182 individuals; 2022: 5,255 individuals; and 2023: 9,458 individuals; Nuqsana Golder 2023). Table 8 summarizes wildlife observations between 2018 and 2023 from both incidental observations and wildlife surveys. Results are presented separately in the sections following to distinguish between results from formal wildlife surveys and results from incidental observations.

**Table 8: Wildlife Observations from Wildlife Surveys and Incidental Observations, 2018 to 2023**

Wildlife Species	Scientific Names	Number of Individuals Observed						Total
		2018	2019	2020	2021	2022	2023	
American Pine Marten	<i>Martes americana</i>	0	0	20	2	0	0	22
Arctic Fox	<i>Vulpes lagopus</i>	105	67	62	160	256	115	765
Arctic Ground Squirrel	<i>Urocitellus parryii</i>	1	10	14	14	45	67	151
Arctic Hare	<i>Lepus arcticus</i>	31	34	50	84	146	130	475
Baird's Sandpiper	<i>Calidris bairdii</i>	0	0	0	2	70	0	72
Bald Eagle	<i>Haliaeetus leucocephalus</i>	1	0	0	1	4	2	8
Bird Spp. <sup>(A)</sup>	N/A	0	0	0	99	0	363	462
Brant	<i>Branta bernicla</i>	0	0	181	25	0	1	207
Canada Goose	<i>Branta canadensis</i>	67	145	470	1,027	889	981	3,579
Caribou	<i>Rangifer tarandus groenlandicus</i>	6,839	86	106	30	1,066	5,197	13,324
Common Raven	<i>Corvus corax</i>	2	5	43	29	93	115	287
Duck Spp.	N/A	20	17	95	164	105	179	580
Grey Wolf	<i>Canis lupus</i>	0	2	2	2	2	10	18
Greater White-Fronted Goose	<i>Anser albifrons</i>	0	44	0	6	0	0	50
Gull Spp.	N/A	0	18	76	74	232	173	573
Gyr Falcon	<i>Falco rusticolus</i>	-	-	-	-	-	1	1
Hawk Spp.	N/A	0	0	0	2	0	0	2
Long-Tailed Duck	<i>Clangula hyemalis</i>	0	0	3	5	0	2	10
Loon Spp.	N/A	-	-	-	-	-	14	14
Mammal Spp.	N/A	0	0	0	3	0	0	3
Muskox	<i>Ovibos moschatus</i>	0	0	22	0	8	0	30
Northern Pintail	<i>Anas acuta</i>	-	-	-	-	-	13	13
Peregrine Falcon	<i>Falco peregrinus</i>	0	4	5	2	0	3	14
Polar Bear	<i>Ursus maritimus</i>	2	2	4	0	1	5	14
Ptarmigan Spp.	N/A	19	8	59	142	87	50	365
Rough-Legged Hawk	<i>Buteo lagopus</i>	0	9	74	5	10	2	100
Sandhill Crane	<i>Grus canadensis</i>	4	68	152	202	175	213	814
Scaup Spp.	N/A	-	-	-	-	-	73	73

**Table 8: Wildlife Observations from Wildlife Surveys and Incidental Observations, 2018 to 2023**

Wildlife Species	Scientific Names	Number of Individuals Observed						
		2018	2019	2020	2021	2022	2023	Total
Snow Goose	<i>Anser caerulescens</i>	100	340	1,190	2,083	1,968	1,610	7,291
Snowy Owl	<i>Bubo scandiacus</i>	2	0	1	1	1	1	6
Tundra Swan	<i>Cygnus columbianus</i>	4	21	21	18	97	138	299
Wolverine	<i>Gulo gulo</i>	1	0	0	0	0	0	1
<b>Total</b>		<b>7,198</b>	<b>880</b>	<b>2,650</b>	<b>4,182</b>	<b>5,255</b>	<b>9,458</b>	<b>20,165</b>

Notes:

(a) Includes small passerines and individuals that could not be identified to species level (e.g., American robin, snow bunting, sparrow species); - indicates that this species or species group was not recorded in this annual reporting table before 2023; spp. = species.

## 9.1 Wildlife Surveys

Agnico Eagle conducted a combined total of 141 wildlife surveys along the AWAR and at Mine infrastructure in 2023. Wildlife surveys were completed along the AWAR an average of every 3.8 days from 7 January to 30 December 2023. Wildlife surveys were completed at Mine infrastructure (e.g., land farms, tank farms, camps, construction areas, exploration areas, the incinerator, water collection ponds) an average of every 7.3 days from 2 January to 18 December 2023 (Table 9).

**Table 9: Details of Wildlife Surveys in 2023**

Month	Number of All-Weather Access Road Surveys	Number of Mine Site Surveys
January	8	5
February	8	4
March	10	3
April	8	3
May	10	4
June <sup>(a)</sup>	4	4
July <sup>(a)</sup>	8	4
August	9	4
September	7	3
October	9	4
November	7	4
December	6	5
<b>Total</b>	<b>94</b>	<b>47</b>

Notes:

(a) Additional caribou surveys completed regularly throughout June and July, described in Section 12.0.

A total of 8,303 individuals from 16 identified wildlife species and 5 unidentified wildlife species groups (e.g., duck, gull, loon, merganser, and ptarmigan spp.) were recorded during surveys along the AWAR. Snow goose (*Chen caerulescens*) was the most commonly recorded bird species with a total of 1,540 individuals observed along the AWAR. Observations of snow geese flocks may include the Ross's goose (*Anser rossii*), which are difficult to distinguish from the snow goose from a distance. Canada goose, sandhill crane (*Grus canadensis*), and tundra swan (*Cygnus columbianus*) were also frequently observed along the AWAR with a total of 775, 162, and 107 individuals recorded in 2023, respectively. There were also 304 individuals grouped under bird spp., which

include small passerines and individuals that could not be identified to the species level. Mammal species recorded along the AWAR included Arctic fox (*Vulpes lagopus*; 9 individuals), Arctic ground squirrel (*Urocitellus parryii*; 53 individuals) and Arctic hare (*Lepus arcticus*; 4 individuals), as well as 7 observations of caribou groups, which totaled 5,013 individual caribou observed.

A total of 985 individuals from 12 identified wildlife species and 6 unidentified wildlife species groups (e.g., bird, duck, gull, loon, ptarmigan, and scaup spp.) were recorded during surveys at Mine infrastructure other than the AWAR in 2023. Canada goose, duck spp., and gull spp. were the most frequently observed species with 201, 138, and 89 individuals recorded, respectively. Mammal species recorded at Mine infrastructure included Arctic fox (8 individuals), Arctic ground squirrel (13 individuals), and Arctic hare (84 individuals), as well as 10 observations of caribou groups, which totaled 162 individual caribou observed.

These totals do not include caribou documented as part of the caribou behaviour monitoring (Section 12.1), caribou remote camera study (Section 0), or caribou advisory programs (Section 12.4). Barren-ground caribou are listed as 'Threatened' by COSEWIC but are not currently listed under the *Species at Risk Act* (SARA; Government of Canada 2023). No species listed under Schedule 1 of SARA were observed during wildlife surveys.

Wildlife tracks were also recorded during surveys. Arctic fox and Arctic hare tracks were recorded during wildlife surveys at Mine infrastructure. No tracks were recorded along the AWAR.

## 9.2 Wildlife Incidentals

There were 142 incidental wildlife observations recorded, representing 242 individuals of 14 species and one species group (i.e., duck spp.), around the Mine site (including the camp area) and the AWAR in 2023 (Table 10). Incidental wildlife observations were recorded between 13 January and 31 December 2023 through Wildlife Logs and Reports (e.g., via radio call, e-mail, or QR code), and do not include mortalities or observations of large herds of migrating caribou. Information on caribou migration through the Mine site and AWAR is presented in Section 12.0.

The most frequently observed species were Arctic fox (98 individuals), Arctic hare (42 individuals), and caribou (22 individuals; Table 10). Species observed only incidentally and not during wildlife surveys were grey wolf (*Canis lupus*), muskox (*Ovibos moschatus*), polar bear (*Ursus maritimus*), rough-legged hawk, and snowy owl.

**Table 10: Incidental Wildlife Observations (2023)**

Common Name	Scientific Name	2023	
		Number of Observations	Number of Individuals
Arctic Fox	<i>Vulpes lagopus</i>	85	98
Arctic Ground Squirrel	<i>Urocitellus parryii</i>	1	1
Arctic Hare	<i>Lepus arcticus</i>	21	42
Canada Goose	<i>Branta canadensis</i>	3	5
Caribou	<i>Rangifer tarandus</i>	8	22
Common Raven	<i>Corvus corax</i>	4	5
Duck Spp.	N/A	3	17
Grey Wolf	<i>Canis lupus</i>	4	10
Muskox	<i>Ovibos moschatus</i>	1	3
Peregrine Falcon	<i>Falco peregrinus</i>	1	1
Polar Bear	<i>Ursus maritimus</i>	5	5
Rough-Legged Hawk	<i>Buteo lagopus</i>	1	1
Sandhill Crane	<i>Grus canadensis</i>	3	11
Snow Goose	<i>Anser caerulescens</i>	1	20
Snowy Owl	<i>Bubo scandiacus</i>	1	1
<b>Total</b>		<b>142</b>	<b>242</b>

**Notes:** Specific GPS locations were not recorded for incidental wildlife observations in 2023. Wildlife mortalities and counts of large herds of migrating caribou are not included. N/A = not applicable; spp. = species.

### 9.3 Den Sites

Prior to construction of Project infrastructure, surveys are required to locate dens of carnivores in accordance with NIRB Project Certificate No. 006 (Amendment No. 002) T&C 53. Surveys were completed between May and August 2023 to locate dens of Arctic fox, grey wolf, polar bear, grizzly bear (*Ursus arctos*), and wolverine (*Gulo gulo*). The focus was on Arctic fox as surveys were conducted during their denning period. Most surveys occurred opportunistically while conducting other tasks in the vicinity or prior to the construction of Project infrastructure. Den surveys consisted of visual observations of den openings and signs of wildlife. An unmanned aircraft system (UAS), or drone, was used to survey for dens when required. Surveys were performed by qualified Environment Department personnel. A total of 141.6 ha was surveyed for dens at the Mine and along the access roads and waterline construction in 2023.

During the 2023 den survey, seven historical dens were revisited; no sign of activity was observed. Four new fox den locations were found in 2023 at the Mine site (one den), Discovery Road (one den), and Apache Bypass (two dens). Three of these dens were confirmed to be active with Arctic fox and one den was confirmed to be active with an Arctic ground squirrel (sik sik). Additional details on den surveys completed in 2023 can be found in Appendix E (Agnico Eagle 2024b).

The recommended construction setback for Arctic fox dens is 150 m. In the situation that construction was closer than the setback distance, mitigation measures identified in Appendix E were implemented. Fox den habitat was protected even when inactive.

## 9.4 Bird Nests

In 2023, six incidental bird nests were observed on the Mine site or along the AWAR (Table 11).

**Table 11: Incidental Bird Nests and Approximate Location, 2023**

Date Nest First Observed	Bird Species	Location	Approximate Coordinates (NAD 83; Zone 15)		Notes
			Easting	Northing	
8 March 2023	American Robin	Power Plant	539163	6990056	Old abandoned nest. Removed on 4 August 2023.
19 April 2023	Common Raven	Batch plant silo ladder	539588	6989051	Raven nest was being constructed on the Batch Plant silo ladder. Raven not observed.
20 April 2023	Common Raven	Batch plant silo ladder	539588	6989051	Confirmed that no eggs were in the nest and nest was removed as per GN DoE authorization.
27 April 2023	Common Raven	Tiri-02	540320	6988437	Ravens were reported flying over SP4. Raven nest was then spotted in Tiri-02
18 June 2023	Canada Goose	KM 22.75	543962	6982929	Nest observed on the side of the AWAR at the end of KM 22 in a small pond on the west side.
1 July 2023	Unknown Spp.	H8	-	-	OP2 Extension by the piezometer.

**Notes:** MBCA = Migratory Bird Convention Act; - = exact location was not recorded; m = metres.

## 9.5 Incidents and Mortalities

Mortalities can occur as wildlife interact with the Project site or become habituated to mining activities resulting from efforts to locate food or shelter (DDMI 1998). Diligent waste management, employee and environmental awareness, and immediate reporting of wildlife sightings in and around Project infrastructure can limit the mortality of wildlife.

### 9.5.1 Methods

Project-related incidents and mortalities are reported to the Mine's Environment Department for documentation in a detailed incident investigation for immediate follow-up. All incidental wildlife mortalities are reported immediately to the GN DoE, and the GN DoE is consulted for follow-up mitigation and disposal procedures. In addition, the KivIA is also immediately notified of wildlife mortalities and the events and circumstances around that mortality. If wildlife had to be deterred to reduce the risk of a wildlife-human incident, then all efforts are made by the environmental technicians to start with the least intrusive method available. All deterrent actions are recorded.

### 9.5.2 Results

A total of eight mortalities across six different species were reported at the Project from 9 June to 19 September 2023; all mortalities were suspected or confirmed to be caused as a direct result of Project activities (Table 12). There were no other reports of incidental mortalities (i.e., mortalities unrelated to Project activities) in 2023.

**Table 12: Wildlife Mortalities and Incidents Reported in 2023**

Date	Species	Number	Location	Project Related	Comments
9 June 2023	Arctic Fox	1	Tiriganiaq Open Pit 2	Yes	A deceased fox was found in Tiriganiaq Open Pit 2. The cause of death is unknown; it is likely the fox drowned. The Environment department was notified, and the animal was recovered. The carcass was disposed of according to the GN Conservation Officer's instructions.
27 July 2023	Common Raven	1	TIRI-02	Yes	The Environment department was notified that a deceased bird was found in TIRI-02; upon inspection, a raven was observed. The carcass was disposed of according to the GN Conservation Officer's instructions.
27 July 2023	Arctic Ground Squirrel	1	Bypass Road	Yes	A dead Arctic ground squirrel (sik sik) was observed on the Bypass Road, near KM 2.5. The cause of death is unknown; it is likely the animal was struck by a vehicle.
4 August 2023	Arctic Ground Squirrel	2	AWAR	Yes	Two dead Arctic ground squirrels (sik sik) were observed on the AWAR, near KM 5. The cause of death is unknown; it is likely the animals were struck by a vehicle.
9 August 2023	Avian Spp.	1	Gymnasium	Unknown	A deceased avian specimen was discovered outdoors, on the western side of the gymnasium building. Due to the advanced stage of decomposition and the absence of clear indicators of causality, definitive identification of the specimen could not be determined, and the exact cause of death also remains unknown. Agnico Eagle retrieved the carcass, which was disposed of according to the GN Conservation Officer's instructions.
28 August 2023	Arctic Hare	1	Waste Rock Storage Facility 1	Yes	A deceased Arctic hare was reported outdoors on the Waste Rock Storage Facility 1 ramp. Examining the carcass, it's likely that the Arctic hare came in contact with a haul truck. Agnico Eagle retrieved the carcass, which was disposed of according to the GN Conservation Officer's instructions.
19 September 2023	Black-and-White Warbler	1	Geology coreshack	Yes	At approximately 4:00 PM, a black-and-white warbler ( <i>Mniotilta varia</i> ) was reported inside the geology coreshack. The bird seemed lethargic when it was initially seen in the building. The Environment staff ensured that the bird had an easy way to fly out on its own. When the bird was checked on at around 5:20 PM, it was found dead. The exact cause of death remains unknown. The Environment Department notified the GN Conservation Officers and the Environmental Assessment Coordinator at ECCC, on 6 October 2023. The carcass was disposed of according to the GN Conservation Officer's instructions.

**Notes:** AWAR = All-Weather Access Road, ECCC = Environment and Climate Change Canada; GN = Government of Nunavut; spp. = species.

Three Project-related bird mortalities were recorded in 2023: a common raven, a black-and-white warbler (*Mniotilta varia*), and an unknown avian spp. that could not be identified due to the state of decomposition. These avian species were disposed of according to instructions from the GN DoE (i.e., GN Conservation Officer). Three Arctic ground squirrels were reported dead in two incidents on the Bypass Road and AWAR near KM 2.5 and KM 5. One Arctic hare was found dead on the Waste Rock Storage Facility 1 ramp. One Arctic fox was found in Tiriganiaq Open Pit 2.

Following initial guidance from the GN DoE in response to incidents and observations of Arctic foxes in and around the Mine in 2017, the GN DoE directs Agnico Eagle to deploy traps to remove animals as necessary. Traps were deployed in January 2023; however, no animals were caught, and traps were not subsequently deployed. The Environment Department employs many mitigation measures to minimize the presence of foxes on site. Toolbox talks for every crew of the department emphasize the importance of waste segregation to avoid attracting wildlife. Inspections are completed regularly in every location outside to prevent food waste availability to wildlife. These mitigations were reinforced by BEARWISE in a bear safety site audit report for the Meliadine Mine Site completed in April 2023 (BearWise 2023). Several action items following the safety site audit were undertaken to reduce wildlife attractants and ensure the safety of site personnel and local wildlife. Items were assigned to responsible parties to oversee the implementation of each action and set realistic timelines for completion. The Environment Department further encouraged regular progress updates to ensure accountability and monitor the effectiveness of the implemented measures.

## 9.6 Accuracy of Impact Predictions

A summary of the impact predictions proposed in the TEMMP (Agnico Eagle 2022b) is provided in Table 13. Through systematically recording the presence of all wildlife within and around the Project footprint, Environmental staff will remain apprised of current and emerging issues and will be able to manage issues as they arise. To use a common example, surveillance monitoring may detect that wildlife has gained access and is taking shelter beneath a building.

The thresholds presented in Table 13 have been employed for the Mine to date for consideration of any adaptive management for the TEMMP (Agnico Eagle 2022b). Refinement of these thresholds may be considered, in collaboration with the GN, as appropriate, as more data is collected and analyzed over time.

**Table 13: Accuracy of Impact Predictions – Wildlife Incidents 2023**

Monitoring Indicator	Preliminary Threshold	Exceeded in 2023?	Adaptive Management	Monitoring Method	TEMMP Section
Vehicle Collisions	No more than 1 ungulate/year	No	No action required	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	9.5.2
Project Related Mortality <sup>(a)</sup>	No more than 1 ungulate/year	No	No action required	Wildlife Sightings Log, Site Surveillance Monitoring	9.5.2
Project Related Mortality <sup>(a)</sup>	No more than 20 Arctic fox/year	No	On-going waste management and, regular toolbox meetings reiterating that any disrespect of wildlife or of Meliadine's wildlife policy is unacceptable and against company rules	Wildlife Sightings Log, Site Surveillance Monitoring, with particular emphasis around waste management areas	9.5.2
Project Related Mortality <sup>(a)</sup>	No more than 1 raptor/year	No	Not currently identified	Wildlife Sightings Log, Site Surveillance Monitoring	9.5.2
Project Related Mortality <sup>(a)</sup>	No more than 1 waterbird/year	No	On-going and regular toolbox meetings on awareness of blind-spots, particularly for large vehicles and equipment	Wildlife Sightings Log, Site Surveillance Monitoring	9.5.2

**Notes:** TEMMP = Terrestrial Environment Management and Monitoring Plan.

(a) Project Related Mortality = A death that can be directly linked to the Mine or mining activity.

## 9.7 Recommendations

Mortalities recorded in 2023 are within predicted thresholds. Agnico Eagle was proactive in managing wildlife conflict. Diligent waste management practices, employee and environmental awareness (e.g., toolbox meetings), and immediate reporting of wildlife sightings in and around Project infrastructure to limit mortality of wildlife should be continued. Specific recommendations from GN and wildlife audits in 2023 were to avoid mixing food waste with other types of waste, to educate personnel to not feed wildlife, to ensure that all waste containers are sealed, and to ensure that doors of buildings that contain waste remain closed (BearWise 2023). Agnico Eagle will continue to implement these recommendations.

## 10.0 WILDLIFE DETERRENTS

Wildlife deterrents were implemented at five locations in 2023 to deter birds from nesting. Propane cannons were used near lake J8, near the northeast corner of the TSF, near Pond 5a, and TSF Cell 2 North in 2023. Bird deterrent balloons were used at TSF Cell 2 North in 2023. Environmental technicians also actively deterred incidental observations of wildlife (e.g., Arctic fox, Canada goose) around Mine infrastructure; all activities were successful.

## 11.0 MUSKOXEN

Agnico Eagle has provided the GN DoE with in-kind contributions and support for previous muskoxen surveys and will continue to do so when requested. No surveys were completed by the GN DoE in 2023 and in-kind contributions were not requested.

## 12.0 BARREN-GROUND CARIBOU

Barren-ground caribou (including the Lorillard and Qamanirjuaq herds) are listed as 'Threatened' under COSEWIC but are not currently listed under the *Species at Risk Act* (Government of Canada 2023). Barren-ground caribou are ranked S3S4 and are considered 'Vulnerable' in Nunavut (CESCC 2022). Annual home ranges mapped by GN DoE show that the Project is within the annual home range of the Qamanirjuaq (pronounced "Kaminuriak") caribou herd (Campbell et al. 2012, 2014). The Lorillard caribou are migratory (Campbell et al. 2014) and generally distributed north of Chesterfield Inlet, based on telemetry data collected by the GN DoE and the location of their historical calving grounds (Campbell et al. 2012). The likelihood of animals from the Lorillard herd occurring in the RSA for the Mine, as defined in the FEIS (Golder 2014), is very low. Based on GPS telemetry data, now available from the GN DoE through a data sharing agreement with Agnico Eagle, Lorillard caribou most recently came within 90 km of the edge of the Project RSA in 2022.

Baseline survey data documenting the distribution of barren-ground caribou during early winter, spring migration and calving, and post-calving through fall migration and rut periods suggest that the RSA is within the seasonal range of the Qamanirjuaq barren-ground caribou herd (Jalkotzy 1999, 2000, 2001). The annual range of the Qamanirjuaq herd occupies an area from northern Manitoba and Saskatchewan in the south, to southwestern Nunavut and southeastern Northwest Territories (BQCMB 1999; Campbell et al. 2012). Barren-ground caribou are migratory, and movements and range use vary annually (Wakelyn 1999). The annual distribution and life history of this population has been previously documented (Banfield 1954; Kelsall 1968; Thomas 1969; Parker 1972; Heard 1986). The Qamanirjuaq herd calves approximately 57 km to the west-northwest of the Mine and after calving the herd aggregates into a post-calving movement, generally moving east towards the coast and then back to the west and southwest of the Mine where their summer movement and distribution patterns commence. During the post-calving movements to the coast, thousands of caribou can come through the Mine site and reside within and around the Project area from early June to late July (Golder 2020). For additional discussion on the Qamanirjuaq herd please refer to the FEIS (Golder 2014).

### 12.1 Caribou Behaviour Monitoring

The TEMMP indicates that once 50 caribou are observed within 5 km of the Project footprint boundary (visual detection or based on collar data provided by the GN DoE), a work suspension protocol commences at the Mine. Monitoring caribou behaviour in proximity to the mine is integral to understanding how caribou interact with the Project infrastructure including roads (i.e., crossing, deflection, walking parallel) and other Project infrastructure. Documenting behaviour through activity budgets may better inform appropriate adaptive management and distance triggers and thresholds in the future. Over time, a long-term dataset will be used to evaluate obvious response or lack of obvious response of caribou to mining based on behaviour.

The overall objectives of the caribou behaviour monitoring program are to determine if caribou activity budgets change with distance from the mine, and to document caribou response to stressors. Activity budgets (i.e., time spent feeding, resting, walking, running) of caribou exposed to disturbances from the Mine and AWAR will be used to provide inputs for assessing the impact to the energy balance of caribou (see Section 4.5.2 of the TEMMP, Agnico Eagle 2022b, for additional discussion). The immediate effect of specific stressors (e.g., aircraft, vehicles, other wildlife) on caribou behaviour will also provide general insight into the relative effect of natural, Project-related, and community-related (i.e., ATV traffic and harvesting) road stressors on caribou behaviour. Consequently, opportunistic surveys should be completed when appropriate to do so during the caribou post-calving migration, without causing additional stress to caribou.

An external caribou behaviour expert (from ERM Consultants Canada Ltd.) was brought on site in 2020, 2021, 2022, and 2023 to conduct the behaviour monitoring program, and to provide training for the Meliadine Mine Environmental Technicians. The overall objective of the caribou behaviour monitoring program as stated in the TEMMP is:

- To determine if caribou activity budgets change with distance from the mine, and to document caribou response to stressors.
- To determine if caribou distribution changes with proximity to the mine (i.e., do caribou avoid the mine).

Per the Project Certificate (T&C 57), a detailed analysis of caribou responses to operations of the AWAR is required at Meliadine. The detailed objectives of the 2023 study were:

- 1) To conduct a study using behaviour survey methodology at the Project site to estimate how the AWAR and site infrastructure may contribute to the effects of the Project on caribou.
- 2) To use information from the surveys (combined across four years of data collection) to determine factors that predict caribou behaviour near the mine site, specifically looking at distance; group size; and vehicle disturbances.

The primary hypothesis of this study was that caribou closer to the road would demonstrate a stronger response to vehicle disturbances.

### 12.1.1 Methods

Ground-based behavioural observations, or scan sampling, are conducted to provide data on changes in caribou behaviour as a function of distance from the Project. Two different, but complementary approaches have been used to record the activity budget of caribou around the Project and AWAR. See the TEMMP (Agnico Eagle 2022b) for additional details on the behaviour scan method.

Prior to arrival of caribou in June, a wildlife biologist from ERM conducted a classroom and practical training program for Agnico Eagle environmental technicians from Meliadine Mine. The ERM wildlife biologist with an assistant was tasked with conducting behaviour observations as a primary role during July, while Meliadine technicians conducted behaviour observations opportunistically during other fieldwork in alignment with the TEMMP (Agnico 2022b).

The objective of the data analysis was to quantify trends in the survey data, and determine whether factors such as distance to infrastructure, group size, or disturbances could be used to explain caribou behaviour. The primary hypothesis was that caribou closer to the road would demonstrate a stronger response to disturbances. An initial exploratory analysis was conducted to visualize the data and determine the appropriate method for analyzing the data. Behaviour categories were grouped for analysis into “response” behaviours (alert and running) and non-response (feeding, lying down and standing) to increase statistical power.

Following the 2021 analysis there was a suggestion from the TAG to explore whether the proportion of walking caribou changed as a response to disturbance. This was done to see if walking would be better categorized as a response behaviour or non-response behaviour. To test this, a model that included walking, running, and alert behaviours was conducted in addition to the original model with just running and alert behaviours.

Generalized linear mixed-effects models (GLMMs) were developed to statistically test for differences in the proportion of response behaviours in surveyed animals as a function of various controlling variables, including the occurrence of disturbances. Proportions were modelled using a binomial distribution. Because small groups naturally have greater variability in values (i.e., more likely that “all” or “none” of caribou were alarmed when there are only two caribou) an offset was included for the total number of caribou with tallied behaviour. This regression framework provides a means to control for environmental variables, repeated measures, and spatial correlation. Random effects were included for survey ID and year to control for spatial and temporal autocorrelation.

Statistical analyses were conducted using R (R Core Team 2023). Two dependent variables were tested:

- Proportion of response behaviours (alert and running) in each 3-minute interval in each survey.
- Proportion of walking plus response behaviours in each 3-minute interval in each survey.

The two dependent variables were each modelled against a suite of potentially important variables to determine if there was any statistical relationship with response behaviour. Based on an initial assessment of which variables were most statistically relevant, the variables included in this analysis were group size, distance to road, wind speed, and a binary variable identifying whether a disturbance occurred during each 3-minute interval. For each dependent variable, GLMMs were constructed and tested for model fit, as evidenced by the Akaike Information Criterion (AIC; Appendix F).

### 12.1.2 Results

The following provides a summary of caribou behaviour monitoring completed in 2020–2023. Further explanation of statistical analyses and results are contained in Appendix F.

From 17 June to 9 July 2023, groups of caribou were surveyed passing through or near the study area, with numbers peaking around 25 June 2023. This was slightly earlier than the peak in 2022 and 2021, and at least one week earlier than the peak in 2020. Caribou mostly exhibited non-response behaviours: standing, laying, and foraging. Across all survey years, groups tended to show greater response behaviours (running, alert) when in smaller groups (less than 25 caribou) or within 300 m of a road (ERM 2024a).

A total of 213 surveys were completed between 2020 and 2023 (Table 14). In 2023, 29% of surveys recorded a disturbance. Caribou mostly exhibited the non-response behaviours of standing, laying, and feeding. Small groups (i.e., < 25 caribou) tended to have higher proportion of response behaviours (i.e., running, alert) than larger groups, irrespective of disturbances. Groups within 300 m of the road tended to have higher proportions of response behaviours than those further away. Distance to the road was also linked to walking behaviour when grouped with alert and trotting behaviours, suggesting potential for walking as a response to disturbance. Walking behaviour has previously been considered a non-response behaviour, and as such models presented in this report include versions with walking designated as a potential response behaviour, as well as models with walking designated as a non-response behaviour for comparison. These results support that within 300 m of the road, caribou are more alert and active.

Following a disturbance event, the proportion of response behaviours in a group of caribou increased, but typically returned to baseline behaviours within two sampling periods (i.e., six minutes). Caribou were statistically more likely to be walking, alert, or running in sampling periods where a disturbance occurred (i.e., a passing vehicle). Therefore, the use of convoys as a method to consolidate multiple essential vehicles into a single disturbance event may be an effective mitigation to reduce the period caribou exhibit response behaviours following disturbance.

**Table 14: Meliadine Caribou Behaviour Surveys Data Summary**

Caribou Group Size	2020			2021			2022			2023		
	Number of Surveys	Surveys with Disturbance	Surveys with Road Crossing	Number of Surveys	Surveys with Disturbance	Surveys with Road Crossing	Number of Surveys	Surveys with Disturbance	Surveys with Road Crossing	Number of Surveys	Surveys with Disturbance	Surveys with Road Crossing
1-2	5	4	2	8	5	0	11	9	3	3	2	0
3-25	11	2	2	11	7	3	9	7	4	11	1	1
26-50	9	3	0	2	0	0	3	1	0	4	1	4
51-500	14	11	1	16	8	6	18	15	6	8	3	1
501-1,000	6	3	1	0	0	0	8	4	0	2	0	0
>1,000	11	6	0	9	7	3	20	17	2	14	5	6
<b>Total</b>	<b>56</b>	<b>29</b>	<b>6</b>	<b>46</b>	<b>27</b>	<b>12</b>	<b>69</b>	<b>53</b>	<b>15</b>	<b>42</b>	<b>12</b>	<b>12</b>

Source: ERM 2024a.

Environmental variables (e.g., temperature and wind speed) were not related to proportion of response behaviours in caribou groups.

## 12.2 Caribou Remote Camera Study

The following section is a summary of the Caribou Trail Camera Study Compilation Report, 2020 to 2023, completed by ERM (Appendix G; ERM 2024b).

Between 2020 and 2023, a study was conducted using motion-triggered cameras to study caribou interactions with the Project infrastructure during their annual migration, focusing on the AWAR. The initial study was designed to identify features of the AWAR (i.e., slope, substrate, height, and surrounding habitat) that may facilitate higher rates of caribou passage during annual migratory movements. Cameras were also placed at locations identified by community members and Inuit Elders from IQ where caribou more frequently crossed the road. The survey protocol in 2023 followed that used in the previous two years, with some modifications to improve data quality, and with some cameras moved to the Mine site and proposed Discovery Road.

The objectives of the 2023 study were:

- To conduct a study using motion-trigger cameras at the Project site to estimate how the Mine infrastructure including the AWAR may affect caribou movement during seasonal migration.
- To evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2023 and compare these locations with camera data from 2020 to 2022, and with those identified by IQ and GPS collar data.
- To collect information to determine road characteristics that might preferentially be used by caribou for crossing, specifically:
  - Material of road construction (esker versus quarry)
  - Side slope
  - Road height
  - Surrounding vegetation type
- To evaluate what relationship (if any) there is between vehicles recorded on the road and location/timing of caribou observations.
- To provide data on caribou occurrence in the Discovery area and in proximity to the Mine site.

Full details on the study are provided in Appendix G.

### 12.2.1 Methods

Camera locations were selected to maximize coverage and representation of habitat and road types, and to best detect caribou and vehicles along the AWAR. The same approximate locations were used in 2020, 2021, and 2022, with five additional locations added in 2022 to extend camera coverage south along the AWAR. In 2023, fewer cameras were deployed along the AWAR, with cameras distributed around the Mine site and along the proposed Discovery Road. There were 19 cameras deployed along the AWAR, 10 cameras deployed around the Mine site, and 15 cameras deployed along the proposed Discovery Road. All AWAR cameras were installed on the west side of the road facing north and were placed no more than 5 m from the side of the road to better capture vehicle traffic. All cameras took five pictures whenever motion was detected within approximately 40 m of the motion detector, including wildlife, vehicles, and occasionally objects moving in the wind. In addition, all cameras were programmed to take one photo every 30 minutes, day or night, to help capture activity happening beyond the range of the motion detector and to ensure the cameras were operational to measure effort.

Road survey data from 2020 was used in the 2020 to 2023 analyses and included: width, height above tundra, side-slope, surfacing material (esker versus quarry rock, and size), and surrounding vegetation type. All photos from 2022 and 2023 were pre-processed by an artificial intelligence (AI) algorithm to automatically sort photos into four categories: animals, vehicles, humans, and blank images (Beery et al. 2019; Fennell et al. 2022). ERM personnel then reviewed all photos as classified by the AI algorithm and confirmed all detections of wildlife or vehicles. In 2020 and 2021, ERM personnel reviewed all photos from the cameras and recorded every detection of wildlife and vehicles. In 2023, four cameras were spaced along the AWAR and analyzed for detailed vehicle traffic in addition to wildlife.

Analyses were designed to quantify trends both among and within years, and to determine whether factors such as road structure, vehicle traffic on the road, or placement of the cameras could be used to explain caribou occurrence and identify “hotspots” where caribou may be likely to cross the AWAR. Additionally, cameras around the Mine site and along the proposed Discovery Road provided information on caribou movement through the Meliadine area during the study period.

An initial exploratory analysis was conducted to visualize the data and determine the appropriate method for analyzing the data. Where data were complete, generalized linear models (GLMs) were used to assess the differences in the number of caribou detection events as a function of various controlling variables, including road structure. This regression framework provides a means to control for habitat, environmental variables, repeated measurements, and spatial correlation. For some comparisons in which statistical models were not useful due to a small sample size, summary statistics and correlations were calculated. All analyses were carried out using R (R Core Team 2023).

## 12.2.2 Results

Overall, the key findings across four years (2020 to 2023) of the camera study included:

- The cameras were successful at capturing many caribou crossing the AWAR, with peak caribou passage occurring three weeks earlier in 2023 (June 18 – 26) versus 2022 (July 10 – 15), consistent with patterns of inter-annual variability observed in caribou GPS collar data.
- Caribou crossing timing and locations in 2023 were consistent with locations identified in 2020 to 2022, and with locations identified by IQ from Inuit Elders and community members. The hotspots identified by the camera data in all four years aligned more closely with the IQ identified hotspots than the collar data from 2012 to 2019.
- Road height and road-side slope at each camera location was not related to the number of caribou observed at each camera location, suggesting that differences in the structure of the AWAR do not significantly influence the locations where caribou cross. The AWAR was constructed with strict design criteria including having a side slope and material that promoted caribou crossing the road – and thus there may not be enough variability in the road construction to influence caribou crossing.
- More caribou were observed on cameras on the northern half of the road in most years. Esker material is more common as a substrate on the northern half of the road which may suggest caribou prefer crossing on esker material. However, it is more likely that this is due to broad scale caribou movement patterns.
- Median time lag from a vehicle passing to a caribou crossing when the AWAR was open was 1.7 hours, when the AWAR was open with restriction was 3.7 hours, and when the AWAR was closed was 4.3 hours. The increasing time lag between vehicle detection and caribou crossing does not necessarily suggest avoidance of traffic on the AWAR, but may instead reflect the largely reduced volume of traffic due to pre-emptive restriction on the AWAR when caribou are in the area. Vehicle results should be treated with caution, as caribou may pass behind a camera or out of range of the camera motion detector, and therefore not all caribou crossings will be captured by all cameras, despite best efforts to do so.
- Caribou were detected in the Mine and Discovery areas throughout the study period, with small groups around the mine and larger migratory groups along the proposed Discovery Road.

Overall, the results suggest that caribou are not affected by the structure of the Meliadine AWAR, but spatial differences in road crossing locations may be explained by traffic, migration timing, migratory route fidelity, or some combination of these factors. Convoys are currently used to mitigate effects of essential Mine traffic when caribou are in the Mine area. These results highlight the power of using motion-trigger cameras to draw connections between the many interacting variables that may explain caribou passage through the Mine area, which may be integrated with additional sources of data such as collar analysis and behaviour monitoring to inform potential cumulative effects of the Meliadine Mine. Additional camera data will help confirm any potential effects, as well as provide further insight on areas of high caribou passage across the AWAR. Further, pooling data collected across multiple study years will allow for minimum sample sizes necessary to incorporate further quantitative analyses of patterns of caribou movement across the Project.

Further explanation of analyses and results of the caribou trail camera study are contained in Appendix G.

## 12.3 Collared Caribou Inventory

The following section provides a summary of collared caribou presence in the RSA and LSA from 1993 to 2023. The goal of the collared caribou inventory is to understand the potential for indirect effects from the Project on caribou, both immediately adjacent to the Project (i.e., in the LSA) and in the surrounding region (i.e., in the RSA). A data sharing agreement between Agnico Eagle and the GN DoE was reached in 2023; GPS telemetry data (i.e., collar data) for Kivalliq caribou were received from the GN DoE and were used in this collared caribou inventory. Findings from previous analyses using these collar data, including analyses undertaken for the Meliadine Extension or Waterlines proposal (i.e., Commitment 38 analyses; WSP 2023a, WSP 2023b), are also integrated into the collared caribou inventory presented.

### 12.3.1 Methods

For each caribou and year, the collar data were intersected with the LSA and RSA footprints to determine when collared caribou entered and exited the LSA and RSA. Caribou interactions with the LSA and RSA footprints were separated into “bursts”, or unique interaction events that ended when the caribou stepped outside either the LSA or RSA. Thus, a single caribou could have multiple RSA interactions or LSA interactions (bursts) in one year. The mean number of times that each caribou interacted with the LSA and RSA per year (i.e., mean number of bursts) was calculated. Further, the entry date and exit date for each burst was determined, then averaged across all bursts to determine a mean entry and exit date, per RSA and LSA, per year. The duration of time spent in the RSA and LSA was also calculated per burst; if a caribou entered and exited on the same day, the duration was automatically rounded up to 1 day. Then, the mean duration of time spent in the RSA and LSA was averaged per year.

### 12.3.2 Results

Individuals from the Qamanirjuaq herd have been present in the RSA for 16 of the 31 years where collar data are available (Table 15). Caribou began entering the RSA in 2006 and have continued to enter the RSA since then (except in 2009 and 2010). Alternating periods of presence and absence of caribou in the RSA has been noted by IQ (Golder 2014). The number of collared individuals that annually enter the RSA has increased since 2006, with the most Qamanirjuaq caribou entering the RSA between 2017 and 2019. Since 2011, collared Qamanirjuaq caribou have typically entered the RSA in late June to mid-July and have remained in the RSA for 1 to 5 days.

Individuals from the Qamanirjuaq herd have been present in the LSA for 15 of the 31 years where collar data are available (Table 15). In almost all years when caribou have entered the RSA, some individuals have also entered the LSA (except in 2008). Qamanirjuaq caribou began entering the LSA in 2006 and 2007, did not enter the LSA between 2008 and 2010, then have consistently been present in the LSA since 2011. Collared caribou typically enter the LSA in early to mid-July and leave the LSA on the same day; some individuals enter the LSA several times over the course of one summer but remain in the LSA for a day or less during each interaction, which suggests that caribou are not avoiding the Project. The length of time Qamanirjuaq caribou are spending in the LSA has not varied since collared caribou began interacting with the LSA in 2006.

These results align with WSP's (2023a) previous findings that fewer than 30% of Qamanirjuaq caribou come within 5 km of the Project and that 99% of caribou that came within 5 km of the AWAR or Mine for a specific year remained for less than 24 hours. The collar data also support that caribou are spending very little time in the areas immediately adjacent to the Project. In consideration of these results, impacts to the Qamanirjuaq herd due to the Project have the potential for limited transboundary effects. Past analysis of collar data interactions with the Mine infrastructure and AWAR in indicate no strong local scale deflection effects although more regional effects have not been assessed (Appendix D in Golder 2021).

**Table 15: Annual Timing of Qamanirjuaq Collared Caribou Presence and Duration in the Regional Study Area and Local Study Area, 1993–2023**

Year	Total Caribou Collared	RSA					LSA				
		Caribou in RSA	Mean Entries per Caribou	Mean Entry Date	Mean Exit Date	Mean Duration (days)	Caribou in LSA	Mean Entries per Caribou	Mean Entry Date	Mean Exit Date	Mean Duration (days)
1993	5	-	-	-	-	-	-	-	-	-	-
1994	8	-	-	-	-	-	-	-	-	-	-
1995	8	-	-	-	-	-	-	-	-	-	-
1996	13	-	-	-	-	-	-	-	-	-	-
1997	14	-	-	-	-	-	-	-	-	-	-
1998	15	-	-	-	-	-	-	-	-	-	-
1999	18	-	-	-	-	-	-	-	-	-	-
2000	15	-	-	-	-	-	-	-	-	-	-
2001	13	-	-	-	-	-	-	-	-	-	-
2002	16	-	-	-	-	-	-	-	-	-	-
2003	14	-	-	-	-	-	-	-	-	-	-
2004	23	-	-	-	-	-	-	-	-	-	-
2005	22	-	-	-	-	-	-	-	-	-	-
2006	44	2	1.00	17-Sep	06-Oct	19.00	2	1.00	05-Oct	06-Oct	1.00
2007	42	1	1.00	04-Jan	14-Feb	41.00	1	1.00	14-Feb	14-Feb	1.00
2008	48	1	1.00	13-Jul	14-Jul	1.00	-	-	-	-	-
2009	52	-	-	-	-	-	-	-	-	-	-
2010	21	-	-	-	-	-	-	-	-	-	-
2011	40	2	1.00	01-Aug	02-Aug	1.00	2	1.00	01-Aug	01-Aug	1.00
2012	35	5	1.20	15-Jul	18-Jul	3.50	3	1.67	17-Jul	17-Jul	1.00
2013	53	12	1.42	10-Jul	13-Jul	2.47	5	1.20	14-Jul	14-Jul	1.00
2014	55	7	1.86	21-Jul	23-Jul	2.62	3	1.33	09-Jul	09-Jul	1.25
2015	57	36	2.06	28-Jul	01-Aug	3.43	27	1.59	15-Jul	15-Jul	1.12
2016	75	39	2.26	08-Jul	11-Jul	3.11	28	1.54	11-Jul	11-Jul	1.00
2017	121	69	1.36	07-Jul	09-Jul	2.49	48	1.52	09-Jul	09-Jul	1.00
2018	108	50	2.34	08-Jul	11-Jul	3.38	40	1.75	13-Jul	13-Jul	1.01
2019	128	69	1.35	23-Jun	28-Jun	4.82	24	1.54	29-Jun	29-Jun	1.03
2020	112	29	2.07	05-Jul	08-Jul	2.70	14	2.14	10-Jul	10-Jul	1.03
2021	69	21	2.76	14-Jun	17-Jun	2.93	10	1.60	06-Jul	06-Jul	1.00
2022	62	28	2.39	28-Jun	02-Jul	3.90	20	1.75	08-Jul	08-Jul	1.00
2023	66	28	5.18	09-Jun	13-Jun	4.16	24	2.88	27-Jun	28-Jun	1.03

LSA = Local Study Area; RSA = Regional Study Area.

## 12.4 Caribou Advisory

The objective of the Caribou Advisory Monitoring program is ensuring workers are aware of the approximate numbers of caribou on and in close proximity to the Project, which is related to the potential for interactions between caribou and mining activities. The Caribou Advisory raises general awareness so that employees are alert to the likelihood that mitigation could be triggered, and what mitigation entails. The number of animals near the Project and in specific areas dictates the type of mitigation practices that will be undertaken (e.g., road closure, closing specific areas at the Mine site, speed reduction).

### 12.4.1 Methods

Mine staff, in collaboration with the GN and KivIA and including participation of the KHTO, undertake the implementation of a caribou monitoring and work suspension protocol during caribou migration to minimize sensory disturbance at the Project site and along the AWAR. KHTO and KivIA members typically assist Mine staff conducting surveys during caribou migration. In 2023, a KivIA representative was lodged on site for the majority of the migration period, allowing for instant communication with the Environment department and its consultants. The KHTO led the convoys when travel was required on the AWAR (equipment transportation or employee buses) during the caribou migration. Communication protocols built into the work suspensions are designed to be broadcast swiftly and broadly among all departments in real time. The Environmental Department monitored caribou presence as per the caribou migration protocol (TEMMP Appendix III; Agnico Eagle 2022b) including the use of collar data and regular surveys and issuing caribou advisories. Regular surveys for caribou, were completed by on site Environmental Technicians, and consisted of ground surveys at multiple locations, at regular intervals throughout the day (i.e., 06:00, 12:00, 18:00) during caribou migration. The results of the surveys were communicated to all Project Departments, including the KivIA and KHTO, indicating if any work stoppages or restrictions are required and the affected work areas.

A decision tree is used to guide adaptive monitoring and mitigation based on results of surveys. Three action levels are outlined in the decision tree:

- Level 1: triggered when 50 or more caribou are observed within 10 km of the Mine based on ground surveys or review of satellite collar data. Ground surveys are completed every two days, and satellite collar data is reviewed twice per week. Site-wide warnings are issued daily. Level 1 is ongoing for 5 days, or until Level 2 is triggered.
- Level 2: triggered when less than 50 caribou are observed within 5 km of the Mine. Ground surveys are completed every two days, and satellite collar data is reviewed twice per week. Additional mitigation (e.g., work suspension), may be implemented by the Environmental supervisor. Site-wide warnings are issued daily. Level 2 is ongoing for 10 days; or until caribou exit the 5 km mark or Level 3 is triggered.
- Level 3: triggered when 50 or more caribou are observed within 5 km of the Mine. Ground surveys are completed three times per day, and satellite collar data is reviewed at least twice per week. A work suspension protocol is implemented. Site-wide warnings are issued three times per day. Closure occurs on the AWAR when 50 or more caribou are within 100 m of the road. Level 3 is ongoing until caribou exit the 5 km mark.

## 12.4.2 Results

Surveys to monitor migration of the Qamanirjuaq herd through the Project were performed from 16 to 23 January 2023 and 30 May to 25 July 2023. Mine site and AWAR surveys were completed two to three times daily throughout this period by Mine personnel. An additional fourth survey was occasionally done to provide an update on herds. A record of caribou surveys, including date, time, estimated number of caribou and approximate location are presented in Appendix H. Additional fourth surveys are included in Appendix H, but were purposefully omitted in Figure 4 to avoid inflating caribou counts and to allow direct comparison across days (assuming a maximum of three surveys per day).

Caribou were detected during surveys from 16 to 23 January 2023, and closure of the Mine site and/or AWAR was triggered between 20 and 21 January 2023 (Table 16). Caribou were detected during surveys from 30 May to 25 July 2023, and closure of the Mine site and/or AWAR was triggered between 11 June and 11 July 2023 (Table 16). The highest caribou numbers were observed on 6 July 2023 (Figure 4).

Shutdowns affecting different components of the Mine were implemented to facilitate the safe migration of caribou through the Project. Shutdowns are summarized in Table 16. AWAR closures in 2023 totaled 386 hours over 26 days. Vehicle traffic on site and open pit operations were restricted for 281 hours over 20 days. Activities at the Exploration Camp were restricted for 81 hours over 5 days. Activities at the Main Camp were restricted or shutdown for 264 hours over 18 days. Waterline work was cancelled for 296 hours over 28 days. Eleven flights were cancelled to mitigate disturbance to caribou on 19, 20, 21, 26 and 27 June 2023 as well as 6 and 7 July 2023.

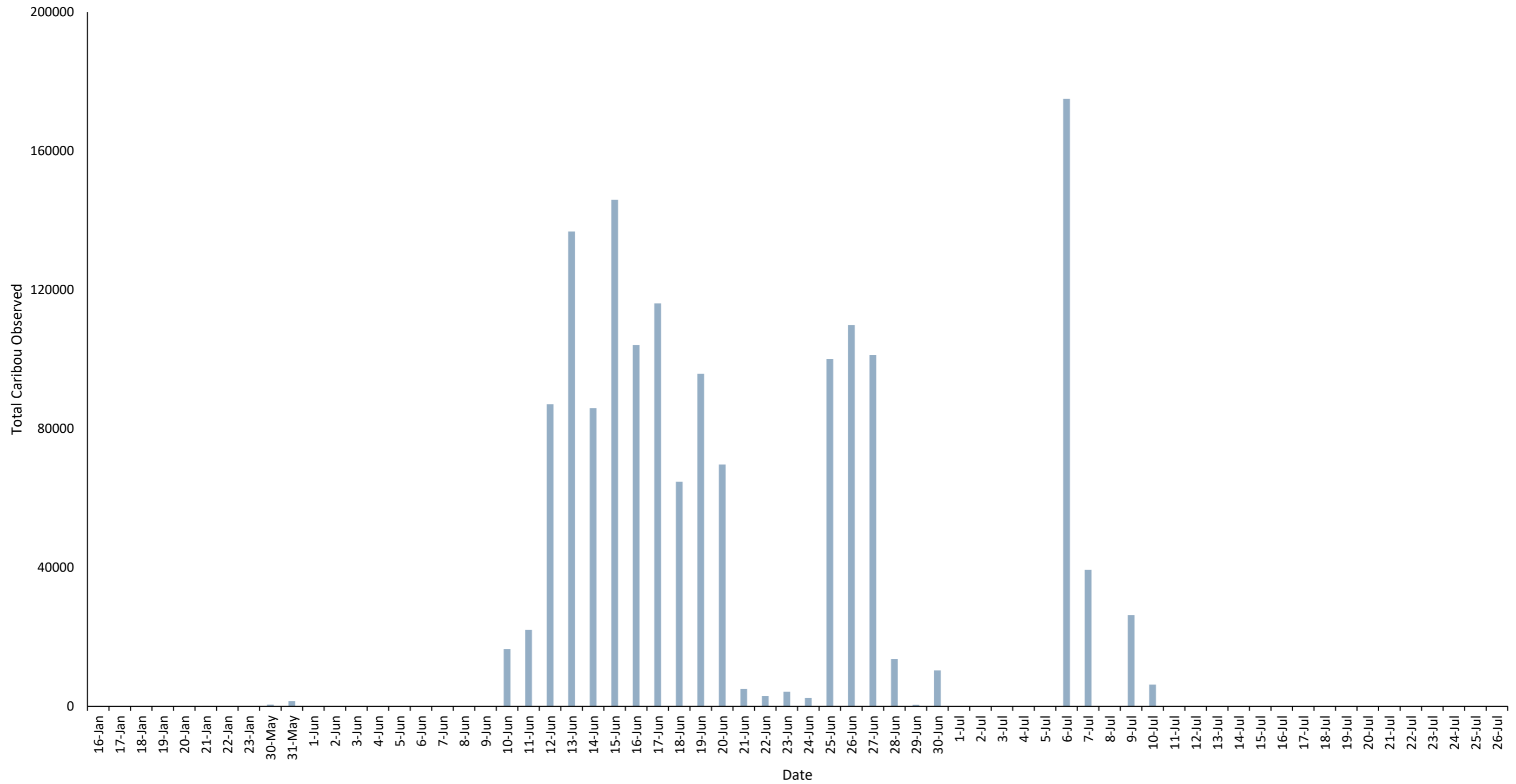


Figure 4: Total caribou observed by date in 2023. Note that caribou observed in January 2023 are included on the same axes as May, June, and July 2023 caribou observations.

**Table 16: Recorded Down Time in 2023**

Date	Hours Closed					Operation Comments	AWAR Comments	Waterline Comments
	AWAR	OP Operations	Exploration Camp Area	Main Camp	Waterline Construction			
2023-01-20	8.0	8.0	0.0	8.0	0.0	Level 3 - Operations shutdown at 16:00	-	-
2023-01-21	11.5	11.5	0.0	11.5	0.0	Level 3 - Operations resumed at 11:30	-	-
2023-06-11	0.0	11.0	0.0	11.0	6.0	Level 3 - Operations shutdown at 13:00	AWAR open with restriction	Waterline work cancelled (18:00-00:00)
2023-06-12	0.0	24.0	0.0	24.0	12.0	Level 3 - Operations shutdown since 2023-06-11	AWAR open with restriction	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-13	0.0	24.0	0.0	24.0	6.0	Level 3 - Operations shutdown since 2023-06-11	AWAR open with restriction	Waterline cancelled (00:00-06:00); Work conducted along waterline (18:00-00:00)
2023-06-14	6.0	24.0	0.0	24.0	6.0	Level 3 - Operations shutdown since 2023-06-11	AWAR close at 18:00	Work conducted along waterline (00:00-06:00); Waterline work cancelled (18:00-00:00)
2023-06-15	12.0	24.0	0.0	24.0	12.0	Level 3 - Operations shutdown since 2023-06-11	AWAR open 6:00 to 18:00, close at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-16	12.0	18.0	0.0	18.0	12.0	Level 2 - Industrial site and Portal 1 at 18:00 Level 3 - Exploration Camp since 2023-06-11	AWAR open 6:00 to 18:00, close at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-17	24.0	6.0	0.0	6.0	12.0	Level 2 - Entire site from 6:00 to 18:00 Level 3 - Operations shutdown at 18:00	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-18	24.0	21.0	0.0	21.0	12.0	Level 3 - Operations shutdown since 2023-06-17 18:00 Level 2 - Industrial Site and Portal 1 at 21:00	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-19	24.0	6.0	0.0	6.0	12.0	Level 2 - Entire site from 6:00 to 12:00 Level 3 - Operations shutdown at 12:00	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-20	24.0	17.0	0.0	17.0	12.0	Level 3 - Operations shutdown from 2023-06-19 12:00 to 2023-06-20 17:00 Level 2 - Entire site at 17:00	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-21	24.0	6.0	0.0	0.0	12.0	Level 2 - Entire site 0:00 to 12:00 Level 3 - Portal 1 at 12:00 Level 2 - Entire site at 18:00	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-22	15.5	6.0	0.0	0.0	12.0	Level 2 - Entire site 0:00 to 18:00 Level 3 - Exploration Camp and Portal 1 at 18:00	AWAR closed 00:00 to 9:30, reopened at 9:30 and closed at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-23	18.0	24.0	24.0	24.0	12.0	Level 3 - Operations shutdown entire site at 6:00	AWAR reopened at 9:00 and closed at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-24	6.0	17.0	17.0	17.0	12.0	Level 3 - Operation shutdown 00:00 to 17:00 Level 2 - Entire site at 17:00	AWAR reopened with restriction at 6:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-25	18.0	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR open 00:00 to 6:00, closed at 6:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-26	24.0	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-27	24.0	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR closed	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-28	6.0	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR reopened at 6:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-29	6.3	6.3	6.3	6.3	12.0	Level 2 - Entire site 00:00 to 17:45 Level 3 - Operations shutdown 17:45	AWAR open from 00:00 to 17:45, closed 17:45 to 24:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-06-30	15.8	9.8	9.5	9.8	12.0	Level 3 - Operations shutdown 00:00 to 9:45 Level 2 - Entire site at 9:45	AWAR closed 00:00 to 9:45, reopened 9:45 to 18:00 and close at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-07-01	6.0	0.0	0.0	0.0	12.0	Level 2 - Entire site since 9:45 2023-06-30	AWAR reopened with restriction at 6:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00). Between June 22 and July 2, smaller groups of caribou have always been seen within 5 km of working area during the evening surveys.
2023-07-02	0.0	0.0	0.0	0.0	6.0	Level 2 - Entire site	AWAR open with restriction	No caribou within 5km radius of the working area on AWAR (KM19-20) - work to start at 18:00 (6 hours total of work for July 2nd)

**Table 16: Recorded Down Time in 2023**

Date	Hours Closed					Operation Comments	AWAR Comments	Waterline Comments
	AWAR	OP Operations	Exploration Camp Area	Main Camp	Waterline Construction			
2023-07-03	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-04	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-05	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-06	13.2	0.0	0.0	0.0	6.0	Level 2 - Entire site	AWAR closed at 10:50	Work conducted along waterline (00:00-06:00); Waterline work cancelled (18:00-00:00)
2023-07-07	20.5	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR reopened from 6:00 to 9:30, closed at 9:30	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-07-08	7.5	0.0	0.0	0.0	7.5	Level 2 - Entire site	AWAR closed from 00:00 to 6:00, (open 06:00 to 22:30, closed 22:30-00:00)	Waterline work cancelled (00:00-06:00). Work conducted along waterline (18:00-22:30) and cancelled from (22:30-00:00) due to presence of caribou by the wildlife monitor
2023-07-09	18.0	0.0	0.0	0.0	12.0	Level 2 - Entire site	AWAR closed at 6:00 and open at 6:00 on 2023-07-10	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-07-10	12.0	11.4	24.0	6.0	12.0	Level 3 - Exploration Camp start 6:40 Level 3 Portal 1- start 6: 40; Level 2 at 12:00; Level 3 at 18:00 Level 3 - Operations shutdown entire site at 18:00	AWAR reopened at 6:00 and close at 18:00	Waterline work cancelled (00:00-06:00) and (18:00-00:00)
2023-07-11	6.0	6.0	0.0	6.0	6.0	Level 3- all site 0:00 to 6:00 Level 2 -all site from 6:00	AWAR open with restriction from 6:00	Work cancelled along waterline (00:00-06:00) and Work conducted along the AWAR (18:00-00:00)
2023-07-12	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-13	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-14	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-15	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-16	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open with restriction	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-17	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-18	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-19	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-20	0.0	0.0	0.0	0.0	0.0	Level 2 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-21	0.0	0.0	0.0	0.0	0.0	Level 1 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-22	0.0	0.0	0.0	0.0	0.0	Level 1 - Entire site	AWAR open, no convoy	Work conducted along waterline (00:00-06:00) and (18:00-00:00)
2023-07-23	0.0	0.0	0.0	0.0	0.0	Level 1 - Entire site	AWAR open, no convoy	-
2023-07-24	0.0	0.0	0.0	0.0	0.0	Level 1 - Entire site	AWAR open, no convoy	-
2023-07-25	0.0	0.0	0.0	0.0	0.0	Level 1 - Entire site	AWAR open, no convoy	-
<b>Total Hours Lost (rounded to nearest hour)</b>	<b>386</b>	<b>281</b>	<b>81</b>	<b>264</b>	<b>296</b>			

### 12.4.3 Traffic Data

A total of 24,254 one-way trips along the AWAR were recorded in 2023, with an average of 2,021 trips per month (Table 17). Traffic rates were lowest in February, and highest in July. Pickup trucks and tractor-trailers were large contributors to traffic rates, followed by fuel tankers, and buses. The number of one-way trips in 2023 was higher than the 18,381 trips in 2022 and 20,323 trips in 2021 (Nuqsana Golder 2023). In addition to one-way trips, there were 52 records of convoy trips between June and July 2023. Trips included crew changes, food or fuel transport, maintenance (i.e., electrical issue at gatehouse), and medical trips.

**Table 17: AWAR Traffic by Month (2023).**

Vehicle Type	Number of One-way Trips by Month												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Ambulance	2	4	6	2	0	2	2	0	6	26	0	5	<b>55</b>
ATV	1	0	0	9	84	139	480	104	171	75	27	0	<b>1,089</b>
Backhoe	0	0	0	0	1	0	1	2	0	1	0	1	<b>6</b>
Boom Truck	1	0	3	4	10	2	5	3	5	2	0	0	<b>36</b>
Bus	210	215	224	213	294	217	201	296	245	263	210	183	<b>2,770</b>
Crane	0	0	0	0	0	2	0	0	0	0	0	0	<b>2</b>
Dump truck	0	0	0	0	53	22	154	58	44	29	2	0	<b>362</b>
Flatbed Tractor	2	0	0	2	6	0	0	3	10	3	0	1	<b>27</b>
Fuel Tanker (40 000 L)	323	186	274	223	273	84	218	298	194	223	155	220	<b>2,670</b>
Fuel Truck (15 000 L)	12	30	47	16	19	5	47	35	38	37	14	10	<b>308</b>
Grader	48	37	40	19	20	14	18	19	31	27	27	30	<b>329</b>
Haul Truck	48	0	4	16	71	167	113	69	153	80	39	0	<b>760</b>
Hino-luggage	10	12	10	12	18	21	12	21	25	22	22	15	<b>200</b>
Hyster (Reach Stacker)	1	0	1	0	2	1	1	5	0	1	0	2	<b>14</b>
Loader	13	3	2	15	16	20	47	55	43	37	3	4	<b>259</b>
Oversized load	0	2	1	3	2	0	1	4	1	0	0	1	<b>16</b>
Pickup	469	532	559	557	836	557	1,337	1,182	993	959	431	373	<b>8,785</b>
Roll Off truck	6	12	0	11	9	0	2	6	12	13	6	4	<b>81</b>
Service truck	8	5	4	6	18	12	26	37	60	44	16	4	<b>240</b>
Sewage Truck	15	14	17	13	23	12	24	19	14	28	15	9	<b>202</b>
Snowblower	31	28	27	8	0	0	0	0	0	0	8	17	<b>120</b>
Telehandler	0	0	0	0	0	0	30	27	41	17	2	0	<b>117</b>
Tractor-trailer	273	77	167	497	545	136	564	796	850	910	588	278	<b>5,681</b>
Water tanker (40 000L)	2	1	11	12	13	13	20	25	5	6	11	6	<b>127</b>
<b>Total</b>	<b>1,474</b>	<b>1,158</b>	<b>1,398</b>	<b>1,639</b>	<b>2,313</b>	<b>1,427</b>	<b>3,303</b>	<b>3,062</b>	<b>2,940</b>	<b>2,802</b>	<b>1,575</b>	<b>1,162</b>	<b>24,254</b>

**Notes:** Trips less than the entire length of the road were rounded up to whole numbers (e.g., 0.5 rounded to 1), therefore total trip numbers provided in table will be larger actual trips performed.

### 12.5 Accuracy of Impact Predictions

A summary of the impact predictions proposed in the TEMMP (Agnico Eagle 2022b) is provided in Table 18. Though not fully developed, the following thresholds are suggested as a starting point for adaptive management and TEMMP (Agnico Eagle 2022b) refinement and is tested against the results of the 2023 observational data (Table 18).

**Table 18: Accuracy of Impact Predictions – Caribou**

Monitoring Indicator	Preliminary Threshold	Exceeded in 2023?	Adaptive Management	Monitoring Method	TEMMP Section
Habitat Loss and Degradation	No greater than 2,950 ha of terrestrial habitat loss	Not assessed in 2023	Not Currently Identified	Aerial photographs, satellite imagery, ground surveys, GIS analysis	5.0
Sensory Disturbance	<10% caribou deflections from AWAR	Not assessed in 2023	Not Currently Identified	Caribou satellite collar data	N/A
Vehicle Collisions	No more than 1 ungulate/year	No	No action required	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	9.5
Hunting by Rankin Inlet Residents	After 3 years of data collection in collaboration with the GN <sup>(a)</sup> , establish a threshold level	Not assessed in 2023	Not Currently Identified	Hunter Harvest Survey, data collected throughout the year and reported annually	13.0
Other Project Related Mortality	No more than 1 ungulate/year	No	No action required	Wildlife Sightings Log, Site Surveillance Monitoring	9.5
Exposure to Contaminated Water or Vegetation	SLRA – TBD	N/A	Not Currently Identified	Vegetation and soil samples	N/A

**Notes:** AWAR = All-Weather Access Road; GN = Government of Nunavut; SLRA = Screening Level Risk Assessment; TEMMP = Terrestrial Environment Management and Monitoring Plan; N/A = not applicable; <= less than; TBD = to be determined.

(a) Proposed thresholds will be established in collaboration with the GN and other relevant parties, such as TAG members.

## 13.0 HUNTER HARVEST STUDY

Agnico Eagle signed a Memorandum of Understanding (MOU), in principle, with the KHTO in March 2019 for the development and execution of a Hunter Harvest Study (HHS). The HHS supports Project Certificate No.006 Term and Condition 46 and 48. The HHS was implemented in 2020 and continued through 2023. In 2021 and 2022, an external consultant, Nunavut Environmental Consulting, was contracted to work alongside the KHTO to conduct the study (Agnico Eagle 2024c). The full HHS report is provided in Appendix I.

### 13.1 Methods

The wildlife species that are the focus of the HHS are caribou, muskox, grizzly bear, polar bear, wolf, wolverine, Arctic fox, goose, ptarmigan, and seal. However, harvest data on other species, such as beluga (*Delphinapterus leucas*), common eider (*Somateria mollissima*), and sandhill crane are also collected. The species in the study were deliberately chosen to make data entry and collection as simple as possible. To support creel surveys, data on fish harvest (Priority species = Arctic char, lake trout, lake whitefish, and Arctic grayling) were also collected.

Inuit and non-Inuit residents, at least 16 years of age, are eligible to participate in the harvest survey. Harvest calendars are provided on a household basis, rather than an individual basis, to simplify data entry and collection, and reflect household hunting patterns. The harvest calendar is attractive and consists of local photographs of wildlife and Nunavut residents. Space is provided for each calendar day where harvest details can be documented.

A map is provided at the end of the calendar that delineates a 5 km<sup>2</sup> UTM grid around the Rankin Inlet and Meliadine mine areas, and regions indicated as important for hunting during discussions with HTO members. Each grid has a unique code to facilitate recording of information. When calendars are issued, participants or participating households are encouraged to write harvest details (e.g., number of animals, sex, age, and location (i.e., grid code) for the appropriate date on the calendar.

Participants were interviewed in person three times during the year (i.e., June 2023, October 2023, and January 2024) by the harvest study coordinator. During the January 2024 interviews, remaining data from 2023 were collected, a new 2024 HHS calendar was provided, and prizes were distributed. The purpose of the interviews is to ensure all harvest data are recorded on the calendars and to collect incidental information to compliment calendar data, including notable Caribou movements, aggregations, and unique observations. Between interview periods, participants were often contacted by phone or social media to encourage recording of harvest data.

Features of the 2023 Hunter Harvest Study included:

- 1) Adding new participants
- 2) Building long-term relationships between participants and researchers
- 3) Increasing engagement with participants on social media platforms such as Facebook and Instagram
- 4) Increasing incentives for participating in the study (e.g., gas vouchers and prizes)

## 13.2 Results

The 2023 HHS included 56 participants, which was a marked increase compared to 2022 (44 participants) and 2021 (40 participants). Of the 56 participants in 2023, caribou harvest data were collected from 37 participants, which was higher than the 31 participants reporting caribou harvest in 2022. An estimated 300 to 350 active hunters live within the Rankin Inlet community. Based on these numbers, the 37 hunters reporting caribou harvest in 2023 conservatively represents 11 to 12% of total hunters in the community.

In 2023, a total of 483 caribou were harvested by 37 participants in the Rankin Inlet HHS. Given that the 37 hunters may represent an estimated 11 to 12% of the Rankin Inlet hunting community, the total estimated number of caribou harvested in 2023 was between 4,025 to 4,390 animals, which is considerably lower than estimates in 2022 (i.e., 5,470 to 6,077 animals) and 2021 (i.e., 6,700 to 7,444). This estimate appears to be conservative since participants likely represented a higher proportion of successful hunters in the community.

The 2023 HHS data indicated that 5.0% of reported harvest occurred within 5 km of the AWAR (4.8% in 2022), and 26.9% occurred within the RSA (29.4% in 2022; see Table 19). During the NWMB study from 1996 to 2001, 24.8% of reported harvest was within the RSA.

**Table 19: Caribou Harvest Distribution along the AWAR and within the Rankin Inlet LSA and RSA (1996 to 2001 [NWMB], and 2021 to 2023 [Rankin Inlet HHS])**

Study	Participation Rate within 5 km of AWAR (% of total hunters)	Average Caribou Harvest within 5 km of AWAR per Participant	% of Annual Harvest within 5 km of AWAR	% of Annual Harvest within Meliadine LSA	% of Annual Harvest within Meliadine RSA
NWMB 1996 to 2001 (Rankin Inlet)	NA	4.1	4.5	0.3	24.8
Rankin Inlet HHS 2021	16.7	5.0	3.7	3.3	19.7
Rankin Inlet HHS 2022	25.8	3.3	4.8	4.0	29.4
Rankin Inlet HHS 2023	16.2	4.0	5.0	2.9	26.9
Average (2021 to 2023)	19.6	4.1	4.5	3.4	25.3

AWAR = All-weather Access Road; HHS = Hunter Harvest Study; LSA = Local Study Area; NWMB = Nunavut Wildlife Management Board; RSA = Regional Study Area.

A total of 14 muskox, 3 wolverine, and 4 wolves were harvested in 2023. Other reported harvested terrestrial mammals included 1 Arctic hare and 4 polar bears. In the marine environment, beluga (*Delphinapterus leucas*; 45 individuals) was the most common species harvested followed by ringed seal (*Pusa hispida*; 29 individuals), bearded seal (*Erignathus barbatus*; 5 individuals), narwal (*Monodon monoceros*; 2 individuals), and walrus (*Odobenus rosmarus*; 2 individuals).

More birds were harvested by Rankin Inlet participants in 2023 (202 birds) than in 2022 (136 birds), but fewer than in 2021 (394 birds). In 2023, Canada goose and snow goose were harvested at the highest levels and made up 45% of all harvest bird species. Common eider, gull spp., ptarmigan (*Lagopus* sp.), sandhill crane, northern pintail, and tundra swan were also harvested.

Arctic char (*Salvelinus alpinus*; 2,525 fish), lake trout (*Salvelinus namaycush*; 122 fish), and Arctic cod (*Arctogadus glacialis*; 54 fish) were the most common species caught by fisherman. Relatively small numbers of Arctic grayling (*Thymallus arcticus*; 3 fish), lake whitefish (*Coregonus clupeaformis*; 6 fish), and burbot (*Lota lota*; 1 fish) were caught in 2023.

### 13.3 Recommendations

The Rankin Inlet Hunter Harvest Study and Creel Survey should be continued on an annual basis to monitor the hunting and fishing patterns of Rankin Inlet residents, and the potential effects of the mine and AWAR. Meetings with participants at certain intervals throughout the year will be particularly important in maintaining contact, building relationships, expanding the study, and collecting good harvest data.

Participation rates can be maintained by continuing to use social media platforms, expanding connections on these platforms, ensuring that all participants are visited during the three scheduled field visits, and continuing with distribution of the well-received year-end prizes while in the community.

Threshold levels for monitoring the effects of Mine development on the distribution of caribou harvest will not be set until three years of hunter harvest data have been collected (i.e., after the 2023 HHS). Harvest data in this report will be discussed with relevant parties (i.e., TAG members) to determine need for mitigation measures and harvest thresholds.

## 14.0 CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional information, please do not hesitate to contact the undersigned.

Your Truly,

**WSP Canada Inc.**

**ORIGINAL SIGNED**

Meghan Beale, MSc, RPBio  
*Senior, Wildlife Biologist*

MB/DC

**ORIGINAL SIGNED**

Daniel Coulton, PhD, RPBio  
*Principal, Wildlife Biologist*

[https://wsponlinecan.sharepoint.com/sites/ca-ca00177499514/shared documents/06. deliverables/01\\_2023\\_tempp\\_annual\\_report/03\\_final/rev1/ca0017749.9514-mel2024\\_017-r-agnicoeagle\\_2023\\_tempp\\_annual\\_report\\_rev1\\_20240326.docx](https://wsponlinecan.sharepoint.com/sites/ca-ca00177499514/shared%20documents/06.%20deliverables/01_2023_tempp_annual_report/03_final/rev1/ca0017749.9514-mel2024_017-r-agnicoeagle_2023_tempp_annual_report_rev1_20240326.docx)

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**APPENDIX A**

**Shipping Inspection Forms, 2023**



204003  
 2023-06-15 08:00 - N/A  
 V230534

Port: Bécancour  
 Section: Bécancour

Pro Forma MANIFEST

MIENA DESGAGNES

Port of Discharge: RANKIN INLET, NUNAVUT  
 Shipper: DESGAGNÉS TRANSARCTIK INC. N/A  
 C/O: N/A  
 Consignee: DESGAGNÉS TRANSARCTIK INC. N/A  
 Notify: N/A

DESGAGNES RANKIN INLET

Product	Packaging	Identifier	Dimensions	Qty	Volume	Weight	HAZ MAT
Vehicles - self-propelled (machinery) HEAVY VEHICULES-NO ASSISTANCE	Unit	Bc: 92787, Desc: CAT MINI EXCAVATOR PO:365, Scope: oversized, PO: 23-00824-1	600 cm x 210 cm x 290 cm	1	36.54 m³	5.305 MT	Class 9/3166/P.G. III

SUBTOTAL QTY: 1

SUBTOTAL VOLUME: 36.54 m³ (1290 cu.ft.)

5.305 MT (11696 lb)

TOTAL QTY: 1	TOTAL VOLUME: 36.54 m³ (1290 cu.ft.)	5.305 MT (11696 lb)
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Quantity: 759      Volume: 18713.3246 m³ (660855 cu.ft.)      8137.216 MT (17939490 lb)

Captain, First Officer / Mate or vessel authorized personnel: \_\_\_\_\_

QSL Canada inc. without prejudice: *J. J. Payton* \_\_\_\_\_

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.





DES GAGNES BAKER LAKE

Product	Packaging	Identifier	Dimensions	Qty	Volume	Weight	HAZ MAT
FULL		KEVIN, Scope: loose, PO: 23-01053-1, Seal # 032073					
20' containers FULL	Unit	Bc: NONU 686867-1, Desc: CONTENEUR 20' PO KEVIN, Scope: loose, PO: 23-01053-1, Seal # 032059	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	11.3 MT	-
20' containers FULL	Unit	Bc: NONU 225266-6, Desc: CONTENEUR 20' PO KEVIN, Scope: loose, PO: 23-01053-1, Seal # 032060	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	12 MT	-
20' containers FULL	Unit	Bc: NONU 220155-5, Desc: CONTENEUR 20' PO KEVIN, Scope: loose, PO: 23-01053-1, Seal # 032066	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	12.5 MT	-
20' containers FULL	Unit	Bc: AXIU 294017-1, Desc: CONTENEUR 20' A3195 CONSULTANT DE L ARCTIQUE, Scope: loose, PO: 23-00857-1, Seal # 6702844	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	14.8 MT	-
20' containers FULL	Unit	Bc: WEDU 142895-3, Desc: CTN 20' A3195, Scope: loose, PO: 23-00857-1, Seal # 6702833	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	13.9 MT	-
20' containers FULL	Unit	Bc: 328310-7, Desc: 20' CTN SANAVIK COOP RETAIL, Scope: loose, PO: 23-00671-1, Seal # 6702950	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	9.9 MT	-
20' containers FULL	Unit	Bc: BBUU 202343-4, Desc: 20' CTNR, Scope: loose, PO: 23-00671-1, Seal # 6702986	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	12 MT	-
20' containers FULL	Unit	Bc: ACOL 003903-0, Desc: 20' CTNR, Scope: loose, PO: 23-00671-1, Seal # 6702975	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	6 MT	-

SUBTOTAL QTY: 16

SUBTOTAL VOLUME: 616.7936 m<sup>3</sup> (21782 cu.ft.)

187.2 MT (412705 lb)

TOTAL QTY: 16	TOTAL VOLUME: 616.7936 m <sup>3</sup> (21782 cu.ft.)	187.2 MT (412705 lb)
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Quantity: 127

Volume: 4593.095 m<sup>3</sup> (162204 cu.ft.)

2346.524 MT (5173200 lb)

Captain, First Officer / Mate or vessel authorized personnel: *[Signature]*

QSL Canada inc. without prejudice: *M.A. Pagan*

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



205605  
2023-06-20 16:00 - N/A  
V230780

DESGAGNES RANKIN INLET

SUBTOTAL QTY: 44

SUBTOTAL VOLUME: 3419.0201 m<sup>3</sup> (120742 cu.ft.)

258.67 MT (570270 lb)

TOTAL QTY: 44

TOTAL VOLUME: 3419.0201 m<sup>3</sup> (120742 cu.ft.)

258.67 MT (570270 lb)

Quantity: 1131

Volume: 26829.4573 m<sup>3</sup> (947473 cu.ft.)

9769.848 MT (21538828 lb)

Captain, First Officer / Mate or vessel authorized personnel:

*[Signature]*  
*Paul Key*

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



207507  
 2023-07-05 08:00 - N/A  
 V230535

DESGAGNES BAKER LAKE

Product	Packaging	Identifier	Dimensions	Qty	Volume	Weight	HAZ MAT
PICK UP-NO ASSISTANCE							
Vehicles - self-propelled (passenger) PICK UP-NO ASSISTANCE	Unit	Bc: 92710, Desc: FORD RANGER LARIAT 2023, Scope: loose, PO: 23-01737-1	550 cm x 220 cm x 200 cm	1	24.2 m <sup>3</sup>	2.744 MT	Class 9/3166/P.G. III
SUBTOTAL QTY: 75		SUBTOTAL VOLUME: 723.1558 m <sup>3</sup> (25538 cu.ft.)		174.175 MT (383990 lb)			

TOTAL QTY: 75	TOTAL VOLUME: 723.1558 m <sup>3</sup> (25538 cu.ft.)	174.175 MT (383990 lb)
---------------	--	------------------------

Quantity: 1305      Volume: 27356.1052 m<sup>3</sup> (966072 cu.ft.)      10104.47 MT (22276543 lb)

Captain, First Officer / Mate or vessel authorized personnel: \_\_\_\_\_

QSL Canada inc. without prejudice: \_\_\_\_\_

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.





210251  
 2023-07-18 08:00 - N/A  
 V230546

DESGAGNES BAKER LAKE

Product	Packaging	Identifier	Dimensions	Qty	Volume	Weight	HAZ MAT
Northern cargo GENERAL	Crate	Bc: 92542, Desc: CRATE 250522, Scope: containerized, PO: 23-00508-2	250 cm x 114 cm x 230 cm	1	6.555 m <sup>3</sup>	1.75 MT	-
Northern cargo GENERAL	Crate	Bc: 92541, Desc: CRATE 246176, Scope: containerized, PO: 23-00361-2	125 cm x 125 cm x 132 cm	1	2.0625 m <sup>3</sup>	0.85 MT	Class 2.1/1075
Northern cargo GENERAL	Crate	Bc: 92540, Desc: CRATE 250439, Scope: containerized, PO: 23-01896-2	262 cm x 92 cm x 113 cm	1	2.7238 m <sup>3</sup>	0.202 MT	-
Northern cargo GENERAL	Crate	Bc: 92539, Desc: CRATE 246005, Scope: containerized, PO: 23-00382-2	92 cm x 92 cm x 65 cm	1	0.5502 m <sup>3</sup>	0.18 MT	Class 3/1263/P.G. III
Vehicles - self-propelled (machinery) HEAVY VEHICULES-NO ASSISTANCE	Unit	Bc: 92589, Desc: DOZER D6-20VP MT318950, Scope: oversized, PO: 23-01883-2	570 cm x 420 cm x 330 cm	1	79.002 m <sup>3</sup>	23.62 MT	Class 9/3166/P.G. III

SUBTOTAL QTY: 13

SUBTOTAL VOLUME: 443.4354 m<sup>3</sup> (15660 cu.ft.)

84.182 MT (185590 lb)

TOTAL QTY: 13	TOTAL VOLUME: 443.4354 m <sup>3</sup> (15660 cu.ft.)	84.182 MT (185590 lb)
---------------	--	-----------------------

Quantity: 796

Volume: 22793.3079 m<sup>3</sup> (804938 cu.ft.)

9374.016 MT (20666168 lb)

Captain, First Officer / Mate or vessel authorized personnel: 

QSL Canada inc. without prejudice: 

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



212301  
 2023-07-27 09:30 - N/A  
 V231243

DESGAGNES BAKER LAKE

Product	Packaging	Identifier	Dimensions	Qty	Volume	Weight	HAZ MAT
Northern cargo GENERAL	Pallet	BAK Bc: 92322, Desc: UNIT 42383, Scope: containerized, PO: 23-02499-2-BAK	122 cm x 101 cm x 39 cm	1	0.4806 m³	0.07 MT	-
Northern cargo GENERAL	Pallet	Bc: 92320, Desc: UNIT 42385, Scope: containerized, PO: 23-02499-2-BAK	255 cm x 140 cm x 132 cm	1	4.7124 m³	0.39 MT	-
Northern cargo WOOD	Crate	Bc: 92528, Desc: OPEN CRATE - TREATED LUMBER - 230088, Scope: loose, PO: 23-02499-2	306 cm x 115 cm x 96 cm	1	3.3782 m³	1.46 MT	-
Northern cargo WOOD	Crate	Bc: 92536, Desc: OPEN CRATE - TREATED LUMBER - 230086, Scope: loose, PO: 23-02499-2	305 cm x 128 cm x 120 cm	1	4.6848 m³	1.424 MT	-
Vehicles - self-propelled (passenger) PICK UP-NO ASSISTANCE	Unit	Bc: 92323, Desc: DODGE RAM 1500 2023 WHITE, Scope: loose, PO: 23-00693-2	590 cm x 220 cm x 215 cm	1	27.907 m³	2.226 MT	Class 9/3166/P.G. III
Vehicles - self-propelled (passenger) PICK UP-NO ASSISTANCE	Unit	Bc: 92317, Desc: GMC SIERRA 2023 WHITE UNIT 45284, Scope: loose, PO: 23-02499-2-BAK	650 cm x 295 cm x 208 cm	1	39.884 m³	2.461 MT	Class 9/3166/P.G. III

SUBTOTAL QTY: 16

SUBTOTAL VOLUME: 118.2842 m³ (4177 cu.ft.)

18.443 MT (40660 lb)

TOTAL QTY: 16	TOTAL VOLUME: 118.2842 m³ (4177 cu.ft.)	18.443 MT (40660 lb)
---------------	---	----------------------

Quantity: 901

Volume: 19280.127 m³ (680871 cu.ft.)

8959.812 MT (19753004 lb)

Captain, First Officer / Mate or vessel authorized personnel: *[Signature]*

QSL Canada inc. without prejudice: \_\_\_\_\_

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



214359  
2023-08-09 08:00 - N/A  
V231301

Port: Bécancour  
Section: Bécancour

**Pro Forma HATCH LIST SUMMARY**  
**MARCELLIN ADESGAGNES**

<b>Port of Discharge</b>	<b>Shipper</b>	<b>C/O</b>	<b>Consignee</b>	<b>Notify</b>
RANKIN INLET, NUNAVUT	AGNICO EAGLE MINES LIMITED 355 Alphonse-Deshaies Blvd BÉCANCOUR QC G9H 2Y7 CANADA	N/A	AGNICO EAGLE MINES LIMITED (DIVISION MELIADINE) PO Box 879 RANKIN INLET NU X0C 0G0 CANADA	N/A

MELIADINE-AEM-STOCK

Location in vessel	Qty	Weight	Volume
Deck 3	28	132.075 MT (291176 lb)	1124.6112 m³ (39715 cu.ft.)
Deck 1	2	21.2 MT (46738 lb)	156.5928 m³ (5530 cu.ft.)
Deck 2	28	89.943 MT (198290 lb)	724.281 m³ (25578 cu.ft.)

SUBTOTAL QTY: 58                      SUBTOTAL VOLUME: 2005.485 m³ (70823 cu.ft.)                      243.218 MT (536204 lb)

TOTAL QTY: 58	TOTAL VOLUME: 2005.485 m³ (70823 cu.ft.)	243.218 MT (536204 lb)
---------------	--	------------------------

Quantity: 883                      Volume: 22755.4835 m³ (803602 cu.ft.)                      10560.552 MT (23282032 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:



QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



214359  
2023-08-09 08:00 - N/A  
V231301

DESGAGNES BAKER LAKE - CLASS 9

Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
propelled (passenger) PICK UP-NO ASSISTANCE	BLACK CLIENT ARCT81 CONSIGNEE 07949, Scope: loose, PO: 23-01436-3						

SUBTOTAL QTY: 8

SUBTOTAL VOLUME: 248.3864 m<sup>3</sup> (8772 cu.ft.)

37.411 MT (82477 lb)

TOTAL QTY: 59

TOTAL VOLUME: 322.4046 m<sup>3</sup> (11386 cu.ft.)

74.724 MT (164738 lb)

Quantity: 126

Volume: 2896.3512 m<sup>3</sup> (102284 cu.ft.)

1424.133 MT (3139676 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



2 1 7 3 7 8  
 2023-08-22 11:30 - N/A  
 V231389

Port  
Bécancour

Section  
Becancour

**Pro Forma DANGEROUS GOODS MANIFEST**  
**MIENA DESGAGNES**

Port of Discharge  
RANKIN INLET, NUNAVUT

Shipper  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

C/O  
N/A

Consignee  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

Notify  
N/A

DESGAGNES RANKIN INLET - CLASS 2.1

Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
Northern cargo GENERAL	Bc: 92920, Desc: GAZ PETROLE LIQU. UN 1075 A2732 CRATE 246286, Scope: containerized, PO: 23-02619-2-RAN	142 cm x 142 cm x 173 cm	1	3.4884 m <sup>3</sup>	1.04 MT	Deck3	Class 2.1/1075
Northern cargo GENERAL	Bc: 92919, Desc: GAZ PETROLE LIQU. UN 1075 A2732 CRATE 246287, Scope: containerized, PO: 23-02619-2-RAN	142 cm x 142 cm x 173 cm	1	3.4884 m <sup>3</sup>	1.04 MT	Deck3	Class 2.1/1075

Deck #2  
AFT PORT  
x2

SUBTOTAL QTY: 2

SUBTOTAL VOLUME: 6.9768 m<sup>3</sup> (246 cu.ft.)

2.08 MT (4586 lb)

TOTAL QTY: 2

TOTAL VOLUME: 6.9768 m<sup>3</sup> (246 cu.ft.)

2.08 MT (4586 lb)

Quantity: 40

Volume: 1667.0272 m<sup>3</sup> (58871 cu.ft.)

333.155 MT (734481 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.

2023-08-30 11:34



217378  
 2023-08-22 11:30 - N/A  
 V231389

Port  
 Bécancour

Section  
 Bécancour

**Pro Forma HATCH LIST SUMMARY**

MIENA DESGAGNES

<b>Port of Discharge</b>	<b>Shipper</b>	<b>C/O</b>	<b>Consignee</b>	<b>Notify</b>
RANKIN INLET, NUNAVUT	DESGAGNÉS TRANSARCTIK INC. N/A	N/A	DESGAGNÉS TRANSARCTIK INC. N/A	N/A

DESGAGNES RANKIN INLET

Location in vessel	Qty	Weight	Volume
Deck 3	2	2.08 MT (4586 lb)	6.9768 m <sup>3</sup> (246 cu.ft.)

SUBTOTAL QTY: 2

SUBTOTAL VOLUME: 6.9768 m<sup>3</sup> (246 cu.ft.)

2.08 MT (4586 lb)

TOTAL QTY: 2

TOTAL VOLUME: 6.9768 m<sup>3</sup> (246 cu.ft.)

2.08 MT (4586 lb)

Quantity: 794

Volume: 22798.5062 m<sup>3</sup> (805122 cu.ft.)

9375.807 MT (20670116 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



219452  
 2023-08-31 13:00 - N/A  
 V231551

Port: Bécancour  
 Section: Bécancour

**Pro Forma HATCH LIST SUMMARY**  
**NORDIKA DESGAGNES**

Port of Discharge: BAKER LAKE, NUNAVUT  
 Shipper: DESGAGNÉS TRANSARCTIK INC. N/A  
 C/O: N/A  
 Consignee: DESGAGNÉS TRANSARCTIK INC. N/A  
 Notify: N/A

**DESGAGNES BAKER LAKE**

Location in vessel	Qty	Weight	Volume
HatchTwinDeck 3	79	69.31 MT (152802 lb)	377.0295 m³ (13315 cu.ft.)
LowerHold 3	19	19.354 MT (42668 lb)	39.7542 m³ (1404 cu.ft.)
Deck 3	11	92.9 MT (204809 lb)	424.0456 m³ (14975 cu.ft.)
Deck 2	3	16.7 MT (36817 lb)	115.6488 m³ (4084 cu.ft.)

SUBTOTAL QTY: 112      SUBTOTAL VOLUME: 956.4781 m³ (33778 cu.ft.)      198.264 MT (437097 lb)

TOTAL QTY: 112	TOTAL VOLUME: 956.4781 m³ (33778 cu.ft.)	198.264 MT (437097 lb)
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Quantity: 926      Volume: 21843.3843 m³ (771392 cu.ft.)      10085.375 MT (22234446 lb)

Captain, First Officer / Mate or vessel authorized personnel: *Paul Pigeon*  
 QSL Canada inc. without prejudice: *Ma...*

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.





219452  
 2023-08-31 13:00 - N/A  
 V231551

Port: Bécancour  
 Section: Bécancour

**Pro Forma HATCH LIST SUMMARY**

**NORDIKA DESGAGNES**

Port of Discharge: BAKER LAKE, NUNAVUT  
 Shipper: DESGAGNÉS TRANSARCTIK INC. N/A  
 C/O: N/A  
 Consignee: DESGAGNÉS TRANSARCTIK INC. N/A  
 Notify: N/A

**DESGAGNES BAKER LAKE**

Location in vessel	Qty	Weight	Volume
HatchTwinDeck 3	79	69.31 MT (152802 lb)	377.0295 m³ (13315 cu.ft.)
LowerHold 3	19	19.354 MT (42668 lb)	39.7542 m³ (1404 cu.ft.)
Deck 3	11	92.9 MT (204809 lb)	424.0456 m³ (14975 cu.ft.)
Deck 2	3	16.7 MT (36817 lb)	115.6488 m³ (4084 cu.ft.)

SUBTOTAL QTY: 112

SUBTOTAL VOLUME: 956.4781 m³ (33778 cu.ft.)

198.264 MT (437097 lb)

TOTAL QTY: 112

TOTAL VOLUME: 956.4781 m³ (33778 cu.ft.)

198.264 MT (437097 lb)

Quantity: 926

Volume: 21843.3843 m³ (771392 cu.ft.)

10085.375 MT (22234446 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.









223689  
 2023-09-20 11:30 - N/A  
 V231530

Port  
 Bécancour

Section  
 Bécancour

**Pro Forma HATCH LIST SUMMARY**

MIENA DESGAGNES

<b>Port of Discharge</b>	<b>Shipper</b>	<b>C/O</b>	<b>Consignee</b>	<b>Notify</b>
RANKIN INLET, NUNAVUT	DESGAGNÉS TRANSARCTIK INC. N/A	N/A	DESGAGNÉS TRANSARCTIK INC. N/A	N/A

DESGAGNES RANKIN INLET

Location in vessel	Qty	Weight	Volume
HatchTwinDeck 3	1	27.272 MT (60124.4681 lb)	154.0619 m <sup>3</sup> (5440.6447 cu.ft.)

SUBTOTAL QTY: 1

SUBTOTAL VOLUME: 154.0619 m<sup>3</sup> (5440.6447 cu.ft.)

27.272 MT (60124.4681 lb)

TOTAL QTY: 1

TOTAL VOLUME: 154.0619 m<sup>3</sup> (5440.6447 cu.ft.)

27.272 MT (60124.4681 lb)

Quantity: 1015

Volume: 21497.1 m<sup>3</sup> (759162.9229 cu.ft.)

9041.897 MT (19933970.6706 lb)

Captain, First Officer / Mate or vessel authorized personnel:

QSL Canada inc. without prejudice:

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



2 2 3 6 8 9  
 2023-09-20 11:30 - N/A  
 V231530

Port  
Bécancour

Section  
Becancour

**Pro Forma DANGEROUS GOODS MANIFEST**  
**MIENA DESGAGNES**

Port of Discharge  
RANKIN INLET, NUNAVUT

Shipper  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

C/O  
N/A

Consignee  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

Notify  
N/A

DESGAGNES RANKIN INLET - CLASS 9

Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
Vehicles - self-propelled (machinery) HEAVY VEHICULES-NO ASSISTANCE	Bc: 93088, Desc: 2014 FREIGHTLINER 30 TONS BOOM TRUCK, Scope: oversized, PO: 23-02878-3-RAN	1330 cm x 294 cm x 394 cm	1	154.0619 m <sup>3</sup>	27.272 MT	HatchTwinDeck3	Class 9/3166/P.G. III
				② TWD #2 AFT			

SUBTOTAL QTY: 1

SUBTOTAL VOLUME: 154.0619 m<sup>3</sup> (5440.6447 cu.ft.)

27.272 MT (60124.4681 lb)

TOTAL QTY: 1

TOTAL VOLUME: 154.0619 m<sup>3</sup> (5440.6447 cu.ft.)

27.272 MT (60124.4681 lb)

Quantity: 74

Volume: 3666.6309 m<sup>3</sup> (129485.8477 cu.ft.)

983.762 MT (2168823.9597 lb)

Captain, First Officer / Mate or vessel authorized personnel: \_\_\_\_\_

QSL Canada inc. without prejudice: \_\_\_\_\_

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



225913  
2023-10-01 08:00 - N/A  
V231483

Port  
Bécancour

Section  
Becancour

**Pro Forma DANGEROUS GOODS MANIFEST**  
**NORDIKA DESGAGNES**

Port of Discharge  
RANKIN INLET, NUNAVUT

Shipper  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

C/O  
N/A

Consignee  
DESGAGNÉS TRANSARCTIK  
INC.  
N/A

Notify  
N/A

**DESGAGNES RANKIN INLET - CLASS 2.2**

Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
Northern cargo CYLINDER	Bc: 93039, Desc: ARGON, Scope: containerized, PO: 23-02652-3-RAN	218 cm x 127 cm x 204 cm	1	5.6479 m <sup>3</sup>	0.661 MT	Deck1	Class 2.2/1006
SUBTOTAL QTY: 1		SUBTOTAL VOLUME: 5.6479 m <sup>3</sup> (199.4537 cu.ft.)		0.661 MT (1457.2556 lb)			

*(A) Deck #1 Fwd STB*

**DESGAGNES RANKIN INLET - CLASS 9**

Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
Vehicles - self-propelled (passenger) CAR-WITH ASSISTANCE	Bc: 92946, Desc: VOLKSWAGON BEETLE WHITE 1973 LORNE KUSUGAK, Scope: loose, PO: 23-02925-3-RAN	410 cm x 170 cm x 180 cm	1	12.546 m <sup>3</sup>	0.76 MT	Deck2	Class 9/3166/P.G. III
SUBTOTAL QTY: 1		SUBTOTAL VOLUME: 12.546 m <sup>3</sup> (443.0578 cu.ft.)		0.76 MT (1675.5132 lb)			

*(B) Deck #2 Fwd*

TOTAL QTY: 2

TOTAL VOLUME: 18.1939 m<sup>3</sup> (642.5115 cu.ft.)

1.421 MT (3132.7687 lb)

Quantity: 242

Volume: 9585.6027 m<sup>3</sup> (338512.3647 cu.ft.)

4948.8144 MT (10910268.1776 lb)

Captain, First Officer / Mate or vessel authorized personnel: *[Signature]*

QSL Canada inc. without prejudice: *[Signature]*

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.  
2023-10-06 11:19



225913  
 2023-10-01 08:00 - N/A  
 V231483

Port  
 Bécancour

Section  
 Bécancour

**Pro Forma HATCH LIST SUMMARY**  
**NORDIKA DESGAGNES**

Port of Discharge  
 RANKIN INLET, NUNAVUT

Shipper  
 DESGAGNÉS TRANSARCTIK  
 INC.  
 N/A

C/O  
 N/A

Consignee  
 DESGAGNÉS TRANSARCTIK  
 INC.  
 N/A

Notify  
 N/A

**DESGAGNES RANKIN INLET**

**Location in vessel**

Location in vessel	Qty	Weight	Volume
HatchTwinDeck 3	3	1.2 MT (2645.5471 lb)	16.808 m³ (593.5689 cu.ft.)
Deck 1	1	0.661 MT (1457.2556 lb)	5.6479 m³ (199.4537 cu.ft.)
Deck 2	1	0.76 MT (1675.5132 lb)	12.546 m³ (443.0578 cu.ft.)

SUBTOTAL QTY: 5

SUBTOTAL VOLUME: 35.0019 m³ (1236.0804 cu.ft.)

2.621 MT (5778.3159 lb)

**TOTAL QTY: 5**

**TOTAL VOLUME: 35.0019 m³ (1236.0804 cu.ft.)**

**2.621 MT (5778.3159 lb)**

Quantity: 1153

Volume: 21706.1742 m³ (766546.3077 cu.ft.)

9908.8924 MT (21845368.3425 lb)

Captain, First Officer / Mate or vessel authorized personnel: *[Signature]*

QSL Canada Inc. without prejudice: *[Signature]*

QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



228062  
2023-10-07 13:00 - N/A  
V231547

Port  
Bécancour

Section  
Becancour

### Pro Forma HATCH LIST SUMMARY

MARCELLIN ADESGAGNES

Port of Discharge  
RANKIN INLET, NUNAVUT

Shipper  
AGNICO EAGLE MINES LIMITED  
(DIVISION MEADOWBANK)  
N/A

C/O  
N/A

Consignee  
AGNICO EAGLE MINES LIMITED  
(DIVISION MELIADINE)  
PO Box 879  
RANKIN INLET NU X0C 0G0  
CANADA

Notify  
N/A

MEADOWBANK-AEM-STOCK

Location in vessel	Qty	Weight	Volume
Deck 1	1	6.688 MT (14744.5161 lb)	38.5496 m³ (1361.3663 cu.ft.)
Deck 3	5	67.178 MT (148102.1385 lb)	231.2974 m³ (8168.1899 cu.ft.)

SUBTOTAL QTY: 6                      SUBTOTAL VOLUME: 269.847 m³ (9529.5562 cu.ft.)                      73.866 MT (162846.6546 lb)

TOTAL QTY: 6                      TOTAL VOLUME: 269.847 m³ (9529.5562 cu.ft.)                      73.866 MT (162846.6546 lb)

Quantity: 842                      Volume: 21465.0263 m³ (758030.2507 cu.ft.)                      9885.7173 MT (21794275.9928 lb)

Captain, First Officer / Mate or vessel authorized personnel: \_\_\_\_\_  
QSL Canada inc. without prejudice: \_\_\_\_\_



QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.



228062  
2023-10-07 13:00 - N/A  
V231547

Port  
Bécancour

Section  
Becancour

**Pro Forma DANGEROUS GOODS MANIFEST**  
**MARCELLIN ADESGAGNES**

Port of Discharge  
RANKIN INLET, NUNAVUT

Shipper  
AGNICO EAGLE MINES LIMITED  
(DIVISION MEADOWBANK)  
N/A

C/O  
N/A

Consignee  
AGNICO EAGLE MINES LIMITED  
(DIVISION MELIADINE)  
PO Box 879  
RANKIN INLET NU X0C 0G0  
CANADA

Notify  
N/A

**MEADOWBANK-AEM-STOCK - CLASS 2.2 (5.1)**

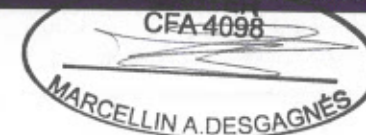
Product	Identifier	Dimensions	Qty	Volume	Weight	Location	HAZ MAT
20' containers STANDARD	Bc: CRSU 126252-6, Desc: , Scope: loose, Seal # 002633	610 cm x 244 cm x 259 cm	1	38.5496 m <sup>3</sup>	7.805 MT	Deck3	Class 2.2 (5.1)/1072
SUBTOTAL QTY: 1		SUBTOTAL VOLUME: 38.5496 m <sup>3</sup> (1361.3649 cu.ft.)		7.805 MT (17207.0796 lb)			

(14) Deck #2 AFT St B

TOTAL QTY: 1	TOTAL VOLUME: 38.5496 m <sup>3</sup> (1361.3649 cu.ft.)	7.805 MT (17207.0796 lb)
--------------	---	--------------------------

**Quantity: 17** **Volume: 693.8924 m<sup>3</sup> (24504.5803 cu.ft.)** **140.8693 MT (310563.6455 lb)**

Captain, First Officer / Mate or vessel authorized personnel: \_\_\_\_\_  
QSL Canada inc. without prejudice: Marcellin A. Desgagnés



QSL Canada visually inspected the parcels before loading them on board to prevent them from holding soils that could contain plant seeds of invasive breeds.

**APPENDIX B**

# CESS Non-Native and Invasive Species in Nunavut

# Non-Native & Invasive species

## In Nunavut

In 2010 the Canadian Endangered Species Conservation Council (CESCC) identified 17 species not normally found in Nunavut.

These are called "non-native species". Some of these plants and animals can become an "invasive species", which represents a potential major concern for the future health of the Arctic.

### What is a non-native species?

A non-native species is defined as an organism that is not normally found in a region. They are introduced by human activities, which can be intentional (e.g. species introduced to control a pest species), accidental (e.g. shipping and ballast water exchange), or environmental (e.g. changes in climate leading to wildlife movements). An example of a non-native species in Nunavut is the European Starling (*Sturnus vulgaris*), which was introduced to North America from Europe intentionally by humans.

### What is an invasive species?

Not all non-native species are considered invasive. This term is reserved for species that do so well in their new habitat that they end up causing harm to the environment, other species, human health, or economic activity (ISAC, 2006). An example of an invasive species in southern Canada is the Zebra Mussel (*Dreissena polymorpha*), which was introduced to North America by ships releasing their ballast water. The Zebra mussel reproduces quickly and establishes large colonies on any hard surface. In this way they take over habitat occupied by native species, reducing the availability of food for other species, and also attaching themselves in great numbers to boats and other infrastructure in the water. (Benson and Raikow, 2010).

### Why should you be concerned about invasive species?

When invasive species are introduced and survive, their populations can increase rapidly because there are no natural predators. Invasive species may feed on native species, compete for food and space, as well as expose native species to new parasites and disease. Invasive species are now widely recognized as a leading cause of endangerment and/or extinction of native species (Lassuy and Lewis, 2010).

**There are currently no known species in Nunavut that can be classified as aquatic or terrestrial invasive species.**



#### Species: Field Sow Thistle (*Sonchus arvensis*)

Impact: The Field Sow Thistle grows quickly, easily and when there are many of them they can reduce the water resources available to other plants. They have the potential to decrease native plant diversity by competing for space and water.

Introduction pathway: Accidentally introduced from Europe into North America in a containment of agricultural crop seed. This plant has been able to spread long distances across Canada because the seeds can travel far in the wind.



#### Species: The European Starling (*Sturnus vulgaris*)

Impact: The European Starling can displace native bird species by taking over nesting sites and competing for food.

Introduction pathway: Introduced intentionally to North America from Europe. These birds then dispersed naturally into Canada through migration.

### How might invasive species get into Nunavut?

Species are transported throughout the world by human activities, like shipping, which allows species to move further distances and over barriers that they could not do on their own. Nunavut remains very remote compared to the rest of Canada and so the lack of major road systems, infrequent shipping and cold climate has limited their introduction and survival.

However, as climate change alters Arctic ecosystems, it creates conditions that are more favorable to the survival and reproduction of non-native species. It also enables greater human activity and development, which gives potential invasive species more opportunities to establish themselves. (Lassuy and Lewis, 2010).

#### Pathways of introduction for invasive species into Nunavut

- Ballast water exchange and hull fouling have the greatest potential for introducing invasive species into the aquatic ecosystems of Nunavut. Ballast water is used to stabilize ships. It is pumped aboard ships from different ports around the world and often exchanged far from the region it was obtained. This water can contain species that are not native, and may establish themselves locally.
- Seeds, insects and even small mammals can be transported around the world through the shipping of grocery produce, lumber, construction supplies, and packing materials, even dirt from someone's footwear can contain plant seeds (IASC, 2010).
- As climate continues to change in the Arctic, many terrestrial and aquatic plants and animals will move further north looking for the food and habitat they desire. These wildlife movements are not a threat when it comes to invasive species, but it is important to note that some species, (especially rare or threatened ones) may not survive the transition. Others may do well, like flying insects, which are already increasing in number in some areas of Nunavut. (IASC, 2010).

Wildlife movements are often referred to as "range extensions" where a species expands the area they can live in when the habitat and climate is favorable for them.



Hull fouling occurs when organisms attach themselves to the outside of a ship's hull where they can then be transported around the world.



The Migratory Grasshopper (*Melanoplus sanguinipes*) is a winged insect that is widely distributed across Canada and is one example of a species that may expand its range into Nunavut.

### How can you help?

#### Report

Have you seen a different plant, animal or insect in Nunavut?

You help identifying these species is important. Report the **location** where you observed the species (GPS Coordinates are very helpful) and provide a **detailed description** of the plant, animal, or insect. If possible **take a photo**.

Remember that not all non-native species are considered invasive. If you see an unknown plant or animal, it is very important to report it.

Do not take any extreme actions; the first step is reporting the species so that territorial and federal agencies can respond appropriately. We will report our findings back to you and information about the species you have observed.

#### Share

Keep yourself informed and educate others about non-native and invasive species. Let them know what to do if they see an unknown or uncommon species.

#### Report a species to your local Conservation Officer.

For More Information or if your CO is not available please contact:

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### Non-Native Species in Nunavut

As of 2011, there are 17 species known to be non-native in Nunavut, these are listed below and are all terrestrial species. Please note that it is not currently known what the potential is for any of these species to become invasive and to what extent. Two species, the starling and the sow thistle are described in more detail below.

SCIENTIFIC NAME	COMMON NAME	ORGANISM TYPE
<i>Carum carvi</i>	Wild Caraway	Flowering Plant
<i>Taraxacum officinale</i>	Common Dandelion	Flowering Plant
<i>Sonchus arvensis</i>	Field Sow Thistle	Flowering Plant
<i>Leucanthemum vulgare</i>	Oxeye Daisy	Flowering Plant
<i>Thlaspi arvense</i>	Field Pennycress	Flowering Plant
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	Flowering Plant
<i>Barbarea vulgaris</i>	Yellow Rocket	Flowering Plant
<i>Amaranthus retroflexus</i>	Green Amaranth	Flowering Plant
<i>Hordeum vulgare</i>	Common Barley	Flowering Plant
<i>Puccinellia distans</i>	Spreading Alkali Grass	Flowering Plant
<i>Vicia cracca</i>	Tufted Vetch	Flowering Plant
<i>Papaver somniferum</i>	Opium Poppy	Flowering Plant
<i>Plantago major</i>	Common Plantain	Flowering Plant
<i>Polygonum aviculare</i>	Prostrate Knotweed	Flowering Plant
<i>Pieris rapae</i>	Cabbage White	Butterfly
<i>Sturnus vulgaris</i>	European Starling	Passerine Bird
<i>Passer domesticus</i>	House Sparrow	Passerine Bird

### Potential Invasive Species in Nunavut

As trade and shipping continues to increase, some aquatic invasive species known to commonly foul ship hulls and ballast waters, like the Chinese Mitten Crab, are more likely to arrive at ports around Nunavut.

A recent report commissioned by Fisheries and Oceans Canada identified a number of potential aquatic invasive species, mainly for the Hudson Bay region. The table below lists only those species considered as "High Risk" to Nunavut and they are found in freshwater & marine environments.

SCIENTIFIC NAME	COMMON NAME	ORGANISM TYPE
<i>Osmerus mordax</i>	Rainbow Smelt	Fish
<i>Gymnocephalus cernuus</i>	Ruffe	Fish
<i>Caprella mutica</i>	Skeleton Shrimp	Crustacean
<i>Chelicorophium curvispinum</i>	Data unavailable	Crustacean
<i>Dikerogammarus villosus</i>	Killer Shrimp	Crustacean
<i>Gmelinoides fasciatus</i>	Data unavailable	Crustacean
<i>Pontogammarus robustoides</i>	Data unavailable	Crustacean
<i>Eriocheir sinensis</i>	Chinese Mitten Crab	Crustacean
<i>Hemimysis anomala</i>	Data unavailable	Crustacean
<i>Balanus improvisus</i>	Acorn Barnacle	Crustacean
<i>Corbicula fluminea</i>	Asian Clam	Mollusc
<i>Dreissena bugensi</i>	Quagga Mussel	Mollusc
<i>Bythotrephes longimanus</i>	Spiny Water Flea	Zooplankton
<i>Cercopagis pengo</i>	Fishhook Water Flea	Zooplankton
<i>Eubosmina maritima</i>	Data unavailable	Zooplankton
<i>Marenzelleria cf. viridis</i>	Data unavailable	Worm
<i>Marenzelleria cf. wireni</i>	Data unavailable	Worm
<i>Cordylophora caspia</i>	Freshwater Hydroid	Hydrozoa
<i>Coscinodiscus wailesii</i>	Data unavailable	Phytoplankton
<i>Odontella sinensi</i>	Data unavailable	Phytoplankton
<i>Prorocentrum minimum</i>	Data unavailable	Phytoplankton
<i>Codium fragile ssp. tomentosoides</i>	Oyster Thief	Algae
<i>Glugea hertwigi</i>	Data unavailable	Protozoa
<i>Amphilinga foliacea</i>	Data unavailable	Parasite



This project was undertaken with the financial support of:



Environment  
Canada

Environnement  
Canada



**APPENDIX C**

**Bird Surveys and PRISM Plots Summary, 2023**



# MELIADINE GOLD MINE PROJECT

## FINAL 2023 BIRD SURVEYS AND PRISM PLOTS SUMMARY REPORT

28 FEBRUARY 2024

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## SECTION 1 • OVERVIEW

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The Agnico Eagle Mines Limited (Agnico Eagle) Meliadine Gold Mine (the Mine) received a Project Certificate (No. 006) from the Nunavut Impact Review Board (NIRB) in February 2015, which was amended in February 2019 (Amendment No. 001) and March 2022 (Amendment No. 002). A Terrestrial Environment Management and Monitoring Plan (TEMMP) for the Mine was prepared for submission with the Project Final Environmental Impact Statement (FEIS) and forms a component of the documentation series produced in accordance with the Project. The TEMMP was updated and submitted to the NIRB in April 2022 (TEMMP Version 4; Agnico Eagle 2022).

This report aims to address the requirements of Terms and Conditions 59, 61, 62, 71, 72, and 74 from the NIRB Project Certificate (No. 006). It summarizes results of bird studies, including the Program for Regional and International Shorebird Monitoring (PRISM) plots surveys, waterbird shoreline surveys, and bird plots, as per the TEMMP, Version 4.

In 2023, a significant post-calving caribou migration into the Mine area prevented completion of most of the bird work scheduled for the June 15<sup>th</sup> to 30<sup>th</sup> bird window. As such, only one PRISM plot and no bird plots were conducted in 2023. With caribou moving out of the Mine area by the end of June, it was possible to complete most of the waterbird shoreline surveys. Additionally, pre-clearance bird nest monitoring was conducted along the AWAR between May and August 2023.

In 2024, the PRISM plots surveying, bird transect and point counts, and waterbird shoreline surveys will continue during the summer, subject to environmental constraints including severe weather and caribou movements.

## SECTION 2 • OBJECTIVES

---

The primary objectives of this report are to:

- 1) Provide a brief overview of the Meliadine Gold Mine and the rationale for breeding bird surveys;
- 2) Describe the methods used to conduct the PRISM plots, waterbird shoreline surveys, bird plots, and pre-clearance bird nest monitoring;
- 3) Summarize results of the 2023 bird surveys; and
- 4) Make recommendations for surveys in subsequent years.

## SECTION 3 • METHODOLOGY

---

### 3.1 PRISM PLOTS

The Program for Regional and International Shorebird Monitoring (PRISM) is a standardized method for monitoring shorebirds in the Canadian Arctic (Bart et al. 2015; **Appendix I**). The PRISM plot surveys followed Environment and Climate Change Canada (ECCC) protocols and are a contribution to ECCC's long-term monitoring program and dataset. A total of 16 plots were chosen by ECCC at the Meliadine Mine (see **Figure 3.1**). Ten plots were surveyed by Golder (now WSP) in June 2018 and 16 plots were surveyed in June 2019. Because of access issues related to caribou post-calving migration from mid-June through July 2023, only one (1) PRISM plot was completed in 2023.

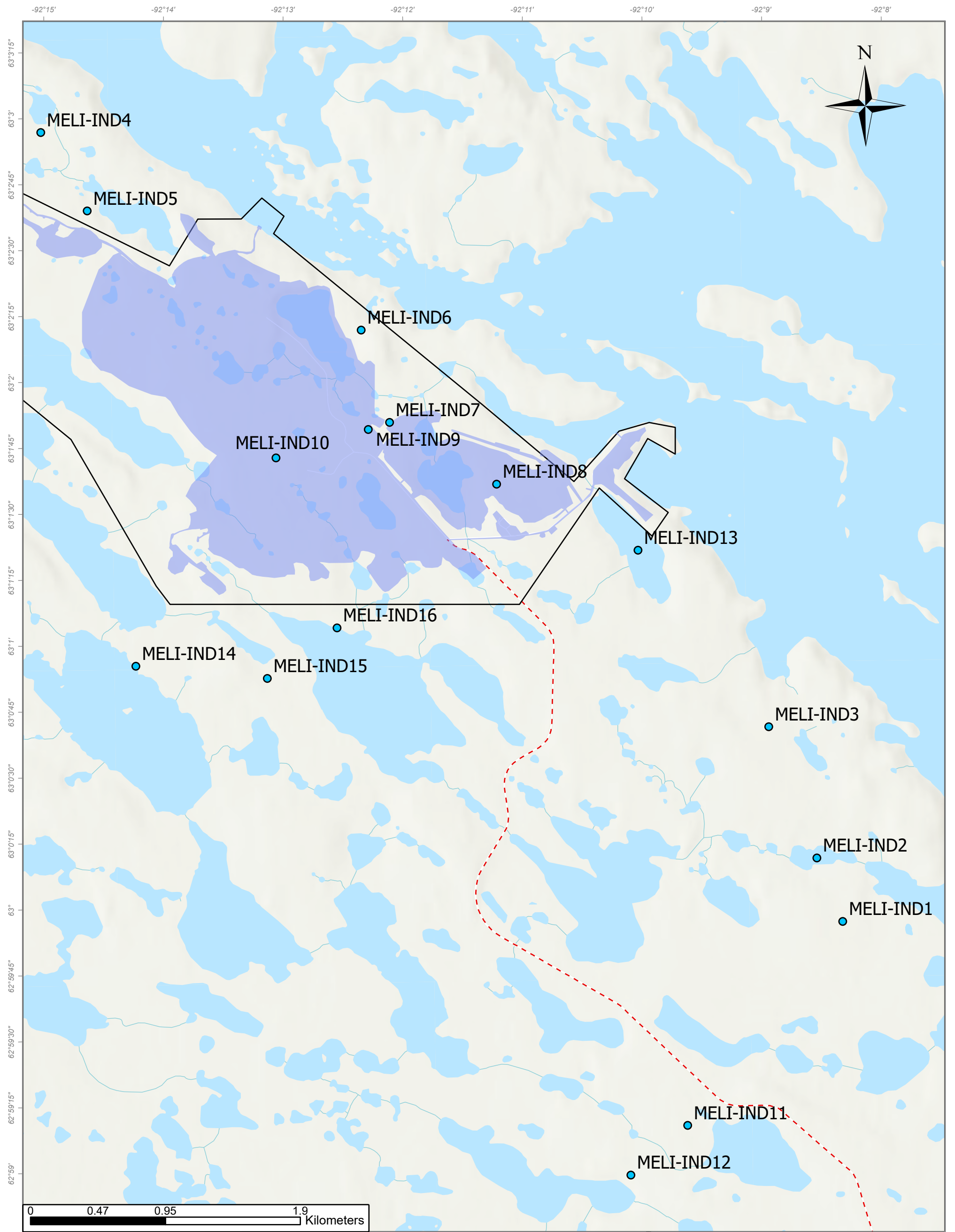
The 300 x 400 m plots are surveyed by a team of two field qualified personnel that transect the plot every 25 m (team members were spaced 25 m apart and used geolocation to orient along transect lines). The purpose of the surveys was to document all birds (i.e., absolute abundance) occurring on the plots, breeding status, and habitat conditions.

PRISM survey raw data will be provided to ECCC Canadian Wildlife Service (CWS) technical experts and the CWS Environmental Assessment Officer every year by March 31<sup>st</sup>. Raw data will include bird and plot habitat data, which will be entered into the CWS provided spreadsheet, and a digital scan of all field data sheets.

### 3.2 WATERBIRD SHORELINE SURVEYS

Shoreline surveys are designed to document the nesting distribution of waterbirds on or along waterbodies within 200 m of mine-related infrastructure (e.g., mine buildings, All-Weather Access Road [AWAR] etc.). Only shorelines within 200 m of infrastructure were surveyed even if a wetland or waterbody intersected the survey area.

All shorelines within 200 m of the Mine are to be surveyed on an annual basis (see **Figure 3.2**). Surveys involve two observers walking along the edge of a waterbody. One observer walks 5 m from the water's edge, while the second observer walks approximately 15 m from the water's edge. If a nest is found, the surveyor approaches the nest to determine nest stage (e.g., egg laying, incubating, nestlings etc.) and nest productivity (i.e., the number of offspring). If a nesting bird show signs of distress, the nest is not approached to avoid nest abandonment. Survey methods are described in more detail in the 2022 version of the TEMMP (Agnico Eagle 2022).




- Meliadine PRISM Location (SW Corner)
- Production Lease
- Meliadine Site
- All Weather Access Road

### Figure 3.1: PRISM Plot Locations at the Meliadine Gold Mine Site

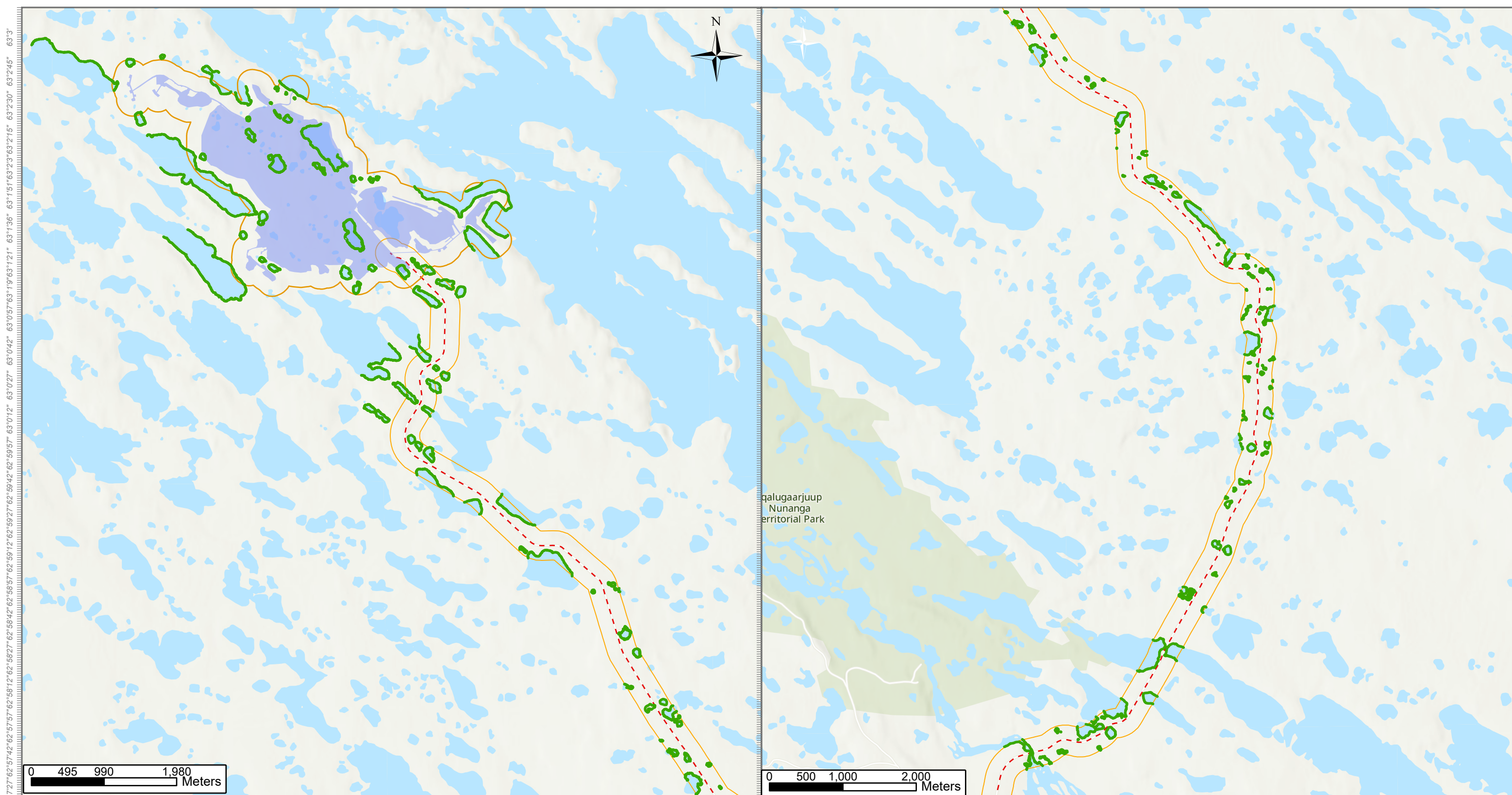
System: NAD 1983 UTM Zone 15N  
Datum: North American 1983

Scale: 1:25,000  
Map Units: Meter



**AGNICO EAGLE**  
MELIADINE

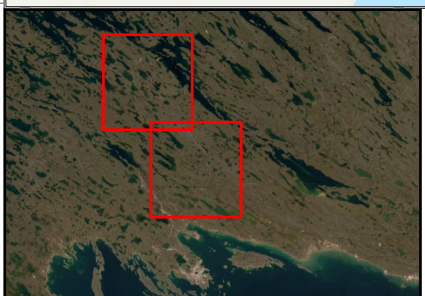
Drawing by: Jade Robitaille	Date: 2024-02-14
Revised by: Hélène Boulanger	Date: 2024-02-14
Approved by: Hélène Boulanger	Date: 2024-02-14



62°57'27" 62°57'42" 62°57'57" 62°58'12" 62°58'27" 62°58'42" 62°58'57" 62°59'12" 62°59'27" 62°59'42" 62°59'57" 63°0'12" 63°0'27" 63°0'42" 63°0'57" 63°1'12" 63°1'27" 63°1'42" 63°1'57" 63°2'12" 63°2'27" 63°2'42" 63°3'

0 495 990 1,980 Meters

0 500 1,000 2,000 Meters



- Waterbird Shoreline Survey Location
- Meliadine Site
- 200m Buffer from Infrastructure
- All Weather Access Road

**Figure 3.2: Waterbird Shoreline Survey Locations at the Meliadine Gold Mine Site**



Scale: 1:50,000 Map Units: Meter

System: NAD 1983 UTM Zone 15N Datum: North American 1983

Drawing by: Jade Robitaille	Date: 2024-02-28
Revised by: Anne-Laurence Paquet	Date: 2024-02-28
Approved by: Anne-Laurence Paquet	Date: 2024-02-28

### 3.3 BIRD TRANSECTS AND POINT COUNTS

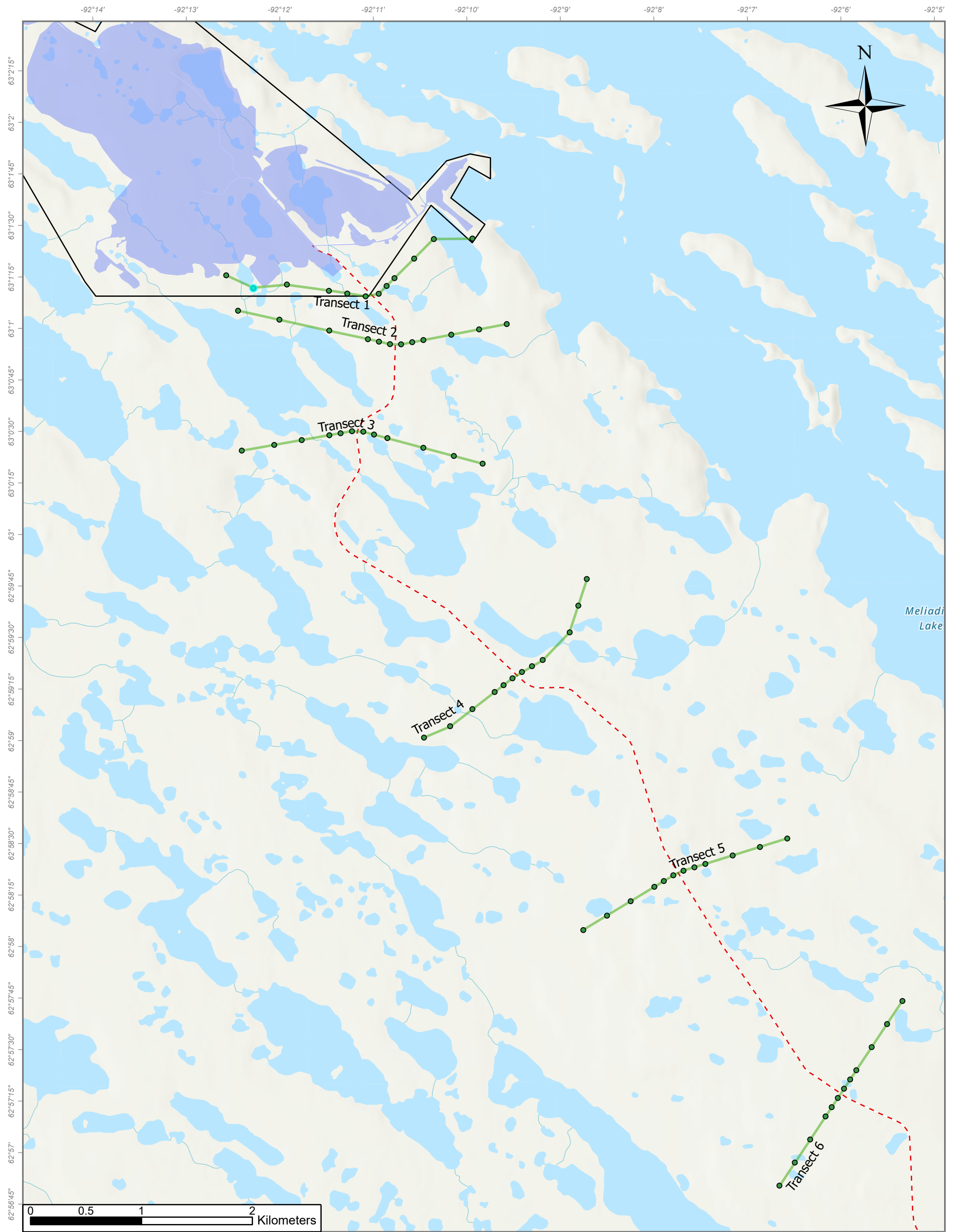
The objective of the point count surveys is to estimate the effects of increased traffic along the AWAR on upland breeding birds and how these effects change with increasing distance from the AWAR. In the future, various statistical approaches, including trend analysis, may be used to determine potential road-related effects on breeding birds. A full set of surveys was conducted by Golder (now WSP) in 2018 and 2019. In 2023, road closures related to Caribou post-calving migration in mid- to late June, the prime survey period for breeding birds, made it impossible to complete any point count surveys.

Point count plots are located within 1 km on either side of the AWAR with the first point count occurring 50 m from the road edge and each subsequent plot spaced 100 m from the center of the preceding plot (see **Figure 3.3**). Six transects with 12 plots per transect result in a total of 72 point counts (see **Appendix II** for UTM coordinates). Point counts are five (5) minutes in duration and all species detected by sight or sound within 50 m and 50-100 m of the observer(s) are recorded. Observations beyond 100 m are recorded at the observer's discretion as incidentals.

### 3.4 PRE-CLEARANCE BIRD NEST SURVEYS

Pre-clearance surveys are conducted during the active bird breeding window to determine if any active nests will be disturbed by proposed activities. Observers survey the entire proposed clearance area and document all bird activity but especially nesting activity. For details on survey locations and results in 2023, refer to **Section 4.4**.

Surveys were conducted between May 15 and August 15, which corresponds to the reproductive period of birds breeding in the Arctic. The proposed construction areas were surveyed at least four days before any disturbance (e.g., construction or borrow pit activity). Surveys were conducted during fair weather (i.e., not raining, low winds, temperature above 5 degrees Celsius). A minimum of two people walked straight-line transects through the proposed construction area, spaced by a maximum of 10 m as shown in **Figure 3.4**. An additional 30 m area on all sides of the proposed disturbance area was surveyed. For areas with ponds and lakes, circular transects spaced by a maximum of 25 m were made. GPS points and photos were collected when a nest was found.




- Production Lease
- Meliadine Site
- Breeding Bird Survey Locations
- All Weather Access Road
- Breeding Bird Transect

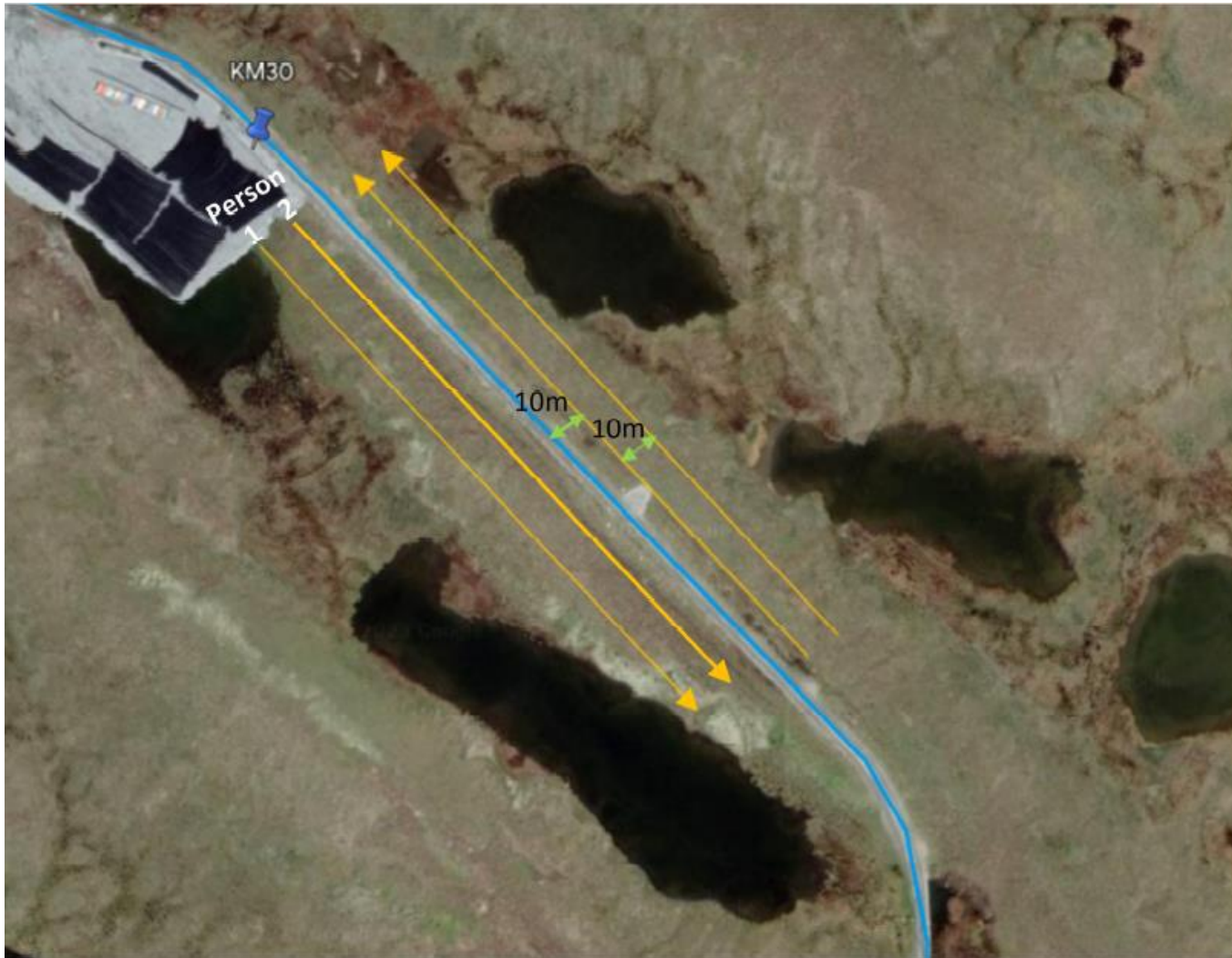
**Figure 3.3: Bird Transect and Plot Survey Locations at the Meliadine Gold Mine Site**

System: NAD 1983 UTM Zone 15N  
Datum: North American 1983

Scale: 1:32,000  
Map Units: Meter



Drawing by:	Date:
Jade Robitaille	2024-02-14
Revised by:	Date:
Helene Boulanger	2024-02-14
Approved by:	Date:
Helene Boulanger	2024-02-14



**Figure 3.4:** Pre-Clearance Survey Methods at the Meliadine Gold Mine Site

## SECTION 4 • 2023 BIRD SURVEY RESULTS

### 4.1 PRISM PLOTS

Because of closures related to caribou post-calving movements in June 2023, only one (1) PRISM plot (MELI-IND11) was completed in 2023 (see **Table 4.1** for timing and weather details).

**Table 4.1:** Fieldwork Details for the Meliadine Gold Mine PRISM Plots in 2023.

Plot (MEL)	Date	Time	Weather	Observers <sup>1</sup>
MELI-IND11	June 22	16:00 to 17:20	8°C, mainly clear, no precipitation, gentle breeze	CN & TP

<sup>1</sup> CN = Christopher Nakoolak; TP = Tom Plath

Four (4) bird species were observed during 2023 PRISM plot surveys (**Table 4.2**). Two (2) species were only observed incidentally outside plots, while the other species were observed while surveying the PRISM plot (**Table 4.2**). Species numbers, behaviours, nests, and other details have been recorded in the PRISM plot data spreadsheets as per the templates provided by CWS that will be provided to ECCC by March 31, 2024.

**Table 4.2:** Wildlife Species Observed on Meliadine Gold Mine PRISM Plots in 2023. Additional Species Observed outside Plots are Listed as Incidental.

Common Name	Scientific Name	PRISM Plots (MEL)	Incidental (Plot #s)
		011	
<b>BIRDS</b>			
Canada Goose	<i>Branta canadensis</i>		11
Common Raven	<i>Corvus corax</i>	1	
Herring Gull	<i>Larus argentatus</i>	1	
Horned Lark	<i>Eremophila alpestris</i>		11

## 4.2 WATERBIRD SHORELINE SURVEYS

Due to road closures during caribou migration, not all shoreline surveys were completed in 2023. See **Appendix III** for survey timing and weather conditions, **Appendix IV** for survey results by location, and **Figure 3.2** for general shoreline survey locations.

A total number of 32 bird species, of which 18 species were waterbirds, were recorded on waterbird shoreline surveys in 2023 (see **Appendix V**). The 10 most encountered species included Horned Lark (recorded at 99 wetlands), Sandhill Crane (79), American Pipit (59), Herring Gull (58), Lapland Longspur (58), Canada Goose (54), Pacific Loon (34), Savannah Sparrow (33), Tundra Swan (31). The 10 most encountered waterbird species were Herring Gull (recorded at 58 wetlands), Canada Goose (54), Least Sandpiper (41), Pacific Loon (34), Tundra Swan (31), Long-tailed Duck (26), Semipalmated Plover (17), Semipalmated Sandpiper (15), Northern Pintail (15), and Common Loon (8).

A total of 36 documented or potential nests were recorded on waterbird shoreline surveys in 2023 (see **Table 4.3**). The 36 nests were from 14 species of which nine (9) species were waterbirds.

**Table 4.3:** Confirmed or Potential Nest Sites for the Meliadine Gold Mine Waterbird Shoreline Survey in 2023.

Common Name	Wetland #	Details
American Pipit	103	1 adult carrying food (15W 539556 6991052)
American Pipit	153	1 adult & nest with 5 eggs (15W 539819 6989719)
Canada Goose	12, 110, 112	Depredated nest on small island with 1 dead adult (15W 541220 6987895)
Canada Goose	26, 129	5 adults & 7 juveniles (15W 541588 6985203)
Canada Goose	142, 158	2 adults & 4 juveniles (15W 544678 6982157)
Canada Goose	224	2 agitated adults (15W 547916 6978628)
Common Raven	165	Empty nest under bridge
Herring Gull	23	1 adult on nest on small island (15W 540369 6986736)
Herring Gull	98	Nest on small island (15W 544364 6982251)
Lapland Longspur	224	2 adults & nest (15W 547133 6978882)
Least Sandpiper	3	1 adult with 2 young (15W 537639 6991064)
Least Sandpiper	16	2 adults with distraction display (15W 537924 6989892)
Least Sandpiper	16	1 adult with distraction display (15W 538094 6989776)
Least Sandpiper	21, 124, 125, 263	1 agitated adult (15W 541172 6985853)
Least Sandpiper	26, 129	1 agitated adult (15W 541406 6985329)
Least Sandpiper	100	2 adults with distraction display (15W 539396 6990606)

**Table 4.3:** Continued.

Common Name	Wetland #	Details
Least Sandpiper	224	2 agitated adults (15W 547316 6978724)
Least Sandpiper	242, 244	1 agitated adult (15W 546603 6979568)
Herring Gull	9, 102	Nest on small island (15W 539619 6990500)
Herring Gull	98	1 adult on island nest (15W 538413 6989422)
Long-tailed Duck	181	1 female & nest with 8 eggs (15W 545754 6972244)
Red-throated Loon	2, 73	2 adults (1 sitting on nest) (15W 537125 6990998)
Red-throated Loon	21, 124, 125, 263	Nesting pair (15W 541208 6985702)
Sandhill Crane	7, 8, 84, 85	2 adults agitated & walking (15W 538796 6990688)
Sandhill Crane	16	2 adults & 1 colt (15W 538483 6989003)
Savannah Sparrow	12, 110, 112	1 adult agitated & singing (15W 540987 6988062)
Savannah Sparrow	130	1 adult flushed & agitated (15W 542738 6984698)
Semipalmated Plover	103	2 adults & nest; agitated & distraction display (15W 539667 6990187)
Semipalmated Plover	153	2 adults with distraction display & nest with 4 eggs (15W 539865 6989680)
Semipalmated Plover	164	2 agitated adults (15W 544691 6971572)
Semipalmated Plover	164	2 agitated adults (15W 544689 6971794)
Semipalmated Plover	224	1 agitated adult (15W 547070 6978939)
Semipalmated Sandpiper	16	2 adults displaying broken wing display (15W 538933 6988938)
Tundra Swan	26, 129	1 adult on nest; Arctic Fox approached but female raised wings in defense and fox left (15W 541588 6985203)
Tundra Swan	103	2 adults & 3 young (15W 539556 6990152)
Tundra Swan	132, 262	2 adults & 3 young (15W 543837 6983912)

### 4.3 BIRD TRANSECTS AND POINT COUNTS

Due to road closures during caribou migration, no point counts were conducted on transects in 2023.

#### 4.4 PRE-CLEARANCE BIRD NEST SURVEYS

Details on date, timing, and results of pre-clearance nest surveys, and mitigation actions taken, are provided in **Appendix VI**.

Eighteen (18) bird species were observed on pre-clearance surveys between May 24<sup>th</sup> and August 12<sup>th</sup>, 2023. Mitigation actions were taken whenever active nesting was observed. Details on confirmed or potential nests are summarized in **Table 4.4** below. Select photos are provided.

When applicable, a setback perimeter was applied to the nest in accordance with the TEMMP.

**Table 4.4:** Bird Nesting Activity and Nests Identified on Pre-Clearance Bird Nest Monitoring at the Meliadine Gold Mine in 2023.

Date (2023)	Species (#)	Details and Mitigation Actions
June 05	Lapland Longspur (1)	Nest with no eggs found; no action taken; see <b>Photo #1</b>
June 06	Lapland Longspur (1)	Nest being build; nest removed at very early stage
June 08	Least Sandpiper (1)	Least Sandpiper adult incubating 4 eggs; photos taken; construction not permitted on designated road section; see <b>Photo #2 &amp; Photo #3</b>
June 29	White-crowned Sparrow (2); nine (9) bird species observed	White-crowned Sparrow pair displaying nesting behaviour; 50 m buffer zone established
June 30	Northern Pintail (1), Semipalmated Plover (1), six (6) other bird species identified	Northern Pintail female on 7 eggs; Semipalmated Plover adult showing nesting behaviour; 50 m buffer zone established
July 08	Semipalmated Plover (1)	Semipalmated Plover nest with 2 eggs and 2 hatchling; 50 m buffer zone established
July 10	Horned Lark (1), Savannah Sparrow (2),	Savannah Sparrow adult with fledgling; no action taken
July 12	Semipalmated Plover (1)	Semipalmated Plover nestling; 100 m buffer zone established
July 13	Horned Lark (1)	Horned Lark nestling; 100 m buffer zone established
July 14	Semipalmated Plover (1), Savannah Sparrow (3)	Semipalmated Plover adult showing nesting behavior; at least 1 young Horned Lark; 100 m buffer established



**Photo #1:** Lapland Longspur Nest (June 05)



**Photo #2:** Least Sandpiper Nest (June 08)



**Photo #3:** Least Sandpiper Nest Mitigation (June 08)

## SECTION 5 • RECOMMENDATIONS

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In 2024, PRISM plots surveys, bird transect and point counts, waterbird shoreline surveys, and pre-clearance bird nest surveys will continue during the summer, subject to environmental constraints including severe weather and caribou movements.

## SECTION 6 • LITERATURE CITED

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Agnico Eagle. 2022. Terrestrial Environment Management and Monitoring Plan. Version 4, 2022.

Bart, J., Andres, B., Brown, S., Donaldson, G., Harrington, B., Johnston, V., Jones, S., Morrison, G., and Skagen, S. 2005. The Program for Regional and International Shorebird Monitoring (PRISM). USDA Forest Service General Technical Report, PSW-GTR-191, 893-901.

## APPENDIX I

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### PRISM Plot Survey Protocols and Plot Coordinates for the Meliadine Gold Project

## **ARCTIC PRISM SURVEY DETAILS – FOR AGNICO EAGLE CREWS AT MELIADINE**

### **(part of Arctic PRISM Region 6.4)**

Canadian Wildlife Service, J. Rausch/Nik Clyde, April 2022

#### **PLOT SELECTION LOGISTICS**

Attached below are the selected plots packages (PDF). Each dot on the overview map represents a PLOT (instead of a ZONE as in previous years). The plots selected for this site are a mix of repeat surveys of previous plots and new plots. We have chosen this method to attempt to gain more accurate information on trends for most of the partner surveys. This information will be paired with results from the larger PRISM surveys to better inform shorebird population and trend estimates.

#### **The plan is to survey 48 plots over the next 10 years.**

Rather than survey plots completely at random (as in previous years), we have assigned priorities to the plots provided as part of this package (see table below for priority ranking).

Plots should still be chosen at random within the same priority level. Please do not subdivide the PRISM study area into directional quadrats where 1 quadrat per field season is surveyed, or in numerical order (b/c the numerical order assignment is not random). Just randomly choose from all available plots (within a given priority level) based on which direction the weather is the best in, or in later years, areas or distances from camp that haven't been done yet.

If a plot is not surveyable for some reason (snow cover, bear on plot, etc.) it should be attempted again in future years until all plots have been completed.

In the case where only a section of the plot is un-surveyable you could still survey the portion of the plot that is surveyable, mark how much of the plot was actually surveyed (% of total plot area surveyed) and indicate percent of plot that was surveyed on page 1 on Plot Survey Summary Form

The 'Plot Survey' section of the Plot Survey Summary Form must still be completed for an un-surveyable plot, indicating Site, plot name, Surveyors, date, % area surveyed = 0% and reason the survey was not surveyed. Indicate the reason the plot was not surveyed with details (e.g. percent snow cover, estimate of cliff height or plot steepness/slope, river width/depth, etc.).

## Plot Assignments and Priority Rankings

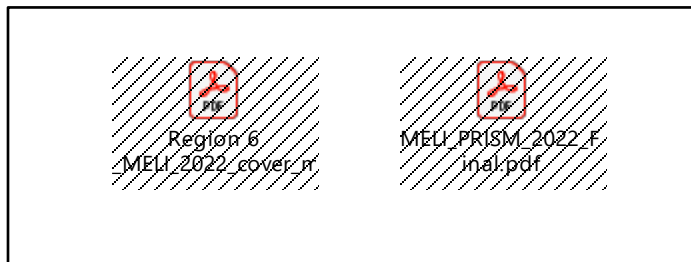
<u>Plot</u>	<u>Priority</u>	<u>Old/New</u>	<u>Included?</u>				
MELI-IND1	High	Old	Yes	MELI-108	Medium	New	No
MELI-IND10	High	Old	Yes	MELI-111	Medium	New	No
MELI-IND11	High	Old	Yes	MELI-126	Medium	New	No
MELI-IND12	High	Old	Yes	MELI-122	Medium	New	No
MELI-IND13	High	Old	Yes	MELI-127	Medium	New	No
MELI-IND14	High	Old	Yes	MELI-107	Medium	New	No
MELI-IND15	High	Old	Yes	MELI-119	Medium	New	No
MELI-IND16	High	Old	Yes	MELI-131	Medium	New	No
MELI-IND2	High	Old	Yes	MELI-120	Medium	New	No
MELI-IND3	High	Old	Yes	MELI-124	Medium	New	No
MELI-IND4	High	Old	Yes	MELI-112	Medium	New	No
MELI-IND5	High	Old	Yes	MELI-129	Medium	New	No
MELI-IND6	High	Old	Yes	MELI-103	Medium	New	No
MELI-IND7	High	Old	Yes	MELI-115	Medium	New	No
MELI-IND8	High	Old	Yes	MELI-123	Medium	New	No
MELI-IND9	High	Old	Yes	MELI-116	Medium	New	No
MELI-130	Medium	New	No	MELI-101	Medium	New	No
MELI-102	Medium	New	No	MELI-132	Medium	New	No
MELI-109	Medium	New	No	MELI-118	Medium	New	No
MELI-117	Medium	New	No	MELI-121	Medium	New	No
MELI-110	Medium	New	No	MELI-125	Medium	New	No
MELI-113	Medium	New	No	MELI-106	Medium	New	No
MELI-114	Medium	New	No	MELI-104	Medium	New	No
MELI-128	Medium	New	No	MELI-105	Medium	New	No

*\*note that only the old repeated plots are included in this package. These are the highest priority so should be surveyed first. We will send an updated package with new plots once they are complete.*

## PLOT SELECTION PACKAGES (PDF)

In the attached selected plots package, there are two sections:

- Overview map of selected PLOTS
  - o Provides an overview of the selected plots.
  - o Shows the location of the southwest corner of each plot.
- Plot maps
  - o Each plot has a map, which shows the general location of the plot to be surveyed.
  - o The coordinates of the southwest corner for each plot is given on the plot maps for convenience.

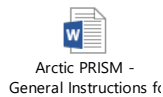


## SURVEY METHODS & DATASHEETS & DATA ENTRY TEMPLATE

The attached Word document has the survey methods as well as the datasheets.

The datasheets should be completed on site (before you leave the plot); this is especially important for the habitat datasheet. The habitat datasheet should be completed at the end of the plot so you have seen the whole plot before completing it (rather than at the beginning of the plot when you have not yet covered it). There is a landform sample guide to help with completing the habitat datasheet.

### Survey Methods & Datasheets Package



After the field season, please send me legible scans of all the datasheets and the photograph(s) from each plot. If you don't want to keep the originals, you can mail them to me for archiving. If you would like to keep the originals, the scans will suffice.

### ***DATA ENTRY TEMPLATE – NEW FOR 2022 SEASON***

In order to standardize data entry we are asking participants to enter data directly into the new excel data entry template included in your package. This template was designed to help simplify the data entry process and has many automated features we hope will make this process easier to accomplish, including pre-filled fields, dropdown menus, and detailed explanations of each column. There is also a README file on the first tab with detailed information on the functions of the data entry template, including tips for troubleshooting any issues. The spreadsheet and new data entry forms have been designed together, so the terminology should be consistent across each and it should hopefully be clear which section of the data entry template corresponds with specific sections of the new field data sheets.

Any feedback on ways we can improve this new tool are welcomed and appreciated.



## SURVEY EQUIPMENT LIST

The below equipment are required for the surveys. A description of what it is used for is included; it probably makes more sense after you've read through the methods document. 😊

- Binoculars (n=4, 1 pair per person)
- Field notebook or clipboard with datasheets (n=2, 1 per team lead for each 2-person team)
  - o Only the team leader (western most person) needs to record, the partner calls out birds to the team leader
- GPS set in UTM (NAD 83) and True North (n=2-4, 1 per team at least but 1 per person is convenient for when a nest is found)
- Compass with the proper declination set (n=2, 1 per team for the non-lead in each team)
- Tall survey stakes with long flagging tape streamers (n=8, 4 per team with 2 stakes of 2 colours per team – bring a few spares in the heli in case a pole snaps – we use skinny bamboo garden stakes)

## USING THE STAKES/COMPASS/GPS #gettingstarted

To get started on the plot, and marking with stakes:

1. The team leader starts in the SW corner, throws a point 400m north and uses GPS to go to it; partner walks due east (using compass) of the leader 25 m and drops a glove.
2. Partner walks a further 25m due east of leader and plants a stake of colour 1. This will be the leader's guidance post on the next southbound pass.
3. The partner continues another 25m and plants a stake of colour 2, this will become the partner's guidance post on the next southbound pass.
4. The partner returns to their glove (back 50m) and the pair heads north using the leader's GPS and the partner maintains a distance of 25m from the leader until they reach the north border of the plot.
5. At the north edge of the plot, the partner uses compass to find due east and walks 25m, this becomes the leader's starting position for the next southbound pass. The partner walks another 25 m and drops a glove or something they can return to. This becomes the partner's starting position for the next southbound pass. The partner then walks over 25 m and plants a stake of colour 1, this will become the leader's guidance post on the next northbound pass. The partner continues another 25m and plants a stake of colour 2, this will become the partner's guidance post on the next northbound pass. The partner returns to their glove (back 50m) and the pair heads south to the first set of deployed stakes which are picked up and subsequently deployed in anticipation of the next southbound pass.
6. Repeat until 3 return passes (3 northbound and 3 southbound) have been completed.

Note: on the first pass north, the leader is only looking 12.5m eastward into the plot. On the last pass south, the partner is looking 25m eastward.

Another option is to not use the stakes and have both people use their GPS and know what easting they should be on; however this often results in people spending too much time looking at their GPS screens, and not enough time scanning the landscape for birds, so the stake method is preferred.

## PHOTOGRAPHS (PLOTS & NESTS)

Take a photo of the plot from any of the 4 corners looking in to the plot (1 photo per plot is fine), and record what corner the photo was taken from.

When the photos are downloaded (back at the office or camp), please label the photos using the below (or a similar) convention:

- PLOT PHOTOS:
  - Plot\_AAA-XXA\_twolettercodeforplotcornerphotowastakenfrom\_RegionX\_YEAR\_PhotographerFirstnameLastname.JPG
    - e.g.:
      - Plot\_IGL-154D\_SW\_Region5\_2016\_JennieRausch.JPG
      - Plot\_KUG-99A\_NW\_Region5\_2016\_LisaPirieDominix.JPG
  - If there is more than one photo from a plot, and it was from the same direction/corner, add numbers behind direction in brackets.
    - e.g.
      - Plot\_AAA-XXXXA\_twolettercodeforplotcornerphotowastakenfrom(1)\_RegionX\_YEAR\_FirstnameLastname.JPG
      - Plot\_AAA-XXXXA\_twolettercodeforplotcornerphotowastakenfrom(2)\_RegionX\_YEAR\_FirstnameLastname.JPG
      - Plot\_AAA-XXXXA\_twolettercodeforplotcornerphotowastakenfrom(3)\_RegionX\_YEAR\_FirstnameLastname.JPG
  - If the photos were taken from different corners, then they will have different file names already so no need to number.
    - e.g.
      - Plot\_AAA-XXXXA\_SE\_RegionX\_YEAR\_FirstnameLastname.JPG
      - Plot\_AAA-XXXXA\_SW\_RegionX\_YEAR\_FirstnameLastname.JPG
- NEST PHOTOS:
  - NestID\_4letterspeciescode\_RegionX\_YEAR\_PhotographerFirstnameLastname.JPG
  - e.g.
    - JJP-01\_LALO\_Region5\_2016\_LisaPirieDominix.JPG

- If there is more than one photo from a nest, add numbers behind the 4 letter species code in brackets.
  - e.g.
    - LPD-08\_AMPI(1)\_ Region5\_2016\_LisaPirieDominix.JPG
    - LPD-08\_AMPI(2)\_ Region5\_2016\_LisaPirieDominix.JPG
    - LPD-08\_AMPI(3)\_ Region5\_2016\_LisaPirieDominix.JPG

## QUESTIONS FOR {2022} FIELD SEASON

If you have questions or run into any problems while completing the surveys and want to talk to Nik (acting for Jennie) during:

- Up to {11 June}: email (nik.clyde@ec.gc.ca) or call me on my cell phone at 604-356-8226.
- {12 June – 08 July}:
  - The best method would be to leave a message for me with the PCSP Base Managers (**867-252-3872**) with your number and a time to call. We talk to PCSP every night ~6:30pm Central time.
- {09 July - September}: email (nik.clyde@ec.gc.ca) or call me on my cell phone at 604-356-8226.

Thanks for participating in the Arctic PRISM!

Our partners are an important and valued part of our program! 😊

Crosswalk from original 2008/2009 Meliadine Plot names ('OriginalPlotName') in the .kmz files to Standardized Arctic PRISM Database Plot names ('StandardizedArcticPRISMPlotName') for re-survey/data entry

Site Name	Standardized Arctic PRISM Plot Name	Original Plot Name	Original Survey Date	UTM Zone	SW corner Easting	SW corner Northing	NW corner Easting	NW corner Northing	NE corner Easting	NE corner Northing	SE corner Easting	SE corner Northing	Original Surveyed Plot Area (km2)
Meliadine	MELI-IND1	PR001	June 14, 2008	15	543543	6985728	543536	6986128	543836	6986132	543843	6985732	0.12
Meliadine	MELI-IND2	PR002	June 15, 2008	15	543361	6986175	543355	6986575	543655	6986579	543661	6986179	0.12
Meliadine	MELI-IND3	PR003	June 15, 2008	15	543022	6987099	542735	6987377	542944	6987593	543231	6987315	0.12
Meliadine	MELI-IND4	PR004	June 15, 2008	15	537894	6991283	537632	6991585	537859	6991782	538121	6991479	0.12
Meliadine	MELI-IND5	PR005	June 15, 2008	15	538221	6990731	537886	6991072	538180	6991129	538467	6990851	0.11
Meliadine	MELI-IND6	PR006	June 15, 2008	15	540151	6989892	539904	6990176	540199	6990233	540401	6989992	0.09
Meliadine	MELI-IND7	PR007	June 15, 2008	15	540351	6989242	540301	6989642	540539	6989643	540601	6989242	0.1
Meliadine	MELI-IND8	PR9001	June 14, 2009	15	541105	6988807	540701	6989242	541101	6989392	541451	6988992	0.21
Meliadine	MELI-IND9	PR9002	June 14, 2009	15	540201	6989192	539801	6989542	540151	6989742	540431	6989435	0.17
Meliadine	MELI-IND10	PR9003	June 14, 2009	15	539551	6988992	539351	6989342	539601	6989442	539901	6989092	0.13
Meliadine	MELI-IND11	PR9004	June 15, 2009	15	542451	6984292	542251	6984642	542379	6984756	542648	6984402	0.08
Meliadine	MELI-IND12	PR9005	June 15, 2009	15	542051	6983942	541901	6984292	542118	6984405	542261	6984030	0.09
Meliadine	MELI-IND13	PR9006	June 15, 2009	15	542101	6988342	541751	6988592	541976	6988809	542258	6988525	0.11
Meliadine	MELI-IND14	PR9007	June 17, 2009	15	538564	6987525	538524	6987620	538881	6987804	538921	6987712	0.04
Meliadine	MELI-IND15	PR9008	June 17, 2009	15	539490	6987439	539189	6987709	539383	6987925	539684	6987655	0.11
Meliadine	MELI-IND16	PR9009	June 17, 2009	15	539981	6987795	540013	6988072	540429	6988024	540397	6987747	0.11

## APPENDIX II

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Bird Transect and Plot Coordinates for the Meliadine Gold Project

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Transect & Point #	UTM Zone	Point X	Point Y
1-01	15V	539980	6988148
1-03	15V	540528	6988065
1-04	15V	540907	6988008
1-05	15V	541072	6987984
1-06	15V	541237	6987959
1-08	15V	541356	6987982
1-09	15V	541427	6988052
1-10	15V	541498	6988123
1-11	15V	541675	6988299
1-12	15V	541853	6988475
1-14	15V	542201	6988480
1-15	15V	540226	6988032
2-01	15V	540087	6987829
2-02	15V	540460	6987748
2-03	15V	540910	6987650
2-04	15V	541258	6987572
2-05	15V	541358	6987550
2-06	15V	541457	6987528
2-08	15V	541557	6987526
2-09	15V	541658	6987546
2-10	15V	541758	6987565
2-11	15V	542010	6987613
2-12	15V	542261	6987661
2-13	15V	542510	6987709
3-01	15V	540121	6986568
3-02	15V	540414	6986620
3-03	15V	540661	6986663
3-04	15V	540911	6986707
3-05	15V	541012	6986725
3-06	15V	541115	6986743
3-08	15V	541217	6986739
3-09	15V	541313	6986713
3-10	15V	541434	6986681
3-11	15V	541758	6986594
3-12	15V	542033	6986520
3-13	15V	542293	6986451

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Transect & Point #	UTM Zone	Point X	Point Y
4-02	15V	542000	6984084
4-03	15V	542200	6984238
4-04	15V	542401	6984393
4-05	15V	542481	6984454
4-06	15V	542562	6984516
4-08	15V	542647	6984573
4-09	15V	542737	6984625
4-10	15V	542834	6984681
4-11	15V	543078	6984930
4-12	15V	543155	6985171
4-13	15V	543231	6985411
4-14	15V	541764	6983982
5-01	15V	543200	6982247
5-02	15V	543414	6982377
5-03	15V	543627	6982507
5-04	15V	543841	6982637
5-05	15V	543926	6982689
5-06	15V	544012	6982741
5-08	15V	544104	6982782
5-09	15V	544202	6982812
5-10	15V	544301	6982843
5-11	15V	544547	6982919
5-12	15V	544793	6982996
5-13	15V	545039	6983072
6-01	15V	544968	6979943
6-02	15V	545107	6980151
6-03	15V	545246	6980359
6-04	15V	545384	6980567
6-05	15V	545440	6980651
6-06	15V	545495	6980734
6-08	15V	545551	6980817
6-09	15V	545606	6980900
6-10	15V	545662	6980984
6-11	15V	545800	6981192
6-12	15V	545939	6981400
6-13	15V	546078	6981608

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## APPENDIX III

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Fieldwork Dates and Time, Weather, and Observers for the Meliadine Gold Mine Project  
Waterbird Shoreline Surveys in 2023

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
1 (& 72, 83)	06 July	09:50 to 10:40	12°C, clear, gentle breeze (NW)	LQ & TP
2 (& 73)	06 July	11:25 to 11:45	12°C, 5% cloud cover, moderate breeze (NW)	LQ & TP
3	06 July	12:00 to 12:15	13°C, 10% cloud cover, moderate breeze (NW)	LQ & TP
4 (& 74)	06 July	13:00 to 13:20	13°C, 10% cloud cover, moderate breeze (NW)	LQ & TP
7 (& 8, 84, 85)	01 July	ND	18°C, 10% cloud cover, light breeze	LQ & DW
8 (& 7, 84, 85)	01 July	ND	18°C, 10% cloud cover, light breeze	LQ & DW
9	29 June	ND	14°C, 20% cloud cover, gentle breeze	LQ & TP
10 (& 11, 106, 107, 108, 109, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
11 (& 10, 106, 107, 108, 109, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
12 (& 110, 112)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
13 (& 113)	29 June	ND	13°C, 30% cloud cover, light air	LQ & DW
14 (& 114)	29 June	07:20	13°C, 30% cloud cover, light air	LQ & DW
16	06 July	13:30 to 16:00	13°C, 15% cloud cover, moderate breeze (NW)	LQ & TP
17 (& 18, 117)	07 July	08:25 to 10:00	10°C, 90% cloud cover, gentle breeze (NW)	LQ & TP
18 (& 17, 117)	07 July	08:25 to 10:00	10°C, 90% cloud cover, gentle breeze (NW)	LQ & TP
19 (& 122)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
20 (& 118, 123)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
21 (& 124, 125, 263)	03 July	07:00 to	7°C, 90% cloud cover, gentle breeze	LQ & DW
22 (& 126)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
23	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
24	03 July	10:40 to	11°C, 90% cloud cover, moderate breeze	LQ & DW
25 (& 128)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
26 (& 129)	02 July	15:20 to	16°C, 70% cloud cover, light breeze	LQ & DW
28 (& 133, 134)	02 July	14:09	16°C, 70% cloud cover, light breeze	LQ & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
31 (& 137, 140)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
32 (& 139)	02 July	10:25 to	16°C, 20% cloud cover, light breeze	LQ & DW
34 (& 141, 143)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
39 (& 43, 148, 159)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
40 (& 150, 161)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
43 (& 39, 148, 159)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
72 (& 1, 83)	July 06	09:50 to 10:40	12°C, clear, gentle breeze (NW)	LQ & TP
73 (& 2)	July 06	11:25 to 11:45	12°C, 5% cloud cover, moderate breeze (NW)	LQ & TP
74 (& 4)	July 06	13:00 to 13:20	13°C, 10% cloud cover, moderate breeze (NW)	LQ & TP
75	July 06	14:14 to 14:20	13°C, 10% cloud cover, moderate breeze (NW)	LQ & TP
76	July 06	15:03 to 15:14	13°C, 30% cloud cover, moderate breeze (NW)	LQ & TP
77 <sup>2</sup>	NA	NA	NA	NA
78 <sup>2</sup>	NA	NA	NA	NA
79 <sup>2</sup>	NA	NA	NA	NA
83 (& 1, 72)	06 July	09:50 to 10:40	12°C, clear, gentle breeze (NW)	LQ & TP
84 (& 7, 8, 85)	01 July	ND	18°C, 10% cloud cover, light breeze	LQ & DW
85 (& 7, 8, 84)	01 July	ND	18°C, 10% cloud cover, light breeze	LQ & DW
90 (& 91)	01 July	14:43 to	18°C, 10% cloud cover, light breeze	LQ & DW
91 (& 90)	01 July	14:43 to	18°C, 10% cloud cover, light breeze	LQ & DW
93 <sup>2</sup>	NA	NA	NA	NA
94	07 July	11:46 to 11:48	11°C, 90% cloud cover, moderate breeze (NW)	LQ & TP
95	29 June	ND	14°C, 20% cloud cover, gentle breeze	LQ & TP
96	29 June	ND	14°C, 20% cloud cover, gentle breeze	LQ & TP
97	29 June	12:17 to	15°C, 20% cloud cover, gentle breeze	LQ & DW
98	29 June	11:17 to	14°C, 20% cloud cover, gentle breeze	LQ & TP

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
99	29 June	ND	15°C, 20% cloud cover, gentle breeze	LQ & DW
100	29 June	ND	14°C, 20% cloud cover, gentle breeze	LQ & TP
101	29 June	ND	15°C, 20% cloud cover, gentle breeze	LQ & DW
102	29 June	ND	14°C, 20% cloud cover, gentle breeze	LQ & TP
103	29 June	16:55 to 17:41	14°C, 30% cloud cover, gentle breeze	LQ & DW
106 (& 10, 11, 107, 108, 109, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
107 (& 10, 11, 106, 108, 109, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
108 (& 10, 11, 106, 107, 109, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
109 (& 10, 11, 107, 108, 111)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
110 (& 12, 112)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
111 (& 10, 11, 107, 108, 109, 110)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
112 (& 12, 110)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
113 (& 13)	29 June	ND	13°C, 30% cloud cover, light air	LQ & DW
114 (& 14)	29 June	07:20	13°C, 30% cloud cover, light air	LQ & DW
115	07 July	13:50 to 14:02	12°C, 70% cloud cover, gentle breeze (NW)	LQ & TP
117 (& 17, 18)	07 July	08:25 to 10:00	10°C, 90% cloud cover, gentle breeze (NW)	LQ & TP
118 (& 20, 123)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
120 (& 121)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
121 (& 120)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
122 (& 19)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
123 (& 20, 118)	03 July	ND	11°C, 90% cloud cover, moderate breeze	LQ & DW
124 (& 21, 125, 263)	03 July	07:00 to	7°C, 90% cloud cover, gentle breeze	LQ & DW
125 (& 21, 124, 263)	03 July	07:00 to	7°C, 90% cloud cover, gentle breeze	LQ & DW
126 (& 22)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
128 (& 25)	03 July	ND	7°C, 90% cloud cover, gentle breeze	LQ & DW
129 (& 26)	02 July	15:20 to	16°C, 70% cloud cover, light breeze	LQ & DW
130	02 July	15:15 to	16°C, 70% cloud cover, light breeze	LQ & DW
131	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
132 (& 262)	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
133 (& 28, 134)	02 July	14:09	16°C, 70% cloud cover, light breeze	LQ & DW
134 (& 28, 133)	02 July	14:09	16°C, 70% cloud cover, light breeze	LQ & DW
135 (& 261)	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
137 (& 31, 140)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
138	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
139 (& 32)	02 July	10:25 to	16°C, 20% cloud cover, light breeze	LQ & DW
140 (& 31, 137)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
141 (& 34, 143)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
142 (& 158)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
143 (& 34, 141)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
144 (& 145, 162)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
145 (& 144, 162)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
146 (& 147)	01 July	10:18 to ND	14°C, 10% cloud cover, light breeze	LQ & DW
147 (& 146)	01 July	10:18 to ND	14°C, 10% cloud cover, light breeze	LQ & DW
148 (& 39, 43, 159)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
149 (& 151, 152, 160)	02 July	08:12 to	14°C, 70% cloud cover, light breeze	LQ & DW
150 (& 40, 161)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
151 (& 149, 152, 160)	02 July	08:12 to	14°C, 70% cloud cover, light breeze	LQ & DW
152 (& 149, 151, 160)	02 July	08:12 to	14°C, 70% cloud cover, light breeze	LQ & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
<b>153</b>	01 July	14:21 to	18°C, 10% cloud cover, light breeze	LQ & DW
<b>154</b>	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>155</b> (& 156, 157, 264, 265)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>156</b> (& 155, 157, 264, 265)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>157</b> (& 155, 156, 264, 265)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>158</b> (& 142)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
<b>159</b> (& 39, 43, 148)	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
<b>160</b> (& 149, 151, 152)	02 July	08:12 to	14°C, 70% cloud cover, light breeze	LQ & DW
<b>161</b> (& 40, 150)	01 July	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>162</b> (& 144, 145)	30 June	ND	14°C, 10% cloud cover, light breeze	LQ & DW
<b>164</b>	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>165</b>	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>166</b> (& 167, 168, 169, 170)	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>167</b> (& 166, 168, 169, 170)	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>168</b> (& 166, 167, 169, 170)	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>169</b> (& 166, 167, 168, 170)	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>170</b> (& 166, 167, 168, 169)	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>171</b>	24 June	10:24 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>172</b> (& 178, 180)	24 June	11:07 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>173</b> (& 174)	24 June	10:44 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>174</b> (& 173)	24 June	10:44 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>175</b>	24 June	14:30 to	14°C, 80% cloud cover, moderate breeze	LQ, CN & DW
<b>176</b>	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
<b>177</b>	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
178 (& 172, 180)	24 June	11:07 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
179	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
180 (& 172, 178)	24 June	11:07 to	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
181	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
186	24 June	ND	10°C, 30% cloud cover, gentle breeze	LQ, CN & DW
188	08 July	16:44 to 16:51	11°C, 90% cloud cover, moderate breeze (S)	LQ & TP
189	08 July	16:56 to 17:03	11°C, 90% cloud cover, moderate breeze (S)	LQ & TP
194	08 July	13:40 to 13:50	12°C, 87% cloud cover, gentle breeze (S)	LQ & TP
195	08 July	14:12 to 14:14	12°C, 80% cloud cover, moderate breeze (S)	LQ & TP
196	08 July	14:07 to 14:09	12°C, 87% cloud cover, gentle breeze (S)	LQ & TP
197	08 July	13:57 to 14:03	12°C, 87% cloud cover, gentle breeze (S)	LQ & TP
198	08 July	12:51 to 12:56	12°C, 80% cloud cover, gentle breeze (S)	LQ & TP
199	08 July	14:18 to 14:25	12°C, 80% cloud cover, moderate breeze (S)	LQ & TP
200	08 July	14:28 to 14:36	12°C, 80% cloud cover, moderate breeze (S)	LQ & TP
204	08 July	12:30 to 12:40	11°C, 80% cloud cover, gentle breeze (S)	LQ & TP
205	08 July	12:30 to 12:40	12°C, 80% cloud cover, gentle breeze (S)	LQ & TP
207	08 July	13:24 to 13:27	11°C, 80% cloud cover, gentle breeze (S)	LQ & TP
208	08 July	Dry	12°C, 80% cloud cover, gentle breeze (S)	LQ & TP
210	08 July	12:45 to 12:50	12°C, 80% cloud cover, gentle breeze (S)	LQ & TP
211 (& 212, 215, 216, 218, 219)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
212 (& 211, 215, 216, 218, 219)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
213 (& 214)	24 June	14:00	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
214 (& 213)	24 June	14:00	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
215 (& 211, 212, 216, 218, 219)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
<b>216</b> (& 211, 212, 215, 218, 219)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
<b>217</b>	24 June	14:00	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
<b>218</b> (& 211, 212, 215, 216, 219)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
<b>219</b> (& 211, 212, 215, 216, 218)	24 June	ND	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
<b>220</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>221</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>222</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>223</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>224</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>225</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>226</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>227</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>228</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>229</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>230</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>231</b> (& 232, 233)	30 June	10:30 to 10:45	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>232</b> (& 231, 233)	30 June	10:30 to 10:45	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>233</b> (& 231, 232)	30 June	10:30 to 10:45	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>234</b>	30 June	ND	8°C, 80% cloud cover, gentle breeze	LQ & DW
<b>235</b>	30 June	ND	8°C, 80% cloud cover, gentle breeze	LQ & DW
<b>237</b> (& 238)	30 June	10:45 to 10:55	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>238</b> (& 237)	30 June	10:45 to 10:55	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>239</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>240</b>	30 June	ND	9°C, 90% cloud cover, drizzle, gentle breeze	LQ & DW
<b>241</b>	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW

**Appendix III**

<b>Wetland #</b>	<b>Date</b>	<b>Time</b>	<b>Weather</b>	<b>Observers<sup>1</sup></b>
242 (& 244)	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW
243	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW
244 (& 242)	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW
245 (& 246)	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW
246 (& 245)	01 July	09:20 to	14°C, 10% cloud cover, light breeze	LQ & DW
247	24 June	15:25 to	15°C, 90% cloud cover, moderate breeze	LQ, CN & DW
249 <sup>2</sup>	NA	NA	NA	NA
250	08 July	Dry	11°C, 80% cloud cover, gentle breeze (S)	LQ & TP
251	08 July	14:48 to 14:51	12°C, 80% cloud cover, moderate breeze (S)	LQ & TP
252	08 July	14:48 to 14:51	12°C, 80% cloud cover, moderate breeze (S)	LQ & TP
253	08 July	13:05 to 13:09	11°C, 80% cloud cover, gentle breeze (S)	LQ & TP
259	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
260	02 July	ND	14°C, 70% cloud cover, light breeze	LQ & DW
261 (& 135)	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
262 (& 132)	02 July	ND	16°C, 20% cloud cover, light breeze	LQ & DW
263 (& 21, 124, 125)	03 July	07:00 to	7°C, 90% cloud cover, gentle breeze	LQ & DW
264 (& 155, 156, 157, 265)	30 June	ND	14°C, 10% cloud cover, light breeze	LQ & DW
265 (& 155, 156, 157, 264)	30 June	ND	14°C, 10% cloud cover, light breeze	LQ & DW

<sup>1</sup> CN = Christopher Nakoolak; LQ = Lars Qaqqaq; DW = Dylan White; TP = Tom Plath

<sup>2</sup> Heavily impacted or developed; not surveyed

## APPENDIX IV

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Detailed Results by Survey Location for Meliadine Gold Mine Waterbird Shoreline Surveys  
in 2023

**Appendix IV**

Wetland #	Date (2023)	Observations <sup>1</sup>
1 (& 72, 83)	06 July	Loon (2 heard), LESA (1, distraction display), COLO (1), CANG (10), SACR (2), AMPI (1)
2 (& 73)	06 July	RTLO (pair with 1 adult sitting on nest)
3	06 July	CORE (1), LESA (1 adult with 2 fledged young)
4 (& 74)	06 July	SAVS (1 singing), LALO (1 singing), CORE (flying over & calling)
7 (& 8, 84, 85)	01 July	SACR (2 agitated adults & walking), HOLA (1 calling), WCSP (1 singing), AMPI (1 calling), LESA (1 taking off), AMPI (1 flushed), AMPI (1 flushed)
8 (& 7, 84, 85)	01 July	SACR (2 agitated adults & walking), HOLA (1 calling), WCSP (1 singing), AMPI (1 calling), LESA (1 taking off), AMPI (1 flushed), AMPI (1 flushed)
9 (& 102)	29 June	HERG (1 nest on small island), HOLA (1 singing), RBME (pair swimming), LESA (1 calling), HERG (1 flying), COLO (1 swimming)
10 (& 11, 106, 107, 108, 109, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
11 (& 10, 106, 107, 108, 109, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
12 (& 110, 112)	03 July	SACR (25 resting), LALO (1 male displaying), CANG (1 nest depredated and 1 dead adult), LTDU (pair swimming), LESA (1 skulking), HOLA (1 singing), CANG (1 flying & landing on pond), PALO (1 swimming), HOLA (1 singing), LALO (1 male chasing 1 female), LALO (1 male calling), CORA (1 flying), LESA (1 skulking), SAVS (1 agitated & singing), CANG (6 flying)
13 (& 113)	29 June	CANG (2 agitated & flying away), SESA (1 calling), AMPI (1 calling), LALO (pair displaying), HOLA (1 singing), CORA (1 flying), PALO (1 flying & calling), HOLA (1), Sik Sik (burrows), CANG (18 flying), LALO (1 male calling), HERG (1 flying), SAVS (1), SNBU (1 flushed), WCSP (1 singing), HOLA (1 singing), Sik Sik (burrows), AMPI (1 calling), SAVS (1 singing), CANG (1 calling), HORE (pair), LALO (pair), TUSW (1 swimming), HOLA (1 singing), CANG (2 flying), HOLA (1 singing), LALO (1 calling),
14 (& 114)	29 June	HOLA (3 chasing & singing), WCSP (1 singing), HERG (3 flying), AMPI (1 singing), AMRO (1 singing), SACR (1 calling), HOLA (1 carrying nesting material), HOLA (2), PALO (1 flying), LALO (1), HOLA (1), WCSP (1 singing), WIPT (1 male calling), AMPI (1), WIPT (1 female), LALO (1 female), HOLA (1 flushed), LALP (1 male), HOLA (1 singing), SESA (1 calling), HOLAR (1 singing), LALO (1 singing), AMPI (1 displaying), SACR (5), LALO (1 male), HOLA (1 pair), CANG (12), CANG (1 injured), WCSP (1 singing), LALO (1 singing), HOLA (1 singing), SAVS (1 singing), Sik Sik (burrows), HERG (1 flying), COLO (2 swimming), LALO (1 calling), REDP (1 flying & calling), AMPI (1), HOLA (1 singing), CANG (5 flying), LALO (1 singing), HOLA (1), Sik Sik (burrows), HOLA (1 calling), WCSP (1 singing), HERG (1 flying), LALO (1 singing), Sik Sik (burrows), AMPI (1), WCSP (1 singing), LTDU (2 flying), CANG (2 flying), WCSP (1 singing), HOLA (1 singing), AMPI (pair), HOLA (pair)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>16</b>	06 July	BAEA (1 adult), LESA (1 calling), LESA (2 adults with distraction display), LALO (1 male), LESA (1 adult with distraction display), CANG (46 in flock), HERG (1 adult incubating on island nest), HOLA (1), AMPI (1), HOLA (1), SEPL (1), SEPL (2 adults with broken-wing distraction display), SACR (2 adults & 1 colt), COLO (1)
<b>17 (&amp; 18, 117)</b>	07 July	CORE (1 flying), CANG (1 flying & calling), CORE (1 flying & calling), AMPI (1), LALO (1 female), SAVS (1), PALO (1 flying), SACR (3), LESA (1), AMPI (1), LALO (1 female), LESA (1), LALO (1 flushed but no nest found), HERG (1 flying), CORA (1 flying)
<b>18 (&amp; 17, 117)</b>	07 July	CORE (1 flying), CANG (1 flying & calling), CORE (1 flying & calling), AMPI (1), LALO (1 female), SAVS (1), PALO (1 flying), SACR (3), LESA (1), AMPI (1), LALO (1 female), LESA (1), LALO (1 flushed but no nest found), HERG (1 flying), CORA (1 flying)
<b>19 (&amp; 122)</b>	03 July	HOLA (1 flying), LALO (1 calling), HERG (1 flying), LALO (1 displaying male)
<b>20 (&amp; 118, 123)</b>	03 July	LTDU (pair swimming), CANG (1 calling), HOLA (2 flying), HERG (1 flying), SACR (1 calling), Sik Sik (1 calling)
<b>21 (&amp; 124, 125, 263)</b>	03 July	SACR (1 calling), RTLO (nesting pair), LESA (1 calling), HOLA (1 singing), LALO (1 singing), SEPL (1), HOLA (1 singing), LTDU (1 calling), LALO (1 female observed), HERG (1 flying), LALO (1 male displaying), LESA (1 agitated adult), HOLA (1 singing), HOLA (1 singing), SACR (2 calling), LALO (1 calling)
<b>22 (&amp; 126)</b>	03 July	LALO (1 male calling), LESA (1 calling), HOLA (1 singing), LALO (1 displaying male), HERG (1 flying), HOLA (1 singing)
<b>23</b>	03 July	HERG (1 adult on nest on small island), HOLA (1 calling), LALO (1 calling), LALO (1 male displaying)
<b>24</b>	03 July	TUSW (1 swimming), GRSC (1 swimming), HOLA (1 calling), LALO (1 male displaying), LESA (1 calling), HOLA (1 calling), LALO (1 calling), LALO (1 female calling), SAVS (1 singing), SACR (2 calling), CANG (2 calling)
<b>25 (&amp; 128)</b>	03 July	SACR (2 calling), LALO (1 male), HERG (1 flying), LALO (1 male calling), LALO (2 chasing pair), PALO (2 swimming), LALO (1 displaying male)
<b>26 (&amp; 129)</b>	02 July	HOLA (1 singing), LALO (1 singing), HERG (1 flying), LALO (1 male displaying), PALO (1 swimming), CANG (5 adults & 7 juveniles on land), HOLA (2 males singing), SACR (2 flying), TUSW (1 adult on nest; raised wings when fox approached), LALO (1 female), Arctic Fox (1 approaching and then leaving nesting TUSW)
<b>28 (&amp; 133, 134)</b>	02 July	LALO (1 displaying), GOEA (1 scavenging a Caribou), LALO (1 singing), LALO (1 female flushed), TUSW (pair is agitated when approached), HERG (pair), HOLA (1 singing), HOLA (1 singing), REDP (flying & singing), LTDU (1 male swimming), LALO (1 female flying off)
<b>31 (&amp; 137, 140)</b>	02 July	LTDU (2 male swimming)
<b>32 (&amp; 139)</b>	02 July	REDP (1 flying & calling), LTDU (pair swimming), NOPI (3 taking off), SACR (2 flying), SACR (1 calling & walking), AMPI (1 calling), LALO (1 male)
<b>34 (&amp; 141, 143)</b>	02 July	HOLA (1 singing), SACR (2 flying), HERG (1 flying)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>39</b> (& 43, 148, 159)	02 July	GWFG (2 flying), AMPI (1 calling)
<b>40</b> (& 150, 161)	01 July	HOLA (1 singing)
<b>43</b> (& 39, 148, 159)	02 July	GWFG (2 flying), AMPI (1 calling)
<b>72</b> (& 1, 83)	06 July	Loon (2 heard), LESA (1, distraction display), COLO (1), CANG (10), SACR (2), AMPI (1)
<b>73</b> (& 2)	06 July	RTLO (pair with 1 adult sitting on nest)
<b>74</b> (& 4)	06 July	SAVS (1 singing), LALO (1 singing), CORE (flying over & calling)
<b>75</b>	06 July	None observed
<b>76</b>	06 July	None observed
<b>83</b> (& 1, 72)	06 July	Loon (2 heard), LESA (1, distraction display), COLO (1), CANG (10), SACR (2), AMPI (1)
<b>84</b> (& 7, 8, 85)	01 July	SACR (2 agitated adults & walking), HOLA (1 calling), WCSP (1 singing), AMPI (1 calling), LESA (1 taking off), AMPI (1 flushed), AMPI (1 flushed)
<b>85</b> (& 7, 8, 84)	01 July	SACR (2 agitated adults & walking), HOLA (1 calling), WCSP (1 singing), AMPI (1 calling), LESA (1 taking off), AMPI (1 flushed), AMPI (1 flushed)
<b>90</b> (& 91)	01 July	AMPI (1 calling), HOLA (1 female flushed)
<b>91</b> (& 90)	01 July	AMPI (1 calling), HOLA (1 female flushed)
<b>94</b>	07 July	None observed
<b>95</b>	29 June	AMPI (1 calling), SESA (1 calling)
<b>96</b>	29 June	AMPI (1 calling), SESA (1 calling)
<b>97</b>	29 June	HOLA (1), AMPI (1 calling)
<b>98</b>	29 June	SAVS (1 singing), AMPI (1 singing), CANG (1 calling), HERG (1 calling), SESA (1 calling), Sik Sik (standing), Sik Sik (standing), HERG (nest on small island)
<b>99</b>	29 June	Wetland filled
<b>100</b>	29 June	SESA (1 calling), NOPI (1 flying), LESA (2 distraction display)
<b>101</b>	29 June	Wetland filled
<b>102</b> (& 9)	29 June	HERG (1 nest on small island), HOLA (1 singing), RBME (pair swimming), LESA (1 calling), HERG (1 flying), COLO (1 swimming)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>103</b>	29 June	GRSC (2 males & 1 female swimming), LTDU (16 swimming), TUSW (2 adults & 3 young), AMPI (1 carrying food), HOLA (2 singing), SNBU (1), COGO (1 swimming), SEPL (pair & nest; agitated and distraction display), NOPI (1 swimming), AMPI (1 calling), HOLA (1), LESA (1), AMPI (1 calling), NOPI (2 females), HERG (1 calling), NOPI (2 males & 1 female flying), LTDU (1 male swimming), GRSC (1 male swimming)
<b>106</b> (& 10, 11, 107, 108, 109, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
<b>107</b> (& 10, 11, 106, 108, 109, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
<b>108</b> (& 10, 11, 106, 107, 109, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
<b>109</b> (& 10, 11, 106, 107, 108, 111)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
<b>110</b> (& 12, 112)	03 July	SACR (25 resting), LALO (1 male displaying), CANG (1 nest depredated and 1 dead adult), LTDU (pair swimming), LESA (1 skulking), HOLA (1 singing), CANG (1 flying & landing on pond), PALO (1 swimming), HOLA (1 singing), LALO (1 male chasing 1 female), LALO (1 male calling), CORA (1 flying), LESA (1 skulking), SAVS (1 agitated & singing), CANG (6 flying)
<b>111</b> (& 10, 11, 106, 107, 108, 109)	03 July	SAVS (1 singing), LESA (1 calling), SACR (3 walking), NOPI (3 swimming), Sik Sik (1 calling), HOLA (1 singing), LALO (1 calling), HERG (1 flying), CANG (1 landing), PALO (1 flying), LALO (1 male displaying), SAVS (1 calling), HOLA (1), SACR (25 resting), SAVS (1), TUSW (2 resting), HERG (1 flying), SAVS (1), HOLA (1 singing), LALO (1 male displaying), HOLA (1 singing)
<b>112</b> (& 12, 110)	03 July	SACR (25 resting), LALO (1 male displaying), CANG (1 nest depredated and 1 dead adult), LTDU (pair swimming), LESA (1 skulking), HOLA (1 singing), CANG (1 flying & landing on pond), PALO (1 swimming), HOLA (1 singing), LALO (1 male chasing 1 female), LALO (1 male calling), CORA (1 flying), LESA (1 skulking), SAVS (1 agitated & singing), CANG (6 flying)
<b>113</b> (& 13)	29 June	CANG (2 agitated & flying away), SESA (1 calling), AMPI (1 calling), LALO (pair displaying), HOLA (1 singing), CORA (1 flying), PALO (1 flying & calling), HOLA (1), Sik Sik (burrows), CANG (18 flying), LALO (1 male calling), HERG (1 flying), SAVS (1), SNBU (1 flushed), WCSP (1 singing), HOLA (1 singing), Sik Sik (burrows), AMPI (1 calling), SAVS (1 singing), CANG (1 calling), HORE (pair), LALO (pair), TUSW (1 swimming), HOLA (1 singing), CANG (2 flying), HOLA (1 singing), LALO (1 calling),

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>114 (&amp; 14)</b>	29 June	HOLA (3 chasing & singing), WCSP (1 singing), HERG (3 flying), AMPI (1 singing), AMRO (1 singing), SACR (1 calling), HOLA (1 carrying nesting material), HOLA (2), PALO (1 flying), LALO (1), HOLA (1), WCSP (1 singing), WIPT (1 male calling), AMPI (1), WIPT (1 female), LALO (1 female), HOLA (1 flushed), LALP (1 male), HOLA (1 singing), SESA (1 calling), HOLAR (1 singing), LALO (1 singing), AMPI (1 displaying), SACR (5), LALO (1 male), HOLA (1 pair), CANG (12), CANG (1 injured), WCSP (1 singing), LALO (1 singing), HOLA (1 singing), SAVS (1 singing), Sik Sik (burrows), HERG (1 flying), COLO (2 swimming), LALO (1 calling), REDP (1 flying & calling), AMPI (1), HOLA (1 singing), CANG (5 flying), LALO (1 singing), HOLA (1), Sik Sik (burrows), HOLA (1 calling), WCSP (1 singing), HERG (1 flying), LALO (1 singing), Sik Sik (burrows), AMPI (1), WCSP (1 singing), LTDU (2 flying), CANG (2 flying), WCSP (1 singing), HOLA (1 singing), AMPI (pair), HOLA (pair)
<b>115</b>	07 July	CANG (22 resting at tip), SNGO (1 resting at tip), AMPI (1)
<b>117 (&amp; 17, 18)</b>	07 July	CORE (1 flying), CANG (1 flying & calling), CORE (1 flying & calling), AMPI (1), LALO (1 female), SAVS (1), PALO (1 flying), SACR (3), LESA (1), AMPI (1), LALO (1 female), LESA (1), LALO (1 flushed but no nest found), HERG (1 flying), CORA (1 flying)
<b>118 (&amp; 20, 123)</b>	03 July	LTDU (pair swimming), CANG (1 calling), HOLA (2 flying), HERG (1 flying), SACR (1 calling), Sik Sik (1 calling)
<b>120 (&amp; 121)</b>	03 July	HOLA (1 singing), Sik Sik (1 calling), LALO (1 male displaying), LALO (1 displaying), HOLA (1 singing), HOLA (1), GERG (1 flying), LTDU (1 male swimming), TUSW (1 flying), CANG (6 flying)
<b>121 (&amp; 120)</b>	03 July	HOLA (1 singing), Sik Sik (1 calling), LALO (1 male displaying), LALO (1 displaying), HOLA (1 singing), HOLA (1), GERG (1 flying), LTDU (1 male swimming), TUSW (1 flying), CANG (6 flying)
<b>122 (&amp; 19)</b>	03 July	HOLA (1 flying), LALO (1 calling), HERG (1 flying), LALO (1 displaying male)
<b>123 (&amp; 20, 118)</b>	03 July	LTDU (pair swimming), CANG (1 calling), HOLA (2 flying), HERG (1 flying), SACR (1 calling), Sik Sik (1 calling)
<b>124 (&amp; 21, 125, 263)</b>	03 July	SACR (1 calling), RTLO (nesting pair), LESA (1 calling), HOLA (1 singing), LALO (1 singing), SEPL (1), HOLA (1 singing), LTDU (1 calling), LALO (1 female observed), HERG (1 flying), LALO (1 male displaying), LESA (1 agitated adult), HOLA (1 singing), HOLA (1 singing), SACR (2 calling), LALO (1 calling)
<b>125 (&amp; 21, 124, 263)</b>	03 July	SACR (1 calling), RTLO (nesting pair), LESA (1 calling), HOLA (1 singing), LALO (1 singing), SEPL (1), HOLA (1 singing), LTDU (1 calling), LALO (1 female observed), HERG (1 flying), LALO (1 male displaying), LESA (1 agitated adult), HOLA (1 singing), HOLA (1 singing), SACR (2 calling), LALO (1 calling)
<b>126 (&amp; 22)</b>	03 July	LALO (1 male calling), LESA (1 calling), HOLA (1 singing), LALO (1 displaying male), HERG (1 flying), HOLA (1 singing)
<b>128 (&amp; 25)</b>	03 July	SACR (2 calling), LALO (1 male), HERG (1 flying), LALO (1 male calling), LALO (2 chasing pair), PALO (2 swimming), LALO (1 displaying male)
<b>129 (&amp; 26)</b>	02 July	HOLA (1 singing), LALO (1 singing), HERG (1 flying), LALO (1 male displaying), PALO (1 swimming), CANG (5 adults & 7 juveniles on land), HOLA (2 males singing), SACR (2 flying), TUSW (1 adult on nest; raised wings when fox approached), LALO (1 female), Arctic Fox (1 approaching and then leaving nesting TUSW), LESA (1 agitated), LALO (2 males displaying)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>130</b>	02 July	SAVS (1 flushed & agitated), PALO (1 swimming & diving), SAVS (1 flushed), HOLA (1 singing), HOLA (1 singing)
<b>131</b>	02 July	SEPL (1 calling), LALO (1 calling), CANG (1 walking), HOLA (1 flying), LALO (1 male displaying)
<b>132</b> (& 262)	02 July	LALO (1 male displaying), SACR (9 flying), SACR (2 flying), TUSW (2 adults & 3 juveniles), GOEA (1 soaring)
<b>135</b>	02 July	None observed
<b>137</b> (& 31, 140)	02 July	LTDU (2 male swimming)
<b>138</b>	02 July	SACR (1 calling), LALO (1 male), REDP (1 flying & calling), LALO (1 calling), SEPL (1 calling)
<b>139</b> (& 32)	02 July	REDP (1 flying & calling), LTDU (pair swimming), NOPI (3 taking off), SACR (2 flying), SACR (1 calling & walking), AMPI (1 calling), LALO (1 male)
<b>140</b> (& 31, 137)	02 July	LTDU (2 male swimming)
<b>141</b> (& 34, 143)	02 July	HOLA (1 singing), SACR (2 flying), HERG (1 flying)
<b>142</b> (& 158)	02 July	CANG (2 adults & 4 juveniles), HERG (1), LALO (1 calling), HERG (2 flying), SAVS (1 flushed)
<b>143</b> (& 34, 141)	02 July	HOLA (1 singing), SACR (2 flying), HERG (1 flying)
<b>144</b> (& 145, 162)	01 July	HOLA (1 singing), LESA (1 calling), HOLA (2 chasing & singing), SACR (1 calling)
<b>145</b> (& 144, 162)	01 July	HOLA (1 singing), LESA (1 calling), HOLA (2 chasing & singing), SACR (1 calling)
<b>146</b> (& 147)	01 July	SACR (1 calling), HOLA (2 singing & flushed)
<b>147</b> (& 146)	01 July	SACR (1 calling), HOLA (2 singing & flushed)
<b>148</b> (& 39, 43, 159)	02 July	GWFG (2 flying), AMPI (1 calling)
<b>149</b> (& 151, 152, 160)	02 July	REDP (1 flying & calling), AMPI (1 calling), WCSP (1 singing), HOLA (1 singing)
<b>150</b> (& 40, 161)	01 July	HOLA (1 singing)
<b>151</b> (& 149, 152, 160)	02 July	REDP (1 flying & calling), AMPI (1 calling), WCSP (1 singing), HOLA (1 singing)
<b>152</b> (& 149, 151, 160)	02 July	REDP (1 flying & calling), AMPI (1 calling), WCSP (1 singing), HOLA (1 singing)
<b>153</b>	01 July	TUSW (1), LTDU (1), GRSC (1), AMPI (1 adult flushed from nest with 5 eggs), SEPL (2 adults with distraction display & nest with 4 eggs), NOPI (pair swimming), SACR (1 walking), HOLA (1 singing), SNBU (1 singing)
<b>154</b>	01 July	GOEA (1 juvenile soaring), LALO (1 displaying), HOLA (1 singing)
<b>155</b> (& 156, 157, 264, 265)	01 July	LALO (1 male displaying), HOLA (1 calling), SACR (1 calling)

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Wetland #	Date (2023)	Observations
<b>156</b> (& 155, 157, 264, 265)	01 July	LALO (1 male displaying), HOLA (1 calling), SACR (1 calling)
<b>157</b> (& 155, 156, 264, 265)	01 July	LALO (1 male displaying), HOLA (1 calling), SACR (1 calling)
<b>158</b> (& 142)	02 July	CANG (2 adults & 4 juveniles), HERG (1), LALO (1 calling), HERG (2 flying), SAVS (1 flushed)
<b>159</b> (& 39, 43, 148)	02 July	GWFG (2 flying), AMPI (1 calling)
<b>160</b> (& 149, 151, 152)	02 July	REDP (1 flying & calling), AMPI (1 calling), WCSP (1 singing), HOLA (1 singing)
<b>161</b> (& 40, 150)	01 July	HOLA (1 singing)
<b>162</b> (& 144, 145)	01 July	HOLA (1 singing), LESA (1 calling), HOLA (2 chasing & singing), SACR (1 calling)
<b>164</b>	24 June	AMPI (1 calling), HOLA (1 singing), Sik Sik (1 standing), SEPL (2 agitated adults & nest), SAVS (1 singing), HERG (1 flying), CANG (5 flying), SACR (2 flying), Sik Sik (1 resting), SEPL (2 adults agitated), AMPI (1 displaying), REDP (1 flying & calling), HOLA (1 singing), AMPI (2 displaying)
<b>165</b>	24 June	HERG (2 flying), REDP (1 flying & calling), WCSP (1 singing), PALO (1 flying), CORA (empty nest under bridge), HOLA (1 calling), HERG (1 flying), CANG (19 flying), CACG (2 flying), HOLA (1), HERG (1 flying)
<b>166</b> (& 167, 168, 169, 170)	24 June	PALO (2 flying), SACR (1 calling), CANG (2 flying), AMPI (1 singing), TUSW (3 flying), CANG (17 flying), AMPI (2), SEPL (1 calling)
<b>167</b> (& 166, 168, 169, 170)	24 June	PALO (2 flying), SACR (1 calling), CANG (2 flying), AMPI (1 singing), TUSW (3 flying), CANG (17 flying), AMPI (2), SEPL (1 calling)
<b>168</b> (& 166, 167, 169, 170)	24 June	PALO (2 flying), SACR (1 calling), CANG (2 flying), AMPI (1 singing), TUSW (3 flying), CANG (17 flying), AMPI (2), SEPL (1 calling)
<b>169</b> (& 166, 167, 168, 170)	24 June	PALO (2 flying), SACR (1 calling), CANG (2 flying), AMPI (1 singing), TUSW (3 flying), CANG (17 flying), AMPI (2), SEPL (1 calling)
<b>170</b> (& 166, 167, 168, 169)	24 June	PALO (2 flying), SACR (1 calling), CANG (2 flying), AMPI (1 singing), TUSW (3 flying), CANG (17 flying), AMPI (2), SEPL (1 calling)
<b>171</b>	24 June	TUSW (2 flushed from pond), HOLA (1 singing), CANG (2), SACR (1), HOLA (1 singing), TUSW (14 flying), SAVS (1 singing), WCSP (1 singing), CANG (17 flying)

**Appendix IV**

Wetland #	Date (2023)	Observations
172 (& 178, 180)	24 June	LALO (1 singing), SAVS (2 singing), HOLA (1 singing), LTDU (2 swimming), NOPI (2 flying), PALO (1 flying), CANG (2 flying), SAVS (2 in territorial dispute), KIEI (pair along shore), SACR (1 foraging), HERG (1 flying), CANG (4), HOLA (1 singing), CANG (3 taking off)
173 (& 174)	24 June	LALO (1 singing), HOLA (1 singing), GWFG (3 flying), SNGO (6 flying), REDP (flying & calling), SACR (1 flying), PALO (1 flying)
174 (& 173)	24 June	LALO (1 singing), HOLA (1 singing), GWFG (3 flying), SNGO (6 flying), REDP (flying & calling), SACR (1 flying), PALO (1 flying)
175	24 June	SACR (1 calling), HOLA (1 singing), SAVS (1 singing)
176	24 June	HERG (1 flying), PALO (1 flying)
177	24 June	CANG (8 flying), SESA (1 taking off & calling), TUSW (1 swimming)
178 (& 172, 180)	24 June	LALO (1 singing), SAVS (2 singing), HOLA (1 singing), LTDU (2 swimming), NOPI (2 flying), PALO (1 flying), CANG (2 flying), SAVS (2 in territorial dispute), KIEI (pair along shore), SACR (1 foraging), HERG (1 flying), CANG (4), HOLA (1 singing), CANG (3 taking off)
179	24 June	Doesn't exist in same location; new area flooded
180 (& 172, 178)	24 June	LALO (1 singing), SAVS (2 singing), HOLA (1 singing), LTDU (2 swimming), NOPI (2 flying), PALO (1 flying), CANG (2 flying), SAVS (2 in territorial dispute), KIEI (pair along shore), SACR (1 foraging), HERG (1 flying), CANG (4), HOLA (1 singing), CANG (3 taking off)
181	24 June	LTDU (female & nest with 8 eggs in moss rich tundra heath; nest lined with down feathers), CANG (3 flying), SESA (1 calling), SAVS (1), TUSW (1 flying), CANG (35 flying), SACR (2), AMPI (1 flushed)
186	24 June	SESA (1 singing), SAVS (1), CANG (2 taking off)
188	08 July	TUSW (1), TUSW (1)
189	08 July	None observed
194	08 July	TUSW (2 flying), HERG (1 flying)
195	08 July	None observed
196	08 July	None observed
197	08 July	HOLA (1), HERG (1 flying)
198	08 July	HERG (1 flying), CORA (2 flying)
199	08 July	None observed
200	08 July	LTDU (2 flushed)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>204</b>	08 July	LESA (1 calling)
<b>205</b>	08 July	None observed
<b>207</b>	08 July	None observed
<b>208</b>	08 July	Dry
<b>210</b>	08 July	None observed
<b>211</b> (& 212, 215, 216, 218, 219)	24 June	SACR (2 calling), CANG (7 flying)
<b>212</b> (& 211, 215, 216, 218, 219)	24 June	SACR (2 calling), CANG (7 flying)
<b>213</b> (& 214)	24 June	SACR (1 calling), PALO (1 calling), HOLA (1 singing)
<b>214</b> (& 213)	24 June	SACR (1 calling), PALO (1 calling), HOLA (1 singing)
<b>215</b> (& 211, 212, 216, 218, 219)	24 June	SACR (2 calling), CANG (7 flying)
<b>216</b> (& 211, 212, 215, 218, 219)	24 June	SACR (2 calling), CANG (7 flying)
<b>217</b>	24 June	Adjacent to new flooded wetland due to impoundment by road
<b>218</b> (& 211, 212, 215, 216, 219)	24 June	SACR (2 calling), CANG (7 flying)
<b>219</b> (& 211, 212, 215, 216, 218)	24 June	SACR (2 calling), CANG (7 flying)
<b>220</b> (& 221)	30 June	AMPI (1 calling)
<b>221</b> (& 220)	30 June	AMPI (1 calling)
<b>222</b> (& 223)	30 June	HERG (1 flying), HOLA (1 singing), AMPI (1 calling), HOLA (1 singing)
<b>223</b> (& 222)	30 June	HERG (1 flying), HOLA (1 singing), AMPI (1 calling), HOLA (1 singing)
<b>224</b>	30 June	CANG (2 adults agitated & walking), LESA (1 flying & calling), SACR (2), HOLA (1), AMPI (1), LESA (agitated pair & nest), LALO (1 singing), HERG (1 sitting), SEPL (1 agitated adult), GOEA (1 soaring above), WCSP (1 singing), LESA (1 flying), AMPI (1 sitting), HOLA (1 singing)

**Appendix IV**

Wetland #	Date (2023)	Observations
<b>225</b> (& 239)	30 June	HOLA (1 singing), SESA (1 calling), WCSP (1 singing), REDP (1 flying), AMPI (1 calling), AMPI (1 calling), SAVS (1 singing), Sik Sik (standing), CORA (1 calling), HOLA (1 singing)
<b>226</b>	30 June	SESA (1 calling), AMPI (1 singing), HERG (1 flying), HOLA (1 singing)
<b>227</b>	30 June	None observed
<b>228</b>	30 June	REDP (1 flying & calling), AMPI (1 calling), WCSP (1 singing)
<b>229</b> (& 230)	30 June	AMPI (1 calling), CORA (1 calling), AMPI (1 calling)
<b>230</b> (& 229)	30 June	AMPI (1 calling), CORA (1 calling), AMPI (1 calling)
<b>231</b> (& 232, 233)	30 June	AMPI (1 singing), HOLA (1 singing)
<b>232</b> (& 231, 233)	30 June	AMPI (1 singing), HOLA (1 singing)
<b>233</b> (& 231, 232)	30 June	AMPI (1 singing), HOLA (1 singing)
<b>234</b>	30 June	Sik Sik (1 running), HOLA (1 singing), CORA (1 calling), HERG (2 flying), SNGO (16 flying), AMPI (1 singing), LESA (1 calling & skulking)
<b>235</b>	30 June	AMPI (1 singing), HOLA (1 singing), TUSW (2 swimming), HOLA (2 chasing & singing), SESA (1 calling), PALO (1 calling), REDP (1 flying & calling), AMPI (1 singing), AMPI (1 singing), WCSP (1 singing)
<b>237</b> (& 238)	30 June	HOLA (1 singing), SACR (2 calling), AMPI (1 singing), LALO (1 singing), HOLA (1 singing), HOLA (1 singing)
<b>238</b> (& 237)	30 June	HOLA (1 singing), SACR (2 calling), AMPI (1 singing), LALO (1 singing), HOLA (1 singing), HOLA (1 singing)
<b>239</b> (& 225)	30 June	HOLA (1 singing), SESA (1 calling), WCSP (1 singing), REDP (1 flying), AMPI (1 calling), AMPI (1 calling), SAVS (1 singing), Sik Sik (standing), CORA (1 calling), HOLA (1 singing)
<b>240</b>	30 June	REDP (1 flying & calling), WCSP (1 singing), SACR (1 calling), AMPI (1 calling)
<b>241</b>	01 July	SAVS (1 singing), WCSP (1 singing), SACR (1 calling), HOLA (1 calling)
<b>242</b> (& 244)	01 July	AMPI (1 calling), LESA (1 agitated & calling), AMPI (1 calling), HOLA (1 singing)
<b>243</b>	01 July	REDP (1 flying & calling)
<b>244</b> (& 242)	01 July	AMPI (1 calling), LESA (1 agitated & calling), AMPI (1 calling), HOLA (1 singing)
<b>245</b> (& 246)	01 July	HOLA (1 singing), HOLA (1 singing), WCSP (1 singing)
<b>246</b> (& 245)	01 July	HOLA (1 singing), HOLA (1 singing), WCSP (1 singing)
<b>247</b>	24 June	WCSP (1 singing), HERG (1 flying), SACR (1 calling)

**Appendix IV**

Wetland #	Date (2023)	Observations
250	08 July	Dry
251	08 July	None observed
252	08 July	None observed
253	08 July	None observed
259	02 July	SEPL (1 calling), HOLA (1 male foraging), HOLA (1 singing)
260	02 July	REDP (1 flying & calling), HOLA (1 calling), CANG (2 flying)
261	02 July	None observed
262 (& 132)	02 July	LALO (1 male displaying), SACR (9 flying), SACR (2 flying), TUSW (2 adults & 3 juveniles), GOEA (1 soaring)
263 (& 21, 124, 125)	03 July	SACR (1 calling), RTLO (nesting pair), LESA (1 calling), HOLA (1 singing), LALO (1 singing), SEPL (1), HOLA (1 singing), LTDU (1 calling), LALO (1 female observed), HERG (1 flying), LALO (1 male displaying), LESA (1 agitated adult), HOLA (1 singing), HOLA (1 singing), SACR (2 calling), LALO (1 calling)
264 (& 155, 156, 157, 265)	01 July	LALO (1 male displaying), HOLA (1 calling), SACR (1 calling)
265 (& 155, 156, 157, 264)	01 July	LALO (1 male displaying), HOLA (1 calling), SACR (1 calling)

<sup>1</sup> **Bird Codes:** AMPI (American Pipit), AMRO (American Robin), BAEA (Bald Eagle), CACG (Cackling Goose), CANG (Canada Goose), COGO (Common Goldeneye), COLO (Common Loon), CORA (Common Raven), CORE (Common Redpoll), GOEA (Golden Eagle), GRSC (Greater Scaup), GWFG (Greater White-fronted Goose), HERG (Herring Gull), HOLA (Horned Lark), HORE (Hoary Redpoll), KIEI (King Eider), LALO (Lapland Longspur), LESA (Least Sandpiper), LTDU (Long-tailed Duck), LOON (Loon sp.), NOPI (Northern Pintail), PALO (Pacific Loon), REDP (Redpoll sp.), RBME (Red-breasted Merganser), RTLO (Red-throated Loon), SACR (Sandhill Crane), SAVS (Savannah Sparrow), SEPL (Semipalmated Plover), SESA (Semipalmated Sandpiper), SNBU (Snow Bunting), SNGO (Snow Goose), TUSW (Tundra Swan), WCSP (White-crowned Sparrow), WIPT (Willow Ptarmigan)

## APPENDIX V

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Summary of Results by Species for the Meliadine Gold Mine Project Waterbird Shoreline  
Surveys in 2023

**Appendix V**

Common Name (Code)	Scientific Name	Wetland #	Total Wetlands
<b>BIRDS</b>			
American Pipit (AMPI)	<i>Anthus rubescens</i>	1, 7, 8, 13, 14, 16, 17, 32, 39, 43, 72, 83, 84, 85, 90, 91, 95, 96, 97, 98, 103, 113, 114, 115, 139, 148, 149, 151, 152, 153, 159, 160, 164, 166, 167, 168, 169, 170, 181, 221, 222, 223, 224, 225, 226, 228, 229, 230, 231, 232, 233, 234, 235, 237, 238, 239, 240, 242, 244	59
American Robin (AMRO)	<i>Turdus migratorius</i>	14, 114	2
Bald Eagle (BAEA)	<i>Haliaeetus leucocephalus</i>	16	1
Cackling Goose (CACG)	<i>Branta hutchinsii</i>	165	1
Canada Goose (CANG)	<i>Branta canadensis</i>	1, 10, 11, 12, 13, 14, 16, 17, 20, 24, 26, 72, 83, 98, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 118, 120, 121, 123, 129, 131, 142, 158, 164, 165, 166, 167, 168, 169, 170, 171, 172, 177, 178, 180, 181, 186, 211, 212, 215, 216, 218, 219, 224, 260	54
Common Goldeneye (COGO)	<i>Bucephala clangula</i>	103	1
Common Loon (COLO)	<i>Gavia immer</i>	1, 9, 14, 16, 72, 83, 102, 114	8
Common Raven (CORA)	<i>Corvus corax</i>	12, 13, 110, 112, 113, 17, 165, 198, 225, 229, 230, 234, 239	13
Common Redpoll (CORE)	<i>Bucephala clangula</i>	3, 4, 17, 74	4
Golden Eagle (GOEA)	<i>Aquila chrysaetos</i>	28, 132, 133, 134, 154, 224, 262	7
Greater Scaup (GRSC)	<i>Aythya marila</i>	24, 103, 153	3
Greater White-fronted Goose (GWFG)	<i>Anser albifrons</i>	39, 43, 148, 159, 173	5
Hoary Redpoll (HORE)	<i>Acanthis hornemanni</i>	13, 113	2
Herring Gull (HERG)	<i>Larus argentatus</i>	9, 10, 11, 13, 14, 16, 17, 19, 20, 21, 22, 23, 25, 26, 28, 34, 98, 102, 103, 106, 107, 108, 109, 111, 113, 114, 118, 120, 121, 122, 123, 124, 125, 126, 128, 129, 132, 133, 141, 142, 143, 158, 164, 165, 172, 176, 178, 180, 194, 197, 198, 222, 223, 224, 226, 234, 247, 263	58

**Appendix V**

Common Name	Scientific Name	Wetland #	Total Wetlands
<b>BIRDS</b>			
Horned Lark (HOLA)	<i>Eremophila alpestris</i>	7, 8, 9, 10, 11, 12, 13, 14, 16, 19, 20, 21, 22, 23, 24, 26, 28, 34, 40, 84, 85, 90, 91, 97, 102, 103, 106, 107, 108, 109, 110, 111, 112, 113, 114, 118, 120, 121, 122, 123, 124, 125, 126, 129, 130, 131, 133, 134, 141, 143, 144, 145, 146, 147, 149, 150, 151, 152, 154, 155, 156, 157, 160, 161, 162, 164, 165, 171, 172, 173, 175, 178, 180, 197, 213, 214, 222, 223, 224, 225, 226, 231, 232, 233, 234, 235, 237, 238, 239, 241, 242, 244, 245, 246, 259, 260, 263, 264, 265	99
King Eider (KIEI)	<i>Somateria spectabilis</i>	172, 78, 180	3
Lapland Longspur (LALO)	<i>Calcarius lapponicus</i>	4, 10, 11, 12, 13, 14, 16, 17, 19, 21, 22, 23, 24, 25, 26, 28, 32, 74, 106, 107, 108, 109, 110, 111, 112, 113, 114, 120, 121, 122, 124, 125, 126, 128, 129, 131, 132, 133, 134, 138, 139, 142, 154, 155, 156, 157, 158, 172, 173, 178, 180, 224, 237, 238, 262, 263, 264, 265	58
Least Sandpiper (LESA)	<i>Calidris minutilla</i>	1, 3, 7, 8, 9, 10, 11, 12, 16, 17, 21, 22, 24, 26, 72, 83, 84, 85, 100, 102, 106, 107, 108, 109, 110, 111, 112, 103, 124, 125, 126, 129, 144, 145, 162, 204, 224, 234, 242, 244, 263	41
Long-tailed Duck (LTDU)	<i>Clangula hyemalis</i>	14, 20, 21, 28, 31, 32, 103, 114, 118, 120, 121, 123, 124, 125, 133, 134, 137, 139, 140, 153, 172, 178, 180, 181, 200, 263	26
Loon sp. (LOON)	<i>Gavia</i> sp.	1, 72, 83	3
Northern Pintail (NOPI)	<i>Anas acuta</i>	10, 11, 32, 100, 103, 106, 107, 108, 109, 111, 139, 153, 172, 178, 180	15
Pacific Loon (PALO)	<i>Gavia pacifica</i>	10, 11, 12, 13, 14, 17, 25, 26, 106, 107, 108, 109, 110, 111, 112, 113, 114, 128, 129, 130, 165, 166, 167, 168, 169, 170, 172, 173, 176, 178, 180, 213, 214, 235	34
Redpoll sp. (REDP)	<i>Acanthis</i> sp.	14, 28, 32, 114, 133, 134, 138, 139, 149, 151, 152, 160, 164, 165, 173, 225, 228, 235, 239, 240, 243, 260	22
Red-breasted Merganser (RBME)	<i>Mergus serrator</i>	9, 102	2
Red-throated Loon (RTLO)	<i>Gavia stellata</i>	2, 21, 73, 124, 125, 263	6

**Appendix V**

Common Name	Scientific Name	Wetland #	Total Wetlands
<b>BIRDS</b>			
Sandhill Crane (SACR)	<i>Grus canadensis</i>	1, 7, 8, 10, 11, 12, 14, 16, 17, 20, 21, 24, 25, 26, 32, 34, 72, 83, 84, 85, 106, 107, 108, 109, 110, 111, 112, 114, 118, 123, 124, 125, 128, 129, 132, 138, 139, 141, 143, 144, 145, 146, 147, 153, 155, 156, 157, 162, 164, 166, 167, 168, 169, 170, 171, 172, 173, 175, 178, 180, 181, 211, 212, 215, 216, 218, 219, 213, 214, 224, 237, 238, 240, 241, 247, 262, 263, 264, 265	79
Savannah Sparrow (SAVS)	<i>Passerculus sandwichensis</i>	4, 10, 11, 12, 13, 14, 17, 24, 74, 98, 106, 107, 108, 109, 110, 111, 112, 113, 114, 130, 142, 158, 164, 171, 172, 175, 178, 180, 181, 186, 225, 239, 241	33
Semipalmated Plover (SEPL)	<i>Charadrius semipalmatus</i>	16, 21, 103, 124, 125, 131, 138, 153, 164, 166, 167, 168, 169, 170, 224, 259, 263	17
Semipalmated Sandpiper (SESA)	<i>Calidris pusilla</i>	13, 14, 95, 96, 98, 100, 113, 114, 177, 181, 186, 225, 226, 235, 239	15
Snow Bunting (SNBU)	<i>Plectrophenax nivalis</i>	13, 103, 113	3
Snow Goose (SNGO)	<i>Anser caerulescens</i>	115, 153, 173, 234	4
Tundra Swan (TUSW)	<i>Cygnus columbianus</i>	10, 11, 13, 24, 26, 28, 103, 106, 107, 108, 109, 111, 113, 120, 121, 129, 132, 133, 134, 166, 167, 168, 169, 170, 171, 177, 181, 188, 194, 235, 262	31
White-crowned Sparrow (WCSP)	<i>Zonotrichia leucophrys</i>	7, 8, 13, 14, 84, 85, 113, 114, 149, 151, 152, 153, 160, 165, 171, 224, 225, 235, 228, 239, 240, 241, 245, 246, 247	25
Willow Ptarmigan (WIPT)	<i>Lagopus lagopus</i>	14, 114	2
<b>Total # of Species</b>			<b>32</b>
<b>MAMMALS</b>			
Arctic Fox	<i>Vulpes lagopus</i>	26, 129	2
Arctic Ground Squirrel	<i>Spermophilus parryii</i>	10, 11, 13, 14, 20, 98, 106, 107, 108, 109, 111, 113, 114, 118, 120, 121, 123, 164, 225, 234, 239	21

## APPENDIX VI

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Survey Methods and Results for the Meliadine Gold Mine Project Pre-Clearance Bird  
Survey Monitoring in 2023

**Appendix VI**

Date (2023)	Time	Coordinates (15W)	Observers	Pre-Clearance Nest Survey Results <sup>1</sup>	Mitigation Actions
May 24	15:35-17:00	Start: 541741 6985300 End: 541737 6985300	DM,IL	AMPI (1), CANG (1), GWGO (2), HERG (1), HOLA (3), LALO (2), TUSW (1), UNSO (2)	No nests found; no action taken
May 25	15:22-16:00	Start: 542680 6984450 End: ~300 m from start	DM,IL	No birds or nest observed (too much wind to survey)	No nests found; no action taken
May 26	13:41-14:37	Start: 543059 6984455 End: 543612 6983969	DM,IL,SG,SK	HOLA (9), SNBU (4)	No nests found; no action taken
May 27 #1	13:00-13:55	Start: 543602 6983929 End: 543990 6982852	IL,JC	CANG (2), HOLA (4), SACR (1), SAND (2), UNSO (1)	No nests found; no action taken
May 27 #2	13:00-14:00	Start: 543994 6982904 End: 543633 6988956	AT,IL,JC,SG	CANG (1), HOLA (4), UNSO (1)	No nests found; no action taken
May 30	16:15-17:00	Start: 543697 6983782 End: 543978 6982920	AT,JC,SG,SK	CANG (2), HOL (2), UNSO (1)	No nests found; no action taken
June 03	09:00-09:45	Start: 544293 6982394 End: 543713 6983738	GL,JT,SG,SK	CANG (1), HOLA (2), LALO (2), LTDU (2), SNBU (1), UNSO (6), WCSP (2)	No nests found; construction not permitted on designated road section
June 04	08:01-08:50	Start: 544376 6982263 End: 545435 6980862	SR,JT,SG,SK	DUNL (2), HOLA (3), SNBU (2), UNSO (1)	No nests found; construction not permitted on designated road section
June 05	14:20-14:50	Start: 545550 6980728 End: 545550 6980728	JC,JR,JT,NM,SG,SK	LALO (1)	Nest with no eggs found; no action taken
June 06	15:30-16:15	Start: 545585 6980784 End: 545585 6980784	MM,SK	LALO (1)	Nest being build; nest removed at very early stage
June 08	10:00-10:29	Start: 544847 6981493 End: 545967 6980487	DI,GL,JT,MM	LESA (1)	LESA adult incubating 4 eggs; photos taken; construction not permitted on designated road section
June 13 #1	ND	Start: 545645 6981303 End: 545520 6981302	JP,MM	No birds or nests observed	No nests found; construction not permitted on designated road section
June 13 #2	ND	Start: 545461 6980809 End: 546430 6979347	JT,MM	No birds or nests observed	No nests found; construction not permitted on designated road section

**Appendix VI**

Date (2023)	Time	Coordinates (15W)	Observers	Pre-Clearance Nest Survey Results <sup>1</sup>	Mitigation Actions
June 13 #3	15:30-17:00	Start: 546527 6979363 End: 545484 6980814	IL,JP	HOLA (3), UNSO (1)	No nests found; construction not permitted on designated road section
June 29 #1	14:00-15:00	Start: 547391 6977106 End: 547391 6977106	DW,LQ	Four (4) bird species observed	No nests found; no action taken
June 29 #2	15:15-16:40	Start: 546839 6974347 End: 546839 6974347	DW,LQ	WCSP (2); nine (9) bird species observed	WCSP pair displaying nesting behaviour; 50 m buffer zone established
June 30	14:10-15:50	Start: KM19 sign east End: KM19 sign west	DW,LQ	NOPI (1), SEPL (1), six (6) other bird species identified	NOPI female on 7 eggs; SEPL adult showing nesting behaviour; 50 m buffer zone established
July 01	17:05-17:45	Start: 545528 6980793 End: 545692 6980695	DW,LQ	Seven (7) bird species observed	No nests found; no action taken
July 02	07:15-08:10	Start: 545528 6980793 End: 545692 6980695	DW,LQ	Seven (7) bird species observed	No nests found; no action taken
July 04	15:00-16:15	Start: 546164 6980099 End: 544876 6981505	LQ,TP	HERG (1), HOLA (2), SACR (2)	No nests found; no action taken
July 05	09:15-09:40	Start: 543495 6984095 End: 542587 6984599	LQ,TP	HOLA (3)	Adult with fledged young; no action taken
July 08	08:00-08:48	Start: 544936 6981469 End: 545967 6980487	LQ,TP	HOLA (2), LALO (1), TUSW (1)	No nests found; construction not permitted on designated road section
July 10	16:43-16:54	Start: 546777 6972936 End: 543868 6983236	DI,LQ	HOLA (1), SAVS (2),	SAVS adult with fledgling; no action taken
July 12	16:02-16:45	Start: 545593 6980819 End: 544418 6982138	AT,IL	SEPL (1)	SEPL nestling; 100 m buffer zone established
July 13	10:00-10:45	Start: 543491 6984113 End: 542560 6984589	IL,RH	HOLA (1)	HOLA nestling; 100 m buffer zone established
July 14	08:00-10:30	Start: 543491 6984113 End: 542560 6984589	IL,RH	SEPL (1), SAVS (3)	SEPL adult showing nesting behavior; at least 1 young HOLA; 100 m buffer established

**Appendix VI**

Date (2023)	Time	Coordinates (15W)	Observers	Pre-Clearance Nest Survey Results <sup>1</sup>	Mitigation Actions
July 15	10:00-11:00	Start: 546135 6980332 End: 546194 6979604	IL,RH	No birds or nests observed	No nests found; construction not permitted on designated road section
July 16	07:50-08:25	Start: 546654 6979246 End: 547236 6978525	IL,RH	No birds or nests observed	No nests found; construction not permitted on designated road section
July 18 #1	14:00-15:00	Start: 540959 6985838 End: 541042 6986184	IL,RH	No birds or nests observed	Construction not permitted on designated road section
July 18 #2	14:00-15:00	Start: 541511 6987725 End: 541517 6987608	IL,RH	No birds or nests observed	Construction not permitted on designated road section
July 20 #1	14:00-15:30	Start: 547091 6978770 End: 547873 6978117	IL,RH	No birds or nests observed	Construction not permitted on designated road section
July 20 #2	14:00-15:30	Start: 545238 6980957 End: 544860 6981504	IL,RH	No birds or nests observed	Construction not permitted on designated road section
July 21 #1	16:10-17:20	Start: 547912 6978142 End: 547908 6977060	IL,JC,RH	No birds or nests observed	Construction not permitted on designated road section
July 21 #2	16:10-17:20	Start: 545708 6980897 End: 545657 6980844	IL,JC,RH	No birds or nests observed	Construction not permitted on designated road section
July 23	14:20-15:40	Start: 543839 6983233 End: 545458 6980812	IL,JC,RH	No birds or nests observed	Construction not permitted on designated road section
July 26	08:20-09:05	Start: 547898 6977035 End: 547894 6978124	JC,JS	No birds or nests observed	Construction not permitted on designated road section
July 27	07:30-07:50	Start: 545707 6980807 End: 545516 6981337	JC,JS	No birds or nests observed	Construction not permitted on designated road section
July 28	08:05-08:45	Start: 543858 6983238 End: 545467 6980830	JC,JS	No birds or nests observed	Construction not permitted on designated road section
July 29	10:30-11:00	Start: 547707 6980807 End: 545516 6981337	JS,SK	No birds or nests observed	Construction not permitted on designated road section

**Appendix VI**

Date (2023)	Time	Coordinates (15W)	Observers	Pre-Clearance Nest Survey Results <sup>1</sup>	Mitigation Actions
July 30	07:22-07:30	Start: 541515 6987575 End: 541492 6987750	JC,JS	No birds or nests observed	Construction not permitted on designated road section
July 31	08:15-10:15	Start: 545466 6980802 End: 543849 6983237	JS,SG	No birds or nests observed	Construction not permitted on designated road section
August 01	08:15-09:15	Start: 547898 6977035 End: 547894 6978124	JS,SG	No birds or nests observed	Construction not permitted on designated road section
August 02	09:30-10:15	Start: 547894 6978124 End: 547533 6978265	JS,SG	No birds or nests observed	No nests found; no action taken
August 03	08:30-16:00	Start: 545466 6980802 End: 543840 6983237	DI,JS,SG	No birds or nests observed	No nests found; no action taken
August 04	09:00-10:00	Start: 543491 6984113 End: 542560 6984589	DI,SG	No birds or nests observed	No nests found; no action taken
August 05	14:00-16:00	Start: 546136 6980335 End: 546105 6980440	JS,SG	No birds or nests observed	No nests found; no action taken
August 06	14:00-15:30	Start: 546221 6979525 End: 546167 6979637	JS,SG	No birds or nests observed	No nests found; no action taken
August 07	10:14-10:42	Start: 547898 6977035 End: 547533 6978205	DI,JT	No birds or nests observed	No nests found; no action taken
August 09	09:45-12:00	Start: 545470 6980787 End: 543837 6983221	IL,MM	No birds or nests observed	Construction not permitted on designated road section
August 09	09:45-12:00	Start: 545470 6980787 End: 543837 6983221	IL,MM	No birds or nests observed	Construction not permitted on designated road section
August 11	09:15-10:00	Start: 546867 6979007 End: 546533 6979325	AT,IL	No birds or nests observed	Construction not permitted on designated road section
August 12	09:00-11:00	Start: 545470 6980787 End: 543837 6983221	DI,IL	No birds or nests observed	Construction not permitted on designated road section

<sup>1</sup> **Bird Codes:** AMPI (American Pipit), CANG (Canada Goose), DUNL (Dunlin), GWFG (Greater White-fronted Goose), HOLA (Horned Lark), LESA (Least Sandpiper), LALO (Lapland Longspur), HERG (Herring Gull), LALO (Lapland Longspur), LTDU (Long-tailed Duck), NOPI (Northern Pintail), SNBU (Snow Bunting), SACR (Sandhill Crane), SAND (Sandpiper sp.), SAVS (Savannah Sparrow), SEPL (Semipalmated Plover), TUSW (Tundra Swan), UNSO (Unidentified Songbird), WCSP (White-crowned Sparrow)

**APPENDIX D**

**Arctic Raptors Research Program Report, 2023**



# ARCTIC RAPTORS

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## **Background**

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Mine, located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. In February 2015, Meliadine received Project Certificate No. 006 issued by the Nunavut Impact Review Board (NIRB) with Amendment No. 001 in February 2019 and Amendment No. 002 in March 2022. Terms and Conditions related to management and mitigation for birds and bird habitat (including raptorial species) are outlined in the NIRB Project Certificate for the Meliadine Gold Mine Project (NIRB 2022), as follows:

- *Term and Condition (T&C) 59; Species at Risk — If Species at Risk or their nests and eggs are encountered during Project activities or monitoring programs, the primary mitigation measure must be avoidance. The Proponent shall establish clear zones of avoidance based on the species-specific nest setback distances outlined in the Terrestrial Environment Management and Monitoring Plan.*
- *T&C 60; Species at Risk — The Proponent shall ensure that the mitigation and monitoring strategies developed for Species at Risk are updated as necessary to maintain consistency with any applicable status reports, recovery strategies, action plans and management plans that may become available during the duration of the Project.*
- *T&C 61; Construction/clearing activities — Prior to bird breeding season, the Proponent shall either conduct clearing activities or identify and install nesting deterrents (e.g., flagging) to discourage birds from nesting in areas likely to be disturbed by construction/clearing activities. If clearing is to take place during the nesting season, a nest survey should take place to identify nests and any identified nests must remain undisturbed until the young have fledged or left the nest. Any nests identified shall be included as part of the annual reporting for the Terrestrial Environmental Mitigation and Monitoring Plan (TEMMP).*
- *T&C 62; Construction/clearing activities — The Proponent shall protect any nests found (or indicated nests) with a buffer zone determined by the setback distances outlined in its Terrestrial Environment Mitigation and Monitoring Plan (TEMMP), until the young have fledged. If it is determined that observance of these setbacks is not feasible, the Proponent will develop nest-specific guidelines and procedures to ensure bird's nests and their young are protected.*
- *T&C 71; Monitoring — The Proponent shall develop detailed and robust mitigation and monitoring plans for migratory birds, reflecting input from relevant agencies, the Kivalliq Inuit Association and communities.*
- *T&C 72; Monitoring — The Proponent shall continue to develop and update relevant monitoring and management plans for migratory birds under the Proponent's Environmental Protection Plan and Terrestrial Environment Mitigation and Monitoring Plan (TEMMP) prior to construction. The key indicators for follow up monitoring under this plan will include upland birds (including migratory birds), waterbirds, raptors, and seabirds including migration and wintering.*

Monitoring indicators for nesting raptors are outlined in the Agnico Eagle Meliadine Division Terrestrial Environment Management and Monitoring Plan (TEMMP; Agnico Eagle 2022) as follows:

- *Monitoring Indicator 1; Disturbance of nesting raptors — To be determined in consultation with GN and Alastair Franke, related to occupancy and productivity.*
- *Monitoring Indicator 2; Projected-related mortality — To be determined in consultation with GN and Alastair Franke.*

## **Species Descriptions**

### **Peregrine Falcon (*Falco peregrinus tundrius*)**

The Arctic peregrine falcon (Figure 1, PEFA) is medium- to large-sized falcon. It has a dark hood and face with distinct dark malar stripe, cream to white throat, slate-grey back, barred belly, legs, and tail. Long pointed wings, stocky body. Plumage of immature birds is brown rather than grey, and the breast is streaked rather than barred. In adults, the cere and orbital ring are yellow, and bluish in immature birds. Compared with gyrfalcons, the peregrine is smaller and less stocky. In flight, the wings of peregrines appear narrower and more pointed. In peregrine falcons, wing tips extend to bottom of the tail when perched, while in gyrfalcons, wing tips extend two-thirds down the length of tail.

*F. p. tundrius* breeds mainly north of the treeline from Alaska east throughout northern Canada to Greenland. It breeds throughout the taiga and tundra wherever suitable nesting habitat and sufficient prey are present. In Nunavut, peregrines appear to have their highest densities in the Kivalliq and Kitikmeot regions. Highest breeding density on record is on the western shores of Hudson Bay in the Kivalliq Region.

*F. p. tundrius* is a long-distance migrant, wintering mainly throughout South and Central America, but also in southern United States and Mexico. Northern-breeding American and Arctic peregrines are highly migratory (Yates et al. 1988, Schmutz et al. 1991, Fuller et al. 1998), and although fall migration occurs over a broad geographic range (Fuller et al. 1998), Yates et al. (1988) indicated that “separate and distinct autumn migratory populations pass through the east and Gulf coasts” of the United States.

Peregrine falcons usually nests on cliffs and rocky outcrops, but also nest on hilltops, river canyons, rock screes, and on occasion directly on the ground (Court et al. 1988, Ratcliffe 1993). They prefer nesting in locations close to water in south-facing, rugged terrain. Hunting habitat includes rugged coastline areas and rolling tundra that consists of raised beaches, dry tundra, sedge meadows, wetlands, and lakes that are inhabited by a diversity of breeding songbirds and shorebirds.

Peregrine Falcons do not build a nest but make a depression (called a scrape) in the substrate on a cliff ledge. Scrapes are usually approximately 20 cm in diameter and 4 cm deep. Females usually do the majority of incubation and brooding of small young. Males provision incubating females and provide most of the prey when nestlings are small. Thereafter, females do most of the feeding, beginning to hunt after young are large enough to thermoregulate on their own. Clutch size is typically 3 or 4 eggs in Nunavut. In Rankin Inlet and Igloolik, the median incubation period of the first egg was 36 days and decreased 1 day for each additional egg. The incubation period of the 4th egg (33 days) was similar to what has been reported elsewhere (Burnham 1983).

The Arctic peregrine falcon is a generalist predator with a diverse diet that includes passerines, shorebirds, ducks, gulls, terns, jaegers, black guillemots, and, when available, collared lemmings, brown lemmings, and Arctic ground squirrels. Bradley and Oliphant (1991) indicated that, around Rankin Inlet, small birds (64% of prey items) represented the greatest portion of prey items, followed by microtine rodents (25%), large birds (8%), and Arctic ground squirrels (4%). The most important prey measured by percent biomass were large birds (43%), followed by small birds (25%), microtine rodents (18%), and Arctic ground squirrels (15%).

In Nunavut, the earliest documented arrival for Peregrine Falcons is 10 May at a known breeding site near Rankin Inlet. Although arrival timing varies with spring conditions, the majority of sites are

occupied during the 3rd week of May. Median laying date in Rankin Inlet (9 June) is typically earlier than Igloolik (15 June) and northern Baffin Island (16 June). Median date of hatching ranges from 14 July at Rankin Inlet to 18 July on northern Baffin Island and 20 July at Igloolik (Jaffre et al. 2015). Birds depart the breeding grounds from mid-September through early October, arriving on the wintering grounds throughout Central and South America in November.

### Gyr Falcon (*Falco rusticolus*)

The gyrfalcon (Figure 2, GYRF) is large with pointed wings, but more rounded and broader than the wings of other falcon species. The tail is relatively long. When perched, wings extend 2/3 down the tail. The body is thick and powerful, particularly in females. Adults have yellow ceres, eye-rings and legs. As in all falcons, the eyes appear black. Three main color morphs occur: black, grey and white. White adults have almost pure white breasts and bellies, with dark wingtips (dipped-in-ink appearance). Grey adults have slate-colored back, with white underparts mottled with gray arrowhead-shaped markings. Dark adults are dark-grey overall above and dark-streaked breasts and belly. There is extreme reverse sex dimorphism, with males being approximately 2/3 the size of females (Ferguson-Lees et al. 2001).

Gyrfalcons distribution extends throughout the circumpolar Arctic. Most of the breeding range occurs north of 60°N, but breeding pairs are known to exist as far south as 55°N, mainly along sea-coasts in eastern Canada. Many adults remain within the breeding range throughout the year, but some disperse southwards in winter, small numbers reaching the northern United States (Cade 1982, Poole 1987). Immature birds are much more likely to winter to south of breeding range, and females are thought to disperse more widely, with many males remaining relatively close to breeding territories throughout the year.

Ptarmigan are often cited as the most important prey species by biomass, but Arctic ground squirrel and Arctic hare are also important, as well as small mammals (mice and voles) and other birds (ducks, sparrows, buntings). In central Nunavut, Poole and Boag (1988) identified eleven species of birds and five species of mammals among the prey. Birds accounted for three quarters of the diet, and adult rock ptarmigan were the most common. Arctic ground squirrel and arctic hare made up the bulk of mammalian prey.

Males occupy and defend nesting territories as early as the end of January, with females arriving in mid-March. In Nunavut, laying typically begin in the first week of May with most pairs laying by the end of the second week in May. Nestlings typically hatch in mid-June, but hatching can occur throughout June. Nestlings fledge in late July or early August after 7 weeks in the nest. In Nunavut, gyrfalcon usually nest on cliff ledges, ideally beneath sheltering overhang; sometimes nests in trees or on man-made structures. Nests are generally on rock ledges or abandoned rough-legged hawk or common raven nests. Use of alternate nest sites is not uncommon. Pairs do not necessarily attempt breeding every year, depending on food supply. Typical clutch size is 3-4 eggs (Booms et al. 2008) that are incubated for 34-36 days mostly by the female (ca. 80%). The North American population including Nunavut is considered to be stable (Clum and Cade 1994, Kirk and Hyslop 1998). Although low spring temperatures are associated with later arrival at nesting territories in Nunavut (Poole and Bromley 1988), there was no effect on laying dates. However, (Poole and Bromley 1988) indicated that increased spring precipitation (snow) reduced reproductive success.

### Rough-legged Hawk (*Buteo lagopus*)

The rough-legged hawk (Figure 3, RLHA) is a medium-large bird of prey, with a fairly small beak, predominantly brown in colour and often mottled. Plumage is highly variable with recognized light and dark morphs. Extensive field experience is required to distinguish between males and females, and between adults and juveniles based on plumage alone. A broad chest band is evident in most plumage variations, and in flight, a dark carpal patch is characteristic in light morph individuals. One or more dark terminal bands appear on the tail. The wing tips are long enough to reach or extend past the tail when the animal is perched. Legs are feathered to feet (Ferguson-Lees et al. 2005).

Widespread throughout North America, breeding from the Aleutian Islands, the interior of Alaska, Yukon, northern Mackenzie, and across Nunavut to northern Labrador and Newfoundland and south to Manitoba and southeastern Quebec. In Nunavut, rough-legged hawks are present over most of the territory except for islands without lemmings (Bechard and Swem 2002).

Regularly hovers, or “kites” while facing into the wind scanning for prey. Soars with wings raised in a slight dihedral (V-shape). It is a diurnal raptor that still-hunts from prominent perching structure on both breeding and wintering grounds. Prey is captured on the ground. Courtship involves soaring and calling, with the male engaged in a flight display of repeated undulating stoops rising upward to mid-air stall. It is gregarious on migration, often travelling in large flocks, but small groups or individuals are not uncommon.

During the summer, breeding pairs prefer rugged terrain areas with steeper slopes in areas associated with primary production (i.e., vegetation), and were most likely to nest in large, productive valleys surrounded by high-elevation plateaus (Galipeau et al. 2016). It is widely distributed in winter, usually found in open habitat resembling the tundra such as prairies, plains, coastal marshes, agricultural fields, and airports (Johnsgard and Johnsgard 1990). More common in wintering areas typified by short growing seasons and low precipitation, with highest densities in the northern United States, Great Basin area, and the western shortgrass prairies (Bock and Lepthien 1976, Bock et al. 1977).

The rough-legged hawk is a small mammal specialist; thus, its breeding activity is generally associated with local abundance of ground squirrels, voles, or lemmings (Hanski 1991, Potapov 1997). It will prey on birds when small mammals are scarce, particularly juvenile passerines and shorebirds, and will resort to consuming carrion opportunistically (Watson 1986). Usually reproductively mature at 2 years of age. Stick-nests are built soon after arrival on territory, typically on cliffs, on bluffs, or on the ground. Clutch sizes are variable (1-7 eggs), depending on food availability, but 3-5 eggs are usual and laid in May. Incubation 31-33 days, provided almost entirely by the female. Nestling period is 35-40 days, and fledglings remain dependent on adults for another 2 weeks. The male provisions the young and the female, which feeds the young. Pairs show nest site fidelity, and in locations where ground squirrels are entirely absent, they may forgo breeding or have small broods when lemmings are low, in contrast to Snowy Owls, which are truly nomadic (Bechard and Swem 2002). Bechard and Swem (2002) indicated that egg-laying date was associated with spring temperatures and snow-free ledges, but Potapov (1997) reported no effect of snow melting date or spring/summer temperatures on number of nesting pairs.

## **Methods**

### **Terminology**

The terminology used throughout this report follows (Franke et al. 2017). The following terms are highlighted in an effort to clarify terminology used in this report, and/or to distinguish terms used from similar terms that have distinct meaning:

**nest** — The structure made or the place used by birds for laying their eggs and sheltering their young (Steenhof and Newton 2007) regardless of whether eggs are laid in the nest in a given year or in any year (Millsap et al. 2015, Steenhof et al. 2017), see Scrape for Gyrfalcons.

**nesting site** — The substrate which supports the nest or the specific location of the nest on the landscape (Ritchie and Curatolo 1982, Millsap et al. 2015, Steenhof et al. 2017).

**alternative nesting site** — One of potentially several nests within a nesting territory that is not a used nest in the current year (Millsap et al. 2015).

**nesting territory** — An area that contains, or historically contained, one or more nests within the home range of a mated pair: a confined locality where nests are found, usually in successive years, and where no more than one pair is known to have bred at one time (Newton and Marquiss 1984, Steenhof and Newton 2007). Note that a nesting territory may or may not be defended (Postupalsky 1974), and probably does not include all of a pair's foraging habitat (Newton and Marquiss 1984, Steenhof and Newton 2007).

**occupancy** — A point estimate of the probability that a nesting territory is occupied in a given breeding season; ideally this estimate should include an estimate of uncertainty around the point. The most simple point estimate is the observed proportion calculated as the quotient of the count of occupied nesting territories and the count of known nesting territories that were fully surveyed in a given breeding season (Franke et al. 2017).

### **Data Exploration**

#### *Distance to disturbance*

Spatial objects (lines and polygons) describing the project footprint and road were acquired from Agnico Eagle. Euclidean distances from nesting sites to the nearest spatial object were calculated in R (R Development Core Team 2017) using the `sp`, `rgeos`, and `geosphere` packages. Summary data were generated using the `summary` function in R.

#### *Assigning Nesting Sites to Nesting Territories*

In the absence of marked individuals, it can be challenging to definitively identify alternative nesting sites. Failure to account for alternative nesting sites can lead to underestimating demographic parameters such as annual productivity. To address this problem, a rule-based approach was used to estimate the number of alternative nesting sites within the study area (Figure 4):

- If two species-specific nesting sites were separated by a distance of  $\leq 1$  km they were considered alternative nesting sites in a single nesting territory.
- If two nesting sites within 1 km of each other were occupied by the same species in a given year, they were considered separate territories.

- If multiple species-specific nesting sites were within 1 km of one another, discrete geographic landforms or discontinuities in cliff structure were used to separate or combine sites into territories.

Temporal patterns of multi-species occupancy were used to assess the plausibility of decisions based on the application of the three rules listed above. For example, if two nesting sites were located within 1 km of each other and were occupied by two different species in alternating years, these nesting sites were identified as distinct alternative nesting sites for each species.

Assigning Identification Numbers (ID) to Nesting Territories was conducted according to the following rule set:

- Nesting Territory IDs were assigned within species only (e.g., Nesting Territory IDs for Peregrine Falcon and Rough-legged hawk were never shared).
- Nesting Territory IDs were assigned using the Identification Number of one of the Nesting Sites in the cluster according to the following rule set, in order of priority:
  - i. Length of tenure (i.e., nesting sites with the longest tenure)
  - ii. First tenure (i.e., nesting sites with the first tenure in the event length of tenure was equal).

### Field Surveys

Two structured surveys were conducted in 2023. The focus of these surveys was to search known nesting sites for the presence of cliff-nesting raptors. In addition to the structured surveys, favorable habitat was searched opportunistically when ferrying between known sites, camps, or other mine infrastructure and when raptors or signs of site use (e.g., whitewash, orange-colored lichen, and unused nests) were observed. Sites were considered occupied if one or more adults displayed territorial or reproductive behavior (e.g., vocalization and/or flight behavior associated with defense of breeding territory or presence of nest building, nest, or eggs). Locations with partially built or unused nests without detection of breeding aged adults were noted as such (e.g., old stick nest; no birds detected). Raptor monitoring in 2023 involved two helicopter surveys (25 - 29 May, 15 – 18 August), and ground - monitoring of potential nesting habitat (natural cliffs, quarries and borrow pits) in coastal areas using snowmobile in May and boat in August.

### Mapping

Shapefiles for the Road, and project footprints were read into R using the `readOGR` function in the `rddal` package and converted to a data frame for `ggplot2` using the `fortify` function. The spatial extent for the mapping exercise was set using the `get_map` function in the `ggmap` package. Maps portraying species-specific nesting sites were plotted using `ggmap`.

### Occupancy

Although estimation of nesting site occupancy can serve as a metric of population status (MacKenzie et al. 2002, 2003), detection of nesting pairs is imperfect, and estimating the proportion of occupied sites without accounting for detection error can lead to underestimation of true occupancy (Kéry and Schmidt 2008). Occupancy modeling estimates parameters that influence occupancy, and simultaneously accounts for imperfect detection (Marsh and Trenham 2008). In any given year, the

status of a nesting site is limited to one of only two outcomes: occupied or not occupied. Occupancy modelling estimates the following parameters:

1. initial colonization – the probability that a nesting site is occupied in the first survey year ( $\psi$ ),
2. colonization – the probability that an unoccupied site becomes occupied between years ( $\epsilon$ ),
3. extinction – the probability that occupied site becomes unoccupied between years ( $\gamma$ ); and,
4. detection – the probability that PEFA are detected given that the nesting site is occupied ( $p$ ).

Nesting site survival is estimated as the reciprocal of extinction (i.e., the probability an occupied site remains occupied between years;  $1-\gamma$ ). In addition, environmental covariates can be added to an occupancy model to test whether they influence the above parameters using a logit link function. Multi-year occupancy was calculated in R (R Development Core Team 2019) using the ‘unmarked’ package. When appropriate, data were standardized (e.g., distance to disturbance was standardized by subtracting the mean from each distance value and dividing by the standard deviation), and then formatted specifically for ‘unmarked’ using the *unmarkedMultFrame* function.

Occupancy between years was analyzed separately for peregrine falcons and rough-legged hawks. To do so, the total number of nesting sites was filtered to include only those nesting sites that were occupied at least once from 2022 to 2023 for both species. Model fitting of candidate models (Table 1) was performed using the *colext* function. Akaike Information Criterion (AIC) was used for model selection.

Two candidate models were selected *a priori* to estimate a potential effect of anthropogenic disturbance (Table 1) when contrasted against the null model. The aim of this analysis was two-fold: 1) to estimate the proportion of occupied nesting sites annually, and; 2) to estimate the trend in nesting site occupancy from 2022 to 2023. Trend in occupancy was estimated using annual occupancy probabilities to calculate average rate of change ( $\lambda$ ) at the population level (MacKenzie et al. 2003) where a value  $<1$  indicates population decline and  $>1$  indicates an increase. For both candidate models (Table 1), initial occupancy ( $\psi$ ) and detection ( $p$ ) probabilities were set to 1 (i.e., constant between years) and time varying (i.e., year), respectively, to allow for a test of an effect of distance to disturbance (i.e., model structure for extinction and colonization varied according to the test for effects). Insufficient years (N=2) of study precluded contrasting a model for the effect of time alone against a model containing disturbance metrics.

*Table 1. Candidate models*

Model structure	Model #	Tests for effect of:
$\psi(1) + \epsilon(1) + \gamma(1) + p(\text{year})$	m0	Null (contrast to m1)
$\psi(1) + \epsilon(d2d) + \gamma(d2d) + p(\text{year})$	m1	Distance to disturbance (d2d) (project infrastructure)

## **Results**

Throughout the region, nesting raptors have been detected at 247 nesting sites (Figure 5). Of these, 119 have been occupied by only rough legged hawks, 84 by only peregrine falcons (24 additional nesting sites have been occupied by either peregrine falcons or rough legged hawks). Six (6) nesting sites have been occupied by common ravens, two (2) by snowy owls and one (1) each by gyrfalcons and short-eared owls.

Within the Regional Study Area (RSA), nesting raptors have been detected at 203 nesting sites. Of these, 105 have been occupied by only rough legged hawks and 60 by only peregrine falcons. Twenty (20) additional nesting sites have been occupied by either peregrine falcons or rough legged hawks resulting in a total of 80 known peregrine falcon nesting sites and 125 rough legged hawk nesting sites. Five (5) nesting sites have been occupied by common ravens, and one (1) each by gyrfalcons, snowy owls, and short-eared owl.

*Table 2. Count of known nesting sites for common raven (CORA), gyrfalcon (GYRF), peregrine falcon (PEFA/PERL), rough legged hawk (RLHA/PERL), short eared owl (SEOW), snowy owl (SNOW), and unknown raptor species (SPP) in the Rankin Inlet region and within the regional study area.*

	CORA	GYRF	PEFA	PERL	RLHA	SEOW	SNOW	SPP
Region	6	1	84	24	119	1	2	10
RSA	5	1	60	20	105	1	1	10

Fourteen (14) peregrine falcon nesting sites were deemed alternates, resulting in a total of 66 known peregrine falcon nesting territories. All peregrine falcon nesting territories were fully surveyed, for which, evidence of breeding was detected at 34 nesting territories (observed proportion = 0.52). Twenty-five (25) rough legged hawk nesting site were deemed to be alternative nesting sites, resulting in a total of 100 known rough legged hawk nesting territories. Ninety four rough legged hawk (94) territories were fully surveyed, of which, evidence of breeding was detected at 21 nesting territories (observed proportion = 0.22).

*Table 3 Distance to disturbance metrics for peregrine falcons (PEFA) and rough-legged hawks (RLHA) nesting sites in the vicinity of the Agnico Eagle Meliadine Mine.*

Species	Mean	SD	Minimum	Maximum
PEFA	5.52	5.05	0.00	23.19
RLHA	5.56	5.02	0.00	22.72

#### Peregrine Falcon Occupancy

The null model (m0; Table 5) best explained probability of occupancy among peregrine falcons (0.58±0.07; Table 7). The null model had the fewest parameters (i.e., most simple explanation of occupancy), and inclusion of distance to anthropogenic disturbance (m1) did not improve model fit (Delta AICc<2.0). Population trend over the two survey years was 0.80, which indicates a decline from 2022 to 2023 (Figure 6; left panel).

*Table 4 Count of nesting territories sampled, count of nesting territories where evidence of breeding was detected, count of nesting territories that were colonized (i.e., occupied in 2023 that were not occupied in 2022), count of nesting territories that were not occupied in 2023 that were occupied in 2022 (i.e., extinct), count of nesting territories for which occupancy status remain the same from 2022 to 2023, and count of nesting territories that were common to both years, for peregrine falcons nesting territories in the vicinity of the Agnico Eagle Meliadine Mine.*

	Sampled	Detected	Colonized	Extinct	Static	Common
2022	58	33	NA	NA	NA	NA
2023	66	35	5	10	43	58

Table 5. Model selection based on AIC score peregrine falcons (PEFA) nesting sites in the vicinity of the Agnico Eagle Meliadine Mine.

Model	K	AICc	Delta AICc	AICcWt	Cum.Wt
m1	7	306.90	0.00	0.55	0.55
m0	5	307.34	0.44	0.45	1

Table 6. Parameter estimates (null model; log odds scale) for peregrine falcon occupancy ( $\psi$ ) and detection ( $\rho$ ).

	$\psi$ (intercept)	$\rho$ (intercept)
Estimate	0.98	0.29
SE	0.35	0.26

Table 7. Predicted occupancy and detection (probability scale), SE, and 95% CI for peregrine falcons.

	Predicted	SE	Lower 95% CI	Upper 95% CI
PEFA occupancy	0.58	0.07	0.43	0.73
PEFA detection	0.70	0.07	0.55	0.82

#### Rough legged Hawk Occupancy

The null model (m0; Table 9) best explained probability of occupancy among rough legged hawks ( $0.39 \pm 0.62$ ; Table 11). Including distance to anthropogenic disturbance did not improve model fit. Population trend over the two survey years was 0.0.32, which indicates a decline from 2022 to 2023 (Figure 6; right panel).

Table 8 Count of nesting territories sampled, count of nesting territories where evidence of breeding was detected, count of nesting territories that were colonized (i.e., occupied in 2023 that were not occupied in 2022), count of nesting territories that were not occupied in 2023 that were occupied in 2022 (i.e., extinct), count of nesting territories for which occupancy status remain the same from 2022 to 2023, and count of nesting territories that were common to both years, for rough legged hawk nesting territories in the vicinity of the Agnico Eagle Meliadine Mine.

	Sampled	Detected	Colonized	Extinct	Static	Common
2022	58	33	NA	NA	NA	NA
2023	66	35	5	10	43	58

Table 9. Model selection based on AIC score for rough legged hawks.

Model	K	AICc	Delta AICc	AICcWt	Cum.Wt
m0	5	228.20	0.00	0.84	0.84
m1	7	231.54	3.34	0.16	1.00

Table 10. Parameter estimates (null model; log odds scale) for rough legged hawk occupancy ( $\psi$ ) and detection ( $\rho$ ).

	$\psi$ (intercept)	$\rho$ (intercept)
Estimate	-0.46	-0.41
SE	0.49	0.52

Table 11. Predicted occupancy and detection (probability scale), SE, and 95% CI for rough legged hawks.

	<b>Predicted</b>	<b>SE</b>	<b>Lower 95% CI</b>	<b>Upper 95% CI</b>
RLHA occupancy	0.39	0.62	0.01	0.23
RLHA detection	0.66	0.14	0.37	0.87

## **Discussion**

Monitoring for breeding raptors has occurred consistently in the area associated with Meliadine Project infrastructure for decades. Conducted by Arctic Raptors Inc., surveys have focused on searching for, documenting, and mapping nesting sites for three raptor species (peregrine falcons, rough-legged hawks, and gyrfalcons). Study design included at two surveys – one to assess the location of occupied territories during the pre-incubation and incubation periods, and one to assess site productivity during the late brood rearing period.

Mitigation and management measures outlined in the TEMMP require the protection of species at risk during the breeding season (T&C 59), and requires that disturbance to birds is minimized through consistent monitoring (T&C 59), including nest-specific mitigation where necessary (T&C 61, 62, and 75). Peregrine falcons were assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in November of 2017, and were ranked “Not at Risk”. The responsible Minister rendered a decision on the recommendation made by COSEWIC, and peregrine falcons are no longer considered to be threatened. This report meets the T&C outlined by NIRB by documenting and mapping raptor nesting sites within 1.5km of the project infrastructure, including minimum “no disturbance” buffers.

This analysis found no evidence of an effect of distance to disturbance on occupancy. Regardless of this finding, the potential for detecting mine-related anthropogenic disturbance will be challenging in light of the presence of roads, trails, cabins, travel routes and activities on the sea/sea-ice and lake ice associated with the community of Rankin Inlet. Conducting multi-year surveys at the scale of the RSA was recommended in 2022, and this report satisfies that recommendation. In addition, further survey effort in northern portion of the RSA where no survey effort had previously been done was also recommended; Agnico Eagle undertook additional hours of survey time and searched the northwestern quadrant of the RSA, finding several previously unknown nesting sites which will be surveyed on an on-going basis.

Population trend between years for both species suggests that occupancy declined from 2022 to 2023, however, this finding should be interpreted with caution until additional years have been considered. Given that no evidence of a distance effect was found, and assuming that the apparent decline is real, other causes should be considered; one potential mechanism is Highly Pathogenic Avian Influenza, which spiked in 2022. It is recommended that any found-dead raptors are submitted for disease testing.

Common ravens were reported flying over TIRI-01Pit (SP4 area) in early May, and a stick nest was discovered in TIRI-02 Pit during the same time. Because use of the pit is currently limited solely to ground water storage, the area was deemed unlikely to be disturbed by construction/clearing activities over the course of the breeding season (i.e., it remained undisturbed)” and no further monitoring was conducted. Further, it is possible that the stick nest was a known nesting site that had been used previously by rough-legged hawks, and was recorded as unoccupied in 2023.

## Terms and Conditions

T&C 59 - 60: Do not apply to raptors.

T&C 61: Nesting deterrents to discourage birds from nesting in areas likely to be disturbed by construction/clearing activities were not required. Surveys of known nesting sites identified those at which breeding attempts were detected, and are reported here.

T&C 62: 40 known nesting sites are within 1.5km of project infrastructure. Nine (9) peregrine falcon nesting sites are within 1.5 km of the haul road and 1 is with 1.5 km of the site footprint. Twenty-three (23) rough legged hawk nesting sites are within 1.5 km of the haul road and two (2) are within 1.5 km of the site footprint. Of the 40 known nesting sites within 1.5 km of project infrastructure, 19 nesting sites are within 0.6 Km of project infrastructure. Four (4) known peregrine falcon nesting sites are within 0.6 km of the haul road and 1 is within 0.6 km of the site footprint. Nine (9) rough legged hawk nesting sites are within 0.6 km of the haul road and two are within 0.6 km of the site footprint.

T&C 71: This report and the results herein represent detailed monitoring for raptors.

T&C 72: Comprehensive field surveys conducted from 2022 to 2023 represent the ongoing efforts to develop and update relevant monitoring for raptors.

Table 12 Geographic coordinates (decimal degrees), distance to project footprint (Km2FP), and distance to haul road (Km2HR) and minimum distance to disturbance (minD2D) for 177 occupied nesting sites in the RSA. Territories within 600 m of infrastructure (road, or footprint) are highlighted in dark yellow, while territories that are within 1500 m are highlighted in light yellow require a management plan. Species column indicates historical occupancy; PEFA = peregrine falcon, RLHA = rough legged hawk, PERL = peregrine falcon or rough legged hawk, SPP = unknown, CORA = common raven, GYRF = gyrfalcon, SNOW = snowy owl, SEOW = short eared owl. Not all nesting sites are occupied in any given year.

NSID	Latitude	Longitude	Species	Km2FP	Km2HR	minD2D
1	62.86834	-92.256	PEFA	17.1	4.8	4.8
2	62.79479	-92.197	SPP	25.2	3.3	3.3
3	62.82665	-91.9332	PEFA	25.3	7.9	7.9
4	62.84473	-92.2999	PERL	20.0	7.3	7.3
5	62.85239	-92.3225	PEFA	19.5	8.4	8.4
6	62.84279	-92.2903	RLHA	20.2	6.8	6.8
8	62.78951	-92.1052	PEFA	26.4	1.2	1.2
10	62.79271	-92.1033	RLHA	26.0	0.9	0.9
11	62.78963	-92.1341	RLHA	26.1	2.1	2.1
14	62.97506	-92.1297	RLHA	6.0	0.2	0.2
15	62.79058	-92.2085	RLHA	25.7	4.0	4.0
18	62.85466	-92.1714	PERL	18.7	0.8	0.8
20	62.85597	-92.1616	PERL	18.6	0.3	0.3
26	62.78538	-92.296	RLHA	26.5	8.0	8.0
28	62.79558	-92.3236	PEFA	25.7	8.9	8.9
29	62.80025	-92.3213	PERL	25.1	8.7	8.7
30	62.78494	-92.1894	PEFA	26.3	3.9	3.9
31	62.81911	-92.2592	PEFA	22.6	5.2	5.2
32	62.82817	-92.2409	CORA	21.5	4.2	4.2
33	62.82787	-92.2401	PEFA	21.5	4.2	4.2
34	62.83007	-92.2424	RLHA	21.3	4.3	4.3
35	62.85095	-91.9668	RLHA	22.1	7.0	7.0
36	62.80346	-92.1986	RLHA	24.2	2.7	2.7
37	62.85816	-92.175	PEFA	18.3	0.9	0.9
38	62.79128	-92.1889	PEFA	25.6	3.3	3.3
39	62.82981	-91.9809	PEFA	23.9	5.6	5.6
40	62.82948	-91.9526	PEFA	24.5	7.0	7.0
41	62.83114	-91.9692	PEFA	24.0	6.2	6.2
42	62.82765	-91.967	PEFA	24.4	6.2	6.2
43	62.82485	-91.941	RLHA	25.3	7.4	7.4
44	62.82068	-91.9016	RLHA	26.6	9.4	9.4
45	62.82539	-91.9235	RLHA	25.6	8.3	8.3
46	63.07264	-92.3604	PEFA	5.7	5.8	5.7
47	62.8155	-92.1894	PERL	22.9	1.7	1.7
48	62.80494	-92.1694	RLHA	24.2	1.5	1.5

NSID	Latitude	Longitude	Species	Km2FP	Km2HR	minD2D
49	62.78624	-92.1509	RLHA	26.4	2.8	2.8
50	62.79457	-92.1446	PERL	25.5	1.9	1.9
51	62.7874	-92.1265	PEFA	26.4	2.0	2.0
52	62.78586	-92.1623	PERL	26.3	3.2	3.2
53	62.80257	-92.2139	PEFA	24.3	3.4	3.4
54	62.81046	-92.2196	RLHA	23.4	3.4	3.4
55	62.7919	-92.1642	RLHA	25.7	2.7	2.7
56	62.79558	-92.1716	RLHA	25.2	2.5	2.5
57	62.82254	-92.2573	PERL	22.2	5.1	5.1
58	62.83214	-92.3117	PEFA	21.5	7.8	7.8
59	62.84242	-92.344	PERL	20.9	9.5	9.5
60	62.80968	-92.3184	SPP	24.1	8.3	8.3
61	62.91406	-92.1407	PEFA	12.4	1.2	1.2
63	62.86624	-92.0784	PEFA	18.3	1.4	1.4
66	62.84227	-92.3251	PERL	20.6	8.6	8.6
67	62.92744	-92.0521	PERL	12.5	0.2	0.2
69	62.81746	-92.2377	PERL	22.7	4.2	4.2
71	62.85398	-92.2971	PERL	19.0	7.1	7.1
72	62.81276	-92.3133	RLHA	23.7	8.0	8.0
74	62.80017	-92.1794	PEFA	24.7	2.2	2.2
76	62.81964	-91.9757	PERL	25.0	5.6	5.6
77	62.86439	-92.0117	PEFA	19.7	4.3	4.3
78	62.79712	-92.1625	PEFA	25.1	2.1	2.1
79	62.87996	-92.2303	RLHA	15.7	3.3	3.3
81	62.86605	-92.2023	PEFA	17.3	2.1	2.1
83	62.79965	-92.3192	RLHA	25.2	8.6	8.6
84	63.02948	-92.3451	PEFA	4.3	4.4	4.3
85	62.85595	-91.8748	PEFA	24.2	10.8	10.8
86	62.8657	-92.2816	RLHA	17.6	6.1	6.1
87	62.85592	-92.3578	RLHA	19.7	10.1	10.1
88	62.88853	-92.1497	PERL	15.1	0.5	0.5
89	62.92978	-92.2217	PEFA	10.1	1.8	1.8
90	63.03822	-92.6421	PEFA	19.1	19.1	19.1
95	62.96931	-92.0023	PEFA	10.6	0.6	0.6
96	62.94216	-92.2926	RLHA	9.5	5.1	5.1
98	62.94722	-92.3012	PEFA	9.2	5.5	5.5
99	62.8501	-92.3931	PEFA	20.9	12.0	12.0
100	62.83075	-92.4026	PEFA	23.1	12.4	12.4
102	62.82212	-91.9067	CORA	26.4	9.1	9.1
103	63.08382	-92.3789	RLHA	7.2	7.2	7.2
104	62.79592	-92.15	RLHA	25.3	2.0	2.0
105	62.78568	-92.1218	CORA	26.7	2.0	2.0

NSID	Latitude	Longitude	Species	Km2FP	Km2HR	minD2D
106	62.84457	-92.3425	RLHA	20.6	9.5	9.5
107	62.86341	-92.031	RLHA	19.4	3.5	3.5
108	62.79659	-92.1612	RLHA	25.2	2.2	2.2
109	63.02752	-92.3336	RLHA	3.9	3.9	3.9
110	62.93445	-92.0572	PEFA	11.7	0.4	0.4
111	62.79798	-92.1971	RLHA	24.9	3.0	3.0
112	62.87769	-92.2388	RLHA	16.0	3.7	3.7
113	62.8969	-92.1489	RLHA	14.2	0.6	0.6
114	62.97403	-91.993	RLHA	10.7	1.2	1.2
115	62.9717	-92.196	RLHA	5.6	0.2	0.2
116	62.94254	-92.3071	RLHA	9.8	5.9	5.9
117	63.05057	-92.1764	RLHA	2.2	2.3	2.2
118	62.83578	-92.253	RLHA	20.7	4.8	4.8
119	62.84214	-92.2616	RLHA	20.0	5.3	5.3
120	62.84616	-92.2754	RLHA	19.7	6.1	6.1
121	62.89437	-92.1321	RLHA	14.6	1.4	1.4
123	62.79734	-92.1471	RLHA	25.2	1.7	1.7
124	62.95798	-91.9294	RLHA	14.4	0.2	0.2
125	62.79715	-92.0836	PEFA	25.7	0.6	0.6
127	62.89143	-91.9793	RLHA	17.8	4.4	4.4
129	63.04116	-92.0721	PEFA	5.0	4.8	4.8
130	62.83242	-91.9027	PERL	25.5	9.5	9.5
133	62.80613	-92.1544	RLHA	24.1	1.1	1.1
134	63.09531	-92.3174	PEFA	6.2	6.2	6.2
135	63.05417	-92.1866	PEFA	2.1	2.1	2.1
136	63.03012	-92.0563	RLHA	5.6	5.0	5.0
137	62.81346	-92.1951	PEFA	23.1	2.1	2.1
138	62.9659	-92.0441	RLHA	9.3	0.2	0.2
144	62.80004	-92.1784	CORA	24.7	2.2	2.2
145	62.83627	-92.2642	PEFA	20.7	5.4	5.4
146	62.87033	-92.5553	RLHA	23.8	19.7	19.7
147	62.80685	-92.3081	PEFA	24.3	7.9	7.9
148	62.82506	-92.3099	RLHA	22.3	7.7	7.7
149	62.80023	-92.2094	RLHA	24.6	3.4	3.4
150	62.95695	-92.2896	SNOW	7.9	4.7	4.7
151	62.78581	-92.0772	PEFA	27.0	1.8	1.8
152	62.81447	-92.2139	PEFA	23.0	3.0	3.0
153	62.84943	-92.0299	RLHA	20.9	4.4	4.4
154	62.80647	-92.2032	PEFA	23.9	2.7	2.7
156	62.80737	-92.1787	RLHA	23.9	1.6	1.6
158	62.85388	-92.1727	RLHA	18.7	0.9	0.9
159	62.78857	-92.0958	RLHA	26.5	1.3	1.3

NSID	Latitude	Longitude	Species	Km2FP	Km2HR	minD2D
160	62.91917	-92.2816	RLHA	11.8	5.0	5.0
161	62.80963	-92.2183	PEFA	23.5	3.3	3.3
162	62.84466	-92.269	PEFA	19.8	5.8	5.8
163	62.8836	-92.0106	RLHA	17.8	3.3	3.3
164	62.94757	-92.3572	RLHA	10.6	8.3	8.3
165	62.8288	-92.2157	RLHA	21.4	2.9	2.9
166	62.92743	-92.0064	RLHA	13.8	2.5	2.5
168	62.8306	-92.3111	RLHA	21.7	7.8	7.8
169	62.86323	-92.2318	RLHA	17.6	3.7	3.7
172	62.94105	-92.2174	RLHA	8.9	1.4	1.4
173	62.94207	-92.0525	RLHA	11.1	1.2	1.2
174	62.96577	-91.9864	PERL	11.5	0.3	0.3
175	62.95735	-92.0185	RLHA	10.8	0.2	0.2
176	62.94125	-92.2573	RLHA	9.1	3.4	3.4
177	62.93968	-92.156	RLHA	9.4	0.8	0.8
178	62.85229	-91.8249	RLHA	26.1	13.0	13.0
179	62.97345	-92.3191	RLHA	7.2	5.8	5.8
180	62.94993	-92.557	RLHA	18.1	18.1	18.1
181	63.02383	-92.5777	RLHA	16.0	16.0	16.0
183	62.82779	-92.2247	RLHA	21.5	3.4	3.4
184	63.04296	-92.2276	RLHA	0.2	0.2	0.2
185	63.05146	-92.181	RLHA	2.1	2.2	2.1
186	63.04966	-92.1714	RLHA	2.2	2.2	2.2
187	63.067	-92.2223	PEFA	2.9	2.7	2.7
188	63.03066	-92.0476	RLHA	6.0	5.3	5.3
189	63.03964	-92.0867	SPP	4.2	4.0	4.0
190	63.04117	-92.0664	PEFA	5.3	5.0	5.0
191	63.00545	-92.2249	SEOW	1.7	0.5	0.5
192	62.98811	-92.1543	RLHA	4.2	0.1	0.1
193	62.81945	-92.238	CORA	22.5	4.1	4.1
194	63.04227	-92.396	RLHA	6.6	6.7	6.6
195	63.02049	-92.3421	RLHA	4.6	4.7	4.6
196	63.05507	-92.1899	PEFA	2.1	2.1	2.1
197	63.0555	-92.2533	GYRF	1.2	1.2	1.2
198	62.87525	-92.2811	RLHA	16.5	5.9	5.9
199	63.03459	-92.0633	PERL	5.3	5.1	5.1
200	63.05908	-92.2401	PEFA	1.7	1.7	1.7
201	62.8897	-92.1586	PERL	14.9	0.1	0.1
202	62.89697	-92.1409	RLHA	14.3	1.0	1.0
203	62.93973	-92.5616	RLHA	18.9	18.6	18.6
204	62.98325	-92.5598	RLHA	16.4	16.4	16.4
205	62.98913	-92.5595	RLHA	16.1	16.1	16.1

NSID	Latitude	Longitude	Species	Km2FP	Km2HR	minD2D
206	62.98951	-92.5519	RLHA	15.7	15.8	15.7
207	63.03754	-92.6441	RLHA	19.2	19.2	19.2
209	63.09079	-92.3244	RLHA	5.9	5.9	5.9
210	62.85975	-91.8865	PEFA	23.5	10.1	10.1
211	62.78424	-92.3093	RLHA	26.8	8.7	8.7
212	62.86443	-92.0153	PERL	19.6	4.1	4.1
213	62.89279	-92.1511	RLHA	14.6	0.5	0.5
214	62.87168	-92.2862	RLHA	17.0	6.2	6.2
215	63.02298	-92.1999	PEFA	0.1	0.2	0.1
216	63.02323	-92.1999	RLHA	0.1	0.2	0.1
217	63.02948	-92.2839	SPP	1.7	1.8	1.7
218	62.94964	-92.301	PEFA	8.9	5.4	5.4
219	62.94549	-92.319	RLHA	9.7	6.4	6.4
220	62.94755	-92.1185	PEFA	9.1	1.0	1.0
221	63.02948	-92.2839	SPP	1.7	1.8	1.7
222	62.90241	-91.78	PEFA	24.1	10.0	10.0
224	62.97502	-92.4037	RLHA	10.3	10.0	10.0
225	63.03358	-92.6285	SPP	18.4	18.5	18.4
226	63.04958	-91.7734	PEFA	20.0	12.9	12.9
227	63.07924	-91.8715	RLHA	15.9	13.7	13.7
228	63.10543	-91.9151	PEFA	15.3	15.1	15.1
229	63.10565	-91.7149	SPP	24.4	19.6	19.6
230	63.1425	-91.7342	SPP	25.2	22.7	22.7
231	63.14867	-91.7643	RLHA	24.3	22.7	22.7
232	63.14907	-91.7736	PEFA	23.9	22.6	22.6
233	63.15709	-91.7882	PEFA	23.8	23.2	23.2
234	63.14742	-91.8165	PEFA	22.0	21.7	21.7
235	63.14853	-91.8186	RLHA	22.0	21.8	21.8
236	62.80675	-92.1722	RLHA	24.0	1.4	1.4
237	62.82458	-92.2533	RLHA	21.9	4.9	4.9
238	62.82969	-92.3039	RLHA	21.7	7.4	7.4
239	63.07238	-92.3581	PEFA	5.6	5.7	5.6
240	62.9143	-91.9367	SPP	17.2	4.4	4.4
241	62.99313	-92.5325	RLHA	14.7	14.7	14.7
242	62.97437	-92.1555	RLHA	5.6	0.9	0.9
243	63.02988	-92.0557	RLHA	5.6	5.0	5.0
244	63.0302	-92.0479	RLHA	6.0	5.2	5.2
245	63.04134	-92.5261	RLHA	13.2	13.2	13.2
246	63.07397	-92.3682	RLHA	6.2	6.2	6.2
247	63.0857	-92.3925	RLHA	7.9	7.9	7.9
248	63.10112	-92.3241	RLHA	6.9	6.9	6.9
249	63.13407	-91.8855	SPP	18.4	18.2	18.2

Figure 1



*Figure 1. Adult male peregrine falcon. Note the dark hood and face with distinct dark malar stripe, white throat, slate-grey back, and barred belly, legs, and tail. Wings are long and pointed. Note the yellow legs, cere and eye ring.*

Figure 2



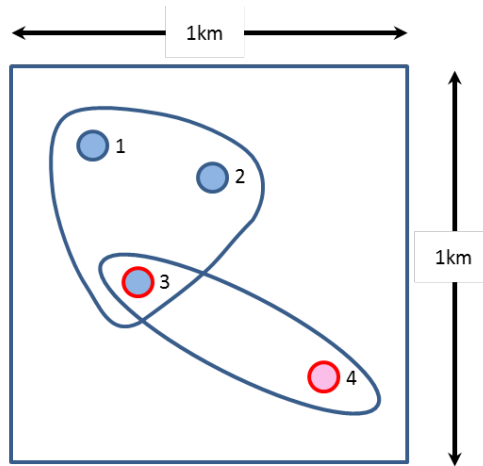
*Figure 2. Adult female gyrfalcon. Note that wings are more rounded and broader than the peregrine falcon. The tail is relatively long. When perched, wings extend 2/3 down the tail. The body is thick and powerful, particularly in females. Adults have a yellow cere*

Figure3



*Figure 3. Adult male rough-legged hawk. Note predominantly brown in colour and mottled. A broad chest band is evident, and dark carpal patches (not evident here) are characteristic in light morph individuals. One or more dark terminal bands appear on the tail. T*

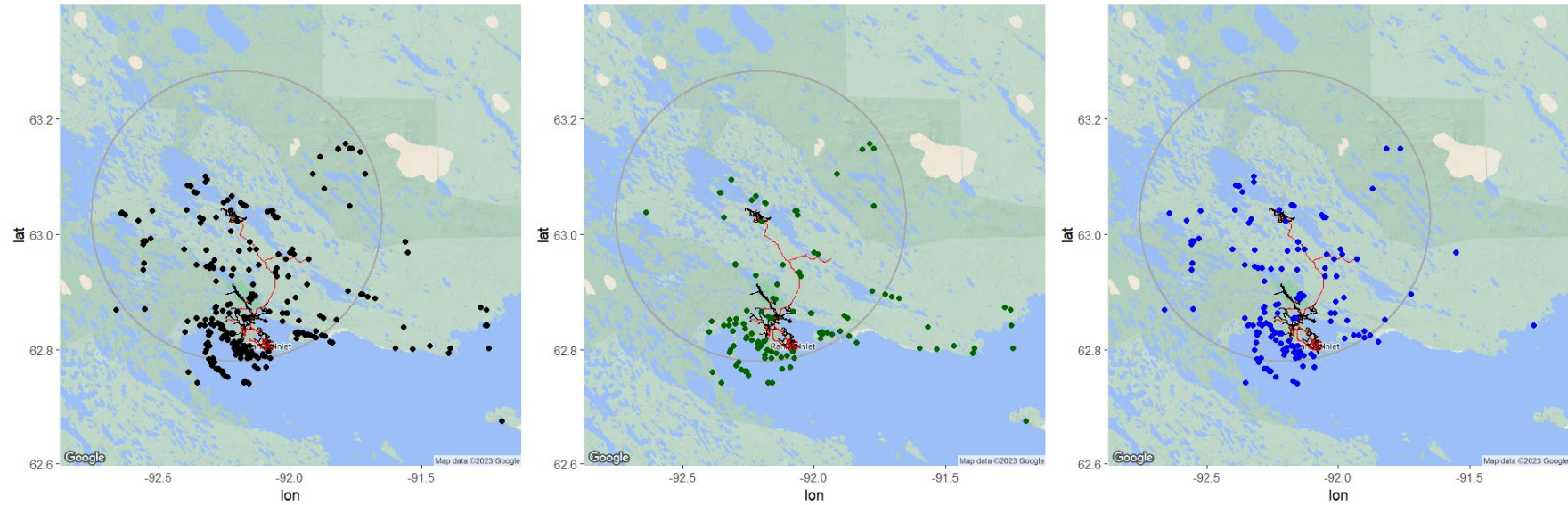
Figure 4



NS ID	PEFA NT ID	RLHA NT ID	2011	2012	2103	2014	2015	2016	2017
1	1	-	PEFA	PEFA	NBD	NBD	NBD	PEFA	PEFA
2	1	-	NBD	NBD	PEFA	NBD	PEFA	NBD	NBD
3	1	4	NBD	NBD	NBD	PEFA	RLHA	RLHA	NBD
4	-	4	RLHA	RLHA	NBD	RLHA	NBD	NBD	RLHA

Figure 4. Rule-based approach used to assign nesting sites to nesting territories. A cluster of four nesting sites within 1 km of one another that exhibit a site occupancy history among seven years for two species (PEFA and RLHA). Nesting Sites 1 and 2 (blue circles with blue borders) have been occupied solely by PEFA. Nesting Site 4 (red circle with red border) has been occupied solely by RLHA. Nesting Site 3 (blue circle with red border) has been occupied by both PEFA and RLHA. In this example, Nesting Sites 1, 2 and 3 are grouped into a single PEFA Nesting Territory and assigned Nesting Territory ID 1 based on PEFA-specific tenure length (Nesting Site 1 has the longest tenure) and first tenure. Nesting Sites 3 and 4 are grouped into a single RLHA Territory and assigned Nesting Territory ID 4 based on RLHA-specific tenure length (Nesting Site 4 has the longest tenure) and first tenure. Unique nesting locations are ultimately defined by a Nesting Territory ID and a Nesting Site ID (E.g., NT ID 1, NS ID 2). NBD = no birds detected.

**Figure 5**



*Figure 5. All known nesting sites in the Rankin Inlet region surveyed (n= 247 left), known peregrine falcon nesting sites (n= 108; middle), and known rough legged hawk nesting sites (n= 143; right). Count of nesting sites for other raptor species and common raven are reported in in Table 2. Also shown are roads (red lines) and trails (black lines), the project footprint (grey polygon), and the boundary of the regional study area (grey).*

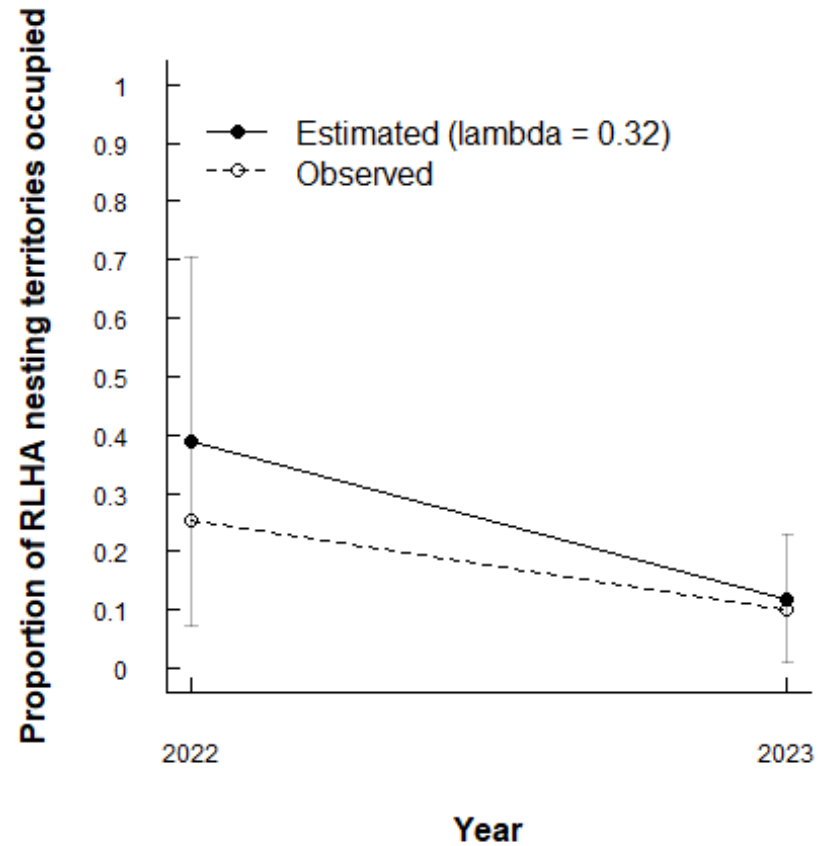
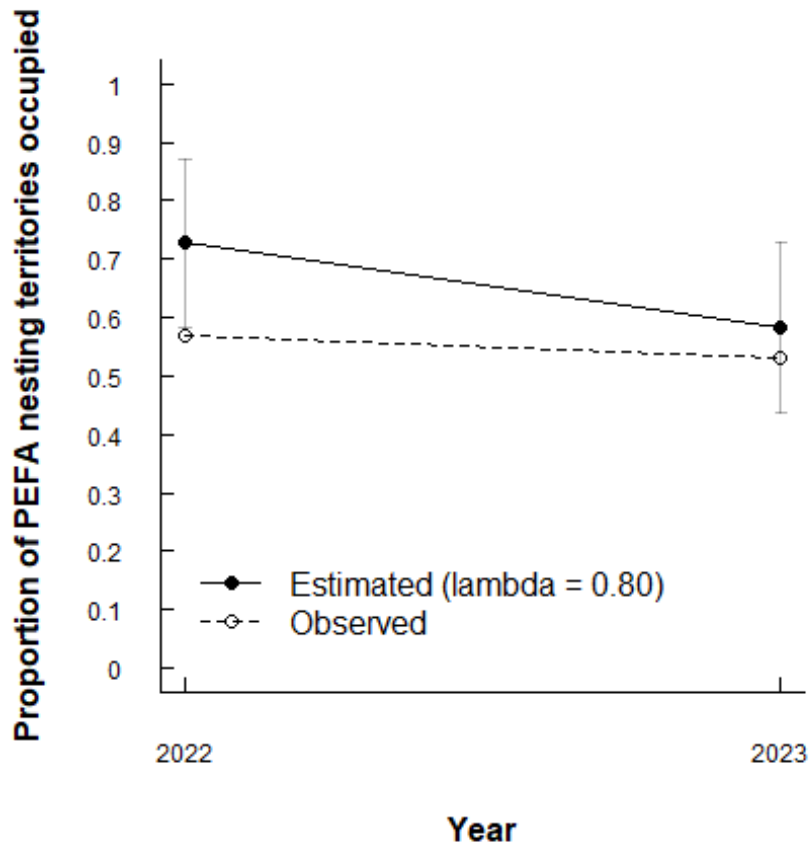


Figure 6 Estimated trend in occupancy for peregrine falcons (L) and rough-legged hawks (R) using annual occupancy probabilities to calculate average rate of change ( $\lambda$ ) at the population level, where  $\lambda < 1.0$  indicates population decline and  $\lambda > 1.0$  indicates an increase.

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**APPENDIX E**

**Den Survey, 2023**



# AGNICO EAGLE

MELIADINE GOLD MINE

## 2023 Den Survey

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**Prepared for:**  
Nunavut Impact Review Board

**Prepared by:**  
Agnico Eagle Mines Limited – Meliadine Division

**FEBRUARY 2024**

### DOCUMENT CONTROL

Version	Date (YMD)	Section	Page	Comment
R0				Initial report

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## ABBREVIATIONS AND UNITS

Agnico Eagle	Agnico Eagle Mines Limited
AWAR	All-Weather Access Road
CK	Community Knowledge
cm	centimeter
InK	Indigenous Knowledge
IQ	Inuit Qaujimajatuqangit
IQn	Inuit Qaujimaningit
km	kilometer
ha	hectare
m	meter
NIRB	Nunavut Impact Review Board
RIBR	Rankin Inlet Bypass Road
TEMMP	Terrestrial Environment Management and Monitoring Plan
TK	Traditional Knowledge

## 1 INTRODUCTION

### 1.1 BACKGROUND

Agnico Eagle Mines Limited (Agnico Eagle) is operating the Meliadine Mine, located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut. In February 2015, Meliadine was issued the Project Certificate No. 006 from the Nunavut Impact Review Board (NIRB) with Amendment No. 001 in February 2019 and Amendment No. 002 in March 2022 to reflect modifications to the Meliadine Gold Mine as proposed in the Saline Effluent Discharge to Marine Environment Proposal (Waterlines Proposal).

The Waterlines Proposal included the installation of dual waterlines along the All-weather Access Road (AWAR) and the Rankin Inlet Bypass Road (RIBR) for the conveyance of treated saline effluent from the Meliadine Mine site to Itivia Harbour in Rankin Inlet. Construction of the waterlines began in 2023.

In accordance with Term and Condition 53 of the NIRB Project Certificate No. 006 (Amendment No. 002):

---

*“Prior to construction of Project infrastructure including the waterlines and Phase 2 of the all-weather access road, the Proponent shall conduct a survey that is sufficient to locate any dens of foxes, bears or wolverines that could be damaged or destroyed during construction or operation of the Project.”*

---

In addition, the Terrestrial Environment Management and Monitoring Plan (TEMMP) also specifies that den surveys for fox, bears, and wolverines should be undertaken prior to construction of Project infrastructure and Phase 2 of the AWAR.

Carnivore species around the Project site include the following:

- Arctic fox (*Alopex lagopus*);
- Grey wolf (*Canis lupus*);
- Polar bear (*Ursus maritimus*);
- Barren ground grizzly (*Ursus arctos*); and
- Wolverine (*Gulo gulo*).

### 1.2 INUIT QAUJIMAJATUQANGIT

Agnico Eagle aims to incorporate Inuit Qaujimaningit (IQn), Inuit Qaujimajatuqangit (IQ), Traditional Knowledge (TK), Community Knowledge (CK), Indigenous Knowledge (InK) in wildlife mitigation and monitoring. Agnico Eagle acknowledges that IQn, IQ, TK, CK, InK is continually learnt and continues to be gathered through various engagements related to the Meliadine Mine. This section highlights IQ, TK and others for better understanding the importance of furbearers for the local communities since time immemorial.

According to the Final Environmental Impact Statement (FEIS; Golder 2014), between 1900 and 1950, trapping foxes was a predominant winter occupation for the Inuit of Rankin Inlet, Whale Cove, and Chesterfield Inlet (Riewe 1992; Freeman 1976). Traplines located near food caches could stretch as long as 160 km. The Meliadine valley area was extensively harvested back then for that purpose (Nanuk Enterprises 2011). Foxes were trapped for their fur. Wolves and wolverines were hunted when encountered due to their interference with food caches and traps, but also due to their high pelt value (Nanuk Enterprises 2011; Riewe 1992; Freeman 1976). Trapping furbearer species provided local Inuit with skins for trade at the small posts along the coast during spring and summer months (Nanuk Enterprises 2011).

Since 1950, trapping has declined but is still taking place by few people in the communities (Nanuk Enterprises 2011). Baseline studies from 1999 indicated that Arctic foxes remain abundant in the area and represent the main species harvested by trappers (Golder 2014).

Polar bears are the most important marine mammals to the people of Rankin Inlet, Whale Cove, and Chesterfield Inlet, in particular for the Inuit hunters (Burt and Hickey 2012). Even if polar bears are rarely seen, polar bears represent an importance to Inuit culture, identity, a strong connection with the land, and Inuit traditional ways of life (Tomaselli et al 2022). A small quota of polar bears is allowed to be hunted reaching a fine balance between the polar bear population concerns and community safety. They were traditionally hunted using harpoons then carried by dogs for their skins, meat and fat (Burt and Hickey 2012). Today, polar bears still a source of country food to local Inuit Elders that is shared in the communities. Polar bears sustain traditional lifestyle and constitute an important community income for locals associated with the tourism and hunting outfitters industries (Burt and Hickey 2012, Nanuk Enterprises 2011). The hide can be sold or used for clothing, as blankets or as mattresses. Skulls, teeth and claws can be carved and sold as jewelry (Tomaselli et al 2022). The area most suitable for polar bears is along the coast. Specifically in the vicinity of the Mine site, the lower Meliadine valley and the lowlands areas were identified to potentially being more suitable for polar bears (Nanuk Enterprises 2011).

In the FEIS, Elders mentioned that grizzly observations were increasing along the coast of Hudson Bay (Golder 2014). Elders also mentioned that they were commonly seen between the Diana River and Meliadine River area and therefore considered as a safety threat to humans and cabins. Grizzlies are consequently hunted if they are seen as a precaution instead of being purposefully hunted for food (Golder 2014).

### 1.3 PURPOSE OF THIS DOCUMENT

This document was prepared to address the above referenced Term and Condition 53, and aims to:

- Summarize den survey methodology;
- Locate carnivore dens that could be impacted by the mining activities or mining-related activities;
- Present the results from the den survey conducted around the Mine site, AWAR, RIBR, proposed Discovery Road, and along the waterline proposed routing; and
- Summarize the mitigation measures to be implemented when dens are found in and around construction site(s).

## 2 METHODS

The den survey consisted of visual observations of den openings generally located on sandy and/or vegetated mound or ridges with a gentle south-facing slope, which are indicators of suitable ground for a den (Macpherson 1996; Lai and Berteaux 2013). Signs of wildlife such as animal observations, tracks, scats, bones, trail conditions, fresh digging were also used to determine the species using the den and if the den was active in 2023 (Elbroch 2003; Murie 1989). When a den was found:

- Location was recorded using a GARMIN map 78s;
- Pictures of the den and the surrounding habitat were taken;
- Den openings were measured; and
- Signs of wildlife were documented.

Appendix A further describes the den characteristics for furbearer species targeted. However, the emphasis of this report is on the Arctic fox as it is the only known species to den in the area during the survey period.

The circumstance under which den surveys were conducted varies. Most of the surveys occurred opportunistically while conducting other tasks in the vicinity. In other occasion, they were conducted prior to the construction of project infrastructure to verify den presence and if it was active. In a few instances, den locations were reported from other departments.

Depending on the locations, the distances, or the areas to cover, surveys were conducted by environmental technicians and/or biologists walking or driving all-terrain vehicles (ATV). When mining-related activities were planned within the setback distance of known dens, the locations were revisited to assess if the den was active. In that situation, the use of drone, binoculars, or trail cameras were used to limit disturbance. Table 1 summarizes the various tundra sections surveyed between May 2023 and August 2023 with their approximative locations.

**Table 1: Tundra Areas Surveyed specifically for dens at the Mine Site, along the Roads and the Waterline in 2023.**

Location	Sections	Area Surveyed (ha)	Total Area Surveyed (ha)
Mine Site	Northeast	0	30.2
	North	0	
	Northwest	2.2	
	Southwest	27.6	
	Southeast	0.4	
Access Roads	Discovery	26.0	26.0
Waterline	AWAR	80.0	85.4
	RIBR	0.0	
	Apache Bypass	5.4	
<b>Total 2023</b>			<b>141.6</b>

### 3 RESULTS

During the 2023 den survey, 7 dens were revisited as identified in Table 2. Figure 1 shows the den locations. Before the start of the waterline construction, the dens Fox-2022-1 and Fox-2022-2 were visited using a drone and binoculars on May 27<sup>th</sup> to see if the dens were active. At the time of the survey, no sign of activity was observed.

Throughout the summer of 2023, a total of 4 new fox den locations were found; 3 of them were reported to be active in 2023. An active den was found along the proposed Discovery Road, two dens were found along the Apache Bypass area and the last one was found west of the Mine site (Table 2, Figure 1). The pictures of the dens can be found in Appendix B.

It should be noted that during revisiting of 2022 dens in 2023, it was determined that 3 of the dens initially identified as fox dens are most likely siksik burrows, as indicated in Table 2. These dens will not be revisited in future surveys as they did not present carnivore den characteristics.

**Table 2: List of Fox Dens Visited in 2023**

Fox Den Number	Location	UTM Zone 15 NAD 83		Den Area (m <sup>2</sup> )	Active in 2023
		Easting	Northing		
<b>Known dens revisited in 2023</b>					
Fox-2022-1	AWAR	541443	6987064	25	No
Fox-2022-2	AWAR	541562	6987030	300	No
Fox-2022-4	Site	536995	6990914	30	Unknown
Fox-2022-5	Site	537301	6990794	30	No – Most likely siksik burrow
Fox-2022-6	Site	538991	6988119	60	No
Fox-2022-8	Site	541971	6988814	25	No – Most likely siksik burrow
Fox-2022-9	Site	542139	6989139	40	Unknown – Most likely siksik burrow
<b>New dens in 2023</b>					
Fox-2023-1	Site	537655	6988311	300	Yes-Fox
Fox-2023-2	Discovery Road	547534	6981527	150	Yes-Fox
Fox-2023-3	Apache Bypass	543315	6968010	30	Yes-Fox
Fox-2023-4	Apache Bypass	543395	6968750	40	Yes-Siksik observed at time of assessment

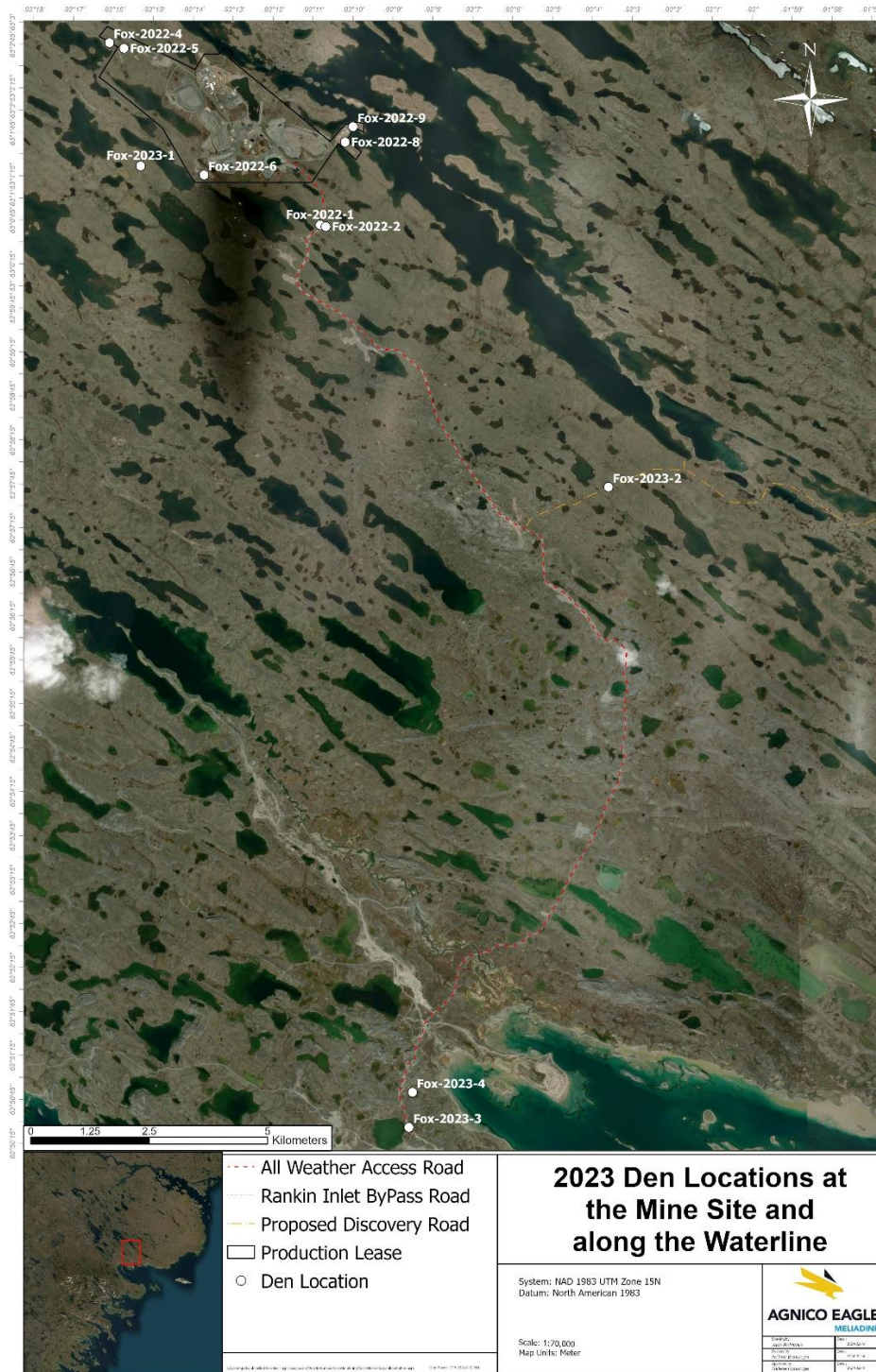


Figure 1: 2023 Den Locations at the Mine Site and along the Waterline

## 4 MITIGATION MEASURES

This section presents the recommendations in the situation where construction activities are within the recommended setback distances of an active den. The recommended construction setbacks are a protection buffer zone around a den where further mitigation measures will be implemented as described below. The setback distances depend on the species, the time of the year and the type of construction activities. The relevant recommended construction setbacks are presented in Table 3.

**Table 3: Recommended Construction Setbacks per Species.**

Species	Construction Setbacks	Sensitive period	Type of activity
Fox dens	150 m	May 1-Sept 15	General industrial activity
Wolf dens	800 m	May 1-Sept 15	General industrial activity
Bear dens polar bear, grizzly	800 m	Sept 30-Mar 30	General industrial activity
Bear dens polar bear, grizzly	1500 m	Sept 30-Mar 30	Blasting
Wolverine dens	2000 m	Oct 15-July 15	General industrial activity

Source: GNWT 2016

Precautions will be taken to not damage or destroy dens. In the situation where a new den is discovered, the Environment Department will be contacted to implement mitigation measures. Otherwise, the mitigation measures of known den locations will consist of:

- Incorporating known den locations and setback distances on the construction plans (drawings and engineering specifications);
- Delineating protective areas clearly at the working site;
- Minimizing the footprint to what is necessary for construction;
- Informing the workers in the area when work is performed at proximity of the dens;
- Keeping the working site clean and free of garbage that could impact or attract wildlife;
- Avoiding harassing wildlife; and
- Implementing the Wildlife Encounter and Deterrence found as an appendix in the TEMMP.

## 5 CONCLUSION

In conclusion, den surveys were completed in summer of 2023 at the Meliadine Mine Site, along a section of the proposed waterlines alignment and proposed Discovery Road. The focus was on Arctic fox as the survey was conducted during their denning period. A total of 4 new den locations were found and 7 dens were revisited. Four (4) dens have been identified as active in 2023, of which 3 were used by foxes and 1 by siksiks. The recommended construction setback of 150 m was applied at active fox dens and mitigation measures as described in Section 4 were implemented in the situation where construction activities were closer than the setback distance. The fox den habitat was protected even when inactive.

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## APPENDIX A. DEN CHARACTERISTICS PER SPECIES

**Table A-1: Den Characteristics per Species**

Species	Den Characteristics
Arctic fox	<ul style="list-style-type: none"> <li>• Locate on mounds, ridges, slopes, or riverbanks.</li> <li>• Excavate from sandy soil or other well-drained substrate where active layer over permafrost is deeper.</li> <li>• Situate on south facing or early thawed areas.</li> <li>• Can be found under large rocks and boulders.</li> <li>• Dens openings are 15-20 cm in diameter. (Lai and Berteaux 2013; Hendrickson et al 2005)</li> </ul>
Grey wolf	<ul style="list-style-type: none"> <li>• Excavate in eskers, ridges of gravel and sand formed by melting glaciers.</li> <li>• Can take over dens of other animals (foxes, ground squirrel).</li> <li>• Close access to caribou. (Hendrickson et al 2005; Cluff et al 2002)</li> </ul>
Polar bear	<ul style="list-style-type: none"> <li>• Excavate soil on land along the slopes of fiords, on peninsulas or islands with sufficient snow cover in early winter for the construction of the dens or on moving multi-year ice and areas of annual rough ice.</li> <li>• Maternity dens in hilly or mountainous coastal areas with good snow coverage (including in proximity of glacier complex), landscape features facilitating snowdrift formation, and abundant preys.</li> <li>• Females typically give birth to cubs in maternity dens in December and January, and leave their dens around March or April at the time of year when ringed seal pups are born. (Nirlungayuk et al. 2016; Tomaselli et al 2022)</li> </ul>
Barren ground grizzly	<ul style="list-style-type: none"> <li>• Excavate in soil.</li> <li>• Rock cavity dens are either caves or cavities in boulder piles.</li> <li>• Locate mid to upper slope positions. (Hodder et al 2014)</li> </ul>
Wolverine	<ul style="list-style-type: none"> <li>• Rocky scree slopes, along eskers, within hard packed snowdrifts or under snow-covered boulders.</li> <li>• Snow greater than 1 m deep, distributed uniformly or accumulated in drifts.</li> <li>• Long, complex snow tunnels in hardened snowdrifts characterize den sites in tundra and alpine areas, and in some cases, the tunnels lead down to entrances under boulders.</li> <li>• Denning period (February-May). (Wolverine Foundation online; Awan et al. 2020)</li> </ul>

**APPENDIX B. DEN SURVEY PHOTOS**



**Photo 1: Fox-2023-1 West of Site on August 20<sup>th</sup>, 2023.**



**Photo 2: Fox-2023-1 West of Site on August 14<sup>th</sup>, 2023.**



**Photo 3: Fox-2023-2 along proposed Discovery Road on August 10<sup>th</sup>, 2023.**



**Photo 4: Fox-2023-3 at Apache Bypass on July 19<sup>th</sup>, 2023.**



**Photo 5: Fox-2023-4 at Apache Bypass on July 19<sup>th</sup>, 2023.**



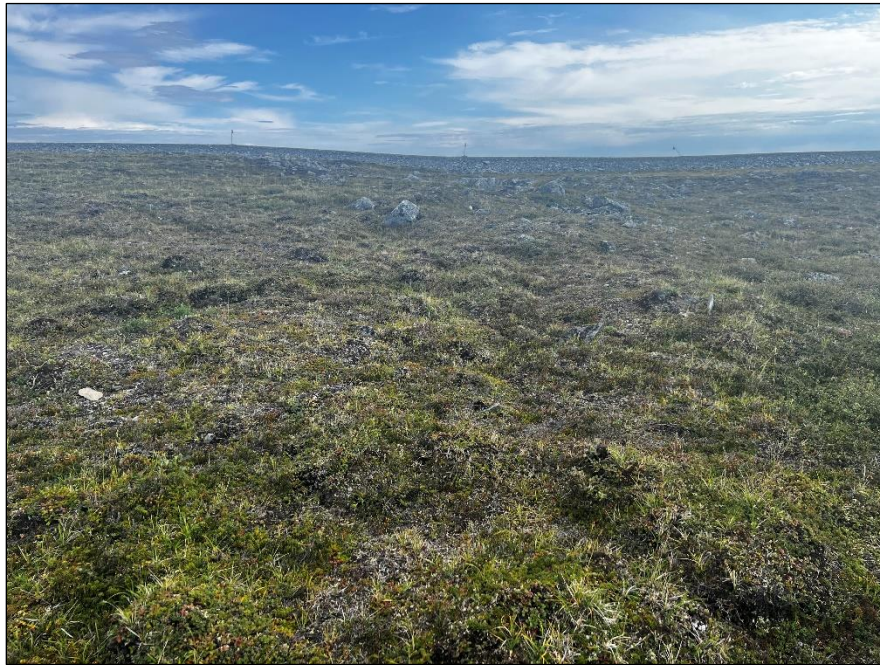
**Photo 6: Fox-2022-1 on May 27<sup>th</sup>, 2023.**



**Photo 7: Fox-2022-2 on May 27<sup>th</sup>, 2023.**



**Photo 8: Fox-2022-4 on August 12<sup>th</sup>, 2023.**



**Photo 9: Fox-2022-5 on August 12<sup>th</sup>, 2023.**



**Photo 10: Fox-2022-6 on May 27<sup>th</sup>, 2023.**



**Photo 10: Fox-2022-8 on August 12<sup>th</sup>, 2023.**



**Photo 11: Fox-2022-9 on August 12<sup>th</sup>, 2023.**

**APPENDIX F**

**Meliadine Project Caribou Behaviour Study, 2023**



# Meliadine Mine

## Caribou Behaviour Study, 2023

PREPARED FOR



**AGNICO EAGLE**

Agnico Eagle Mines Limited

DATE

March 2024

REFERENCE

0689548-02



## ACKNOWLEDGEMENTS

# Meliadine Mine

## Caribou Behaviour Study, 2023

March 2024

This report was authored by Mitch Fennell (MSc), Dr. Arianne Albert (PhD), and Dr. Greg Sharam (PhD) of ERM Consultants Canada Ltd. (ERM), for Agnico Eagle Mines Limited (Agnico Eagle). Caribou behaviour data were collected by ERM and Agnico Eagle staff in 2023, using protocols described herein. Data collection and analytical approaches were designed with the collaboration of the Meliadine Terrestrial Advisory Group, whose input the authors gratefully acknowledge.

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CLIENT: Agnico Eagle Mines Limited

PROJECT NO: 0689548-02

DATE: March 2024

VERSION: D.1

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## ACRONYMS AND ABBREVIATIONS

Agnico Eagle	Agnico Eagle Mines Limited
AIC	Akaike information criterion
ATV	All-terrain vehicle
AWAR	Meliadine Mine All-Weather Access Road
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
BQCMB	Beverly Qamanirjuaq Caribou Management Board
ERM	ERM Consultants Canada Ltd.
GLMMs	Generalized linear mixed-effects models
GN	Government of Nunavut
GNWT ENR	Government of Northwest Territories Department of Environment and Natural Resources
IOL	Inuit Owned Land
IQ	Inuit Qaujimajatuqangit
KivIA	Kivalliq Inuit Association
km	Kilometre
km/h	Speed expressed as kilometres per hour
m	Metre
the Mine	The Meliadine Mine
NIRB	Nunavut Impact Review Board
NWT	Northwest Territories
TAG	Terrestrial Advisory Group
T&C	Terms and Conditions
TEMMP	Terrestrial Environment Management and Monitoring Plan
TK	Traditional Knowledge

## EXECUTIVE SUMMARY

The Meliadine Mine (the Mine), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km directly north of Rankin Inlet, Nunavut. A 30 km All Weather Access Road (AWAR) connects the Mine to Rankin Inlet. Groups of caribou from the Qamanirjuaq herd are present in the Mine area during June and July each year, some crossing through the Mine site and the AWAR.

As part of the Nunavut Impact Review Board (NIRB) Project Certificate #006, Agnico Eagle is required to report on the effects of the Mine on caribou behaviour (Term and Condition 57, b.). To support fulfillment of this condition, the Agnico Eagle Terrestrial Environment Management and Monitoring Plan (TEMMP) includes a behaviour monitoring program to determine if there are changes to behaviour i) with distance to the Mine and ii) in response to disturbances such as passing vehicles.

Behaviour monitoring was conducted annually from 2020 to 2023. Agnico Eagle retained ERM Consultants Canada Ltd. (ERM) to update the field protocols used for behaviour monitoring in early 2020. ERM adapted standard methods for caribou behaviour monitoring developed by the Government of Northwest Territories Department of Environment and Natural Resources (GNWT ENR). Following the first year of data collection in 2020, the protocols were updated for the 2021 season to improve the quality of the data collected. Methods for behaviour monitoring during the 2022 and 2023 seasons were unchanged from 2021.

Following the discussion of the caribou behaviour survey results in 2020 and 2021, the Kivalliq Inuit Association (KivIA) suggested several improvements to the survey protocol and analysis methods. A Terrestrial Advisory Group (TAG) was formed in 2022 and formalized by establishing Terms of Reference in early 2023 as a collaborative forum to discuss Inuit Qaujimagatuqangit (IQ), Traditional Knowledge (TK) and western science applications to mitigation and monitoring programs related to the protection of terrestrial wildlife and wildlife habitat for the Meliadine Mine, including on caribou movement in the Mine area. Agnico Eagle has endeavored to incorporate the suggestions of the TAG into the 2023 analysis.

Field surveys were conducted during June and July 2023 by an ERM wildlife biologist and an Agnico Eagle environmental technician dedicated to behaviour monitoring. In addition, Agnico Eagle environmental technicians were trained to conduct behaviour surveys on an opportunistic basis while conducting other duties. Each survey lasted 30 minutes, with scan samples conducted every three minutes. Data was analyzed across years 2020-2023 for this report.

The behaviour monitoring program in 2020-2023 had several key results:

- Forty-two surveys were conducted in 2023 with peak caribou activity observed between June 17 and June 27. This aligned with the timing from 2022 and was slightly earlier than the peak in 2021 and 2020. The data from 2020 to 2023 were combined for a total of 213 surveys across four years.
- Small groups (<25 caribou) tended to have a higher proportion of response behaviours (running, alert) than larger groups, irrespective of disturbances. Groups within 300 m of the

road also tended to have a higher proportion of response behaviours than those further away. This was apparent in all four survey years (2020 to 2023).

- Caribou mostly exhibited the non-response behaviours of standing, laying, and feeding. Statistical analysis indicated a trend for caribou at greater distance from the road (> 300 m) to have a lower proportion of response behaviours. Distance to the road was also linked to walking behaviour when grouped with alert and trotting behaviours, suggesting potential for walking as a response to disturbance. Walking behaviour has previously been considered a non-response behaviour, and as such models presented in this report include versions with walking designated as a potential response behaviour, as well as models with walking designated as a non-response behaviour for comparison.
- These results together suggest that within approximately 300 m of the road caribou are more alert and active.
- Approximately half of the surveys included a disturbance event, typically from essential Mine vehicles, mostly pickups and all-terrain vehicles (ATVs) used by community members on the Awaracuk Road (AWAR) for travel. The AWAR was closed to Mine vehicles (with the exception of approved convoys and the survey vehicle) when caribou were near the road and all Mine vehicles are required to stop when caribou are on the road. Note that surveys were conducted specifically to record responses to disturbances, so the proportion of surveys with disturbances is higher than the actual proportion of caribou exposed to disturbances.
- In 2023, the AWAR was closed near Rankin Inlet by the GN Conservation Officer and Kangiqliniq Hunters and Trappers Organization to all traffic (including local hunters) during periods of increased caribou sensitivity.
- Following a disturbance event, the proportion of response behaviours in a group of caribou rose, but typically returned to baseline behaviours within two sampling periods (six minutes). Caribou were statistically more likely to be walking, alert, or running in sampling periods where a disturbance occurred (i.e., a passing vehicle).

The survey protocols incorporate feedback from previous years of data and analysis, which were helpful in improving the overall quality and accuracy of the data. Interestingly, even with these changes, the trends in the results were highly consistent among the four years of data. This increases the confidence that trends are repeatable year to year. Overall, the results of the statistical analysis provided support for the key hypothesis that caribou tend to respond to disturbances, particularly when they are close to the road. However, the analysis also found that the effects of disturbances are likely short lived, with caribou returning to non-response behaviours within a short period of six or less minutes.

## 1. PROJECT OVERVIEW

The Meliadine Mine (the Mine), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km directly north of Rankin Inlet, Nunavut. A 30 km all weather access road (AWAR) connects the Mine to Rankin Inlet. The Rankin Inlet By-pass Road was constructed to the west and south of Rankin Inlet to allow mine traffic to circumvent the hamlet of Rankin Inlet when traveling from the AWAR to Itivia Harbour (i.e., Melvin Bay) southwest of Rankin Inlet (Figure 1-1).

The Meliadine Mine was approved by the Nunavut Impact Review Board (NIRB) in 2015 (Project Certificate #006) with a life of mine plan that includes production from five ore bodies. The mine plan includes open pits, underground mining and associated ore processing, waste management and ancillary infrastructure. Construction of the AWAR, camp, ore processing facilities and ancillary infrastructure began in 2017, and production began in Q2 2019. In 2019, the Meliadine Mine NIRB Project Certificate (#006 No. 001) was amended to include discharge of treated saline effluent to the marine environment via diffuser at Itivia Harbour and to convey via truck treated saline effluent along the AWAR to Itivia Harbour. In 2022, the Project Certificate (#006 No. 002) was further amended to allow for the construction of a 34 km waterline, which consists of two 16-inch diameter waterlines needed to convey treated saline effluent from the Mine to Itivia Harbour.

Caribou behaviour studies were conducted in June and July 2020, 2021, 2022, and 2023 at the Meliadine Mine and along the AWAR in support of existing NIRB conditions as outlined in Project Certificate #006 and the associated amendments.

### 1.1 TERRESTRIAL ENVIRONMENT MANAGEMENT AND MONITORING PLAN

The 2015 Project Certificate and 2019 and 2022 Project Certificate Amendments from the NIRB, Term and Condition 57 requires the Mine to report in its annual NIRB report:

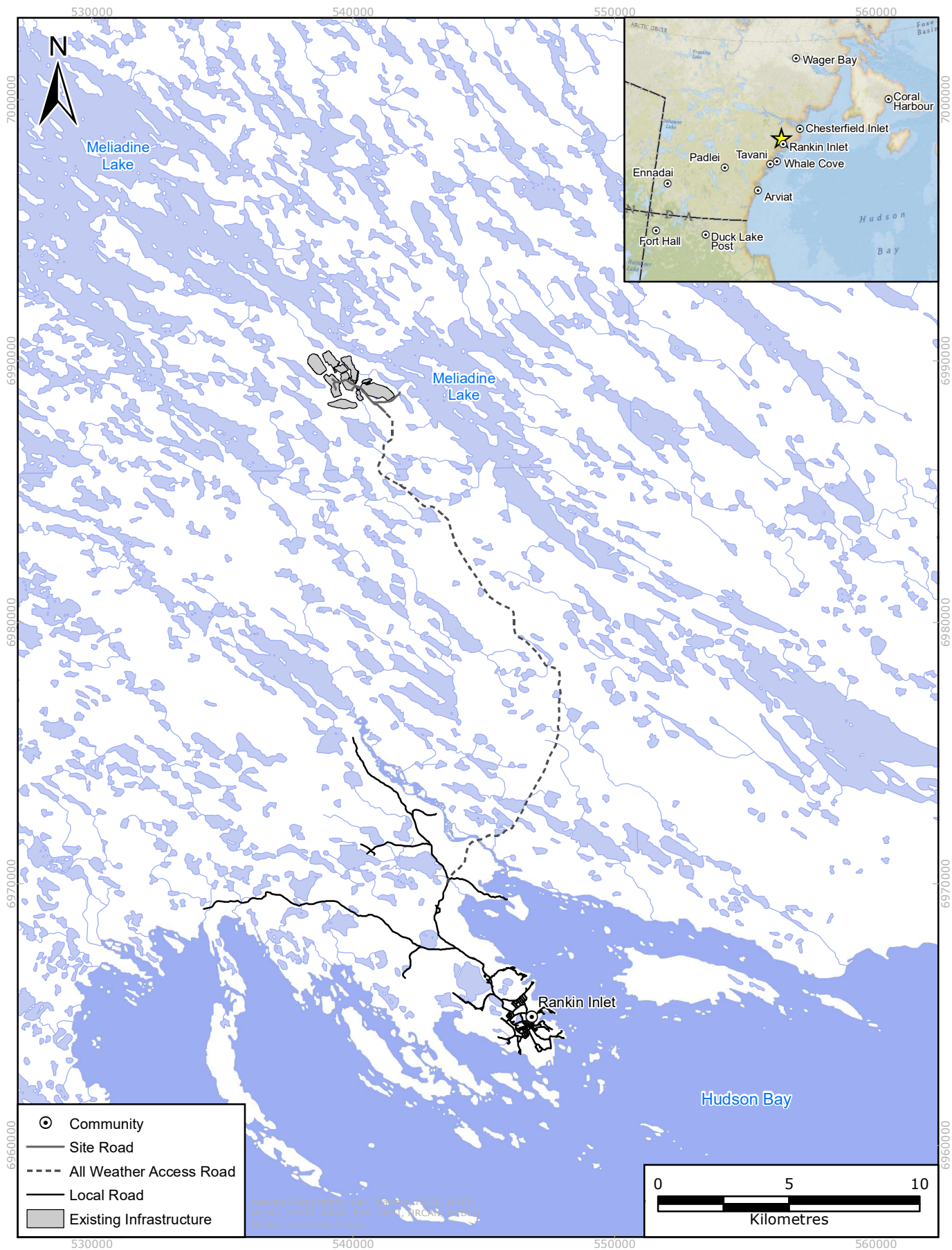
(T&C 57, b.) A detailed analysis of wildlife responses to operations with emphasis on wildlife behaviour, mortalities and displacements (if any), responses to operations of the all-weather access road and associated access roads/trails, and the waterlines;

The Meliadine Mine Terrestrial Environment Management and Monitoring Plan (TEMMP; Agnico Eagle 2022) is designed to meet this condition, with a behaviour monitoring program (Section 4.5) that has two objectives:

- "To determine if caribou activity budgets change with distance from the mine, and to document caribou response to stressors.
- To determine if caribou distribution changes with proximity to the mine (i.e., do caribou avoid the mine)."

The behaviour monitoring program described in this report is designed to address the first of these objectives, while the second objective is met via broader scale location-based GPS collar analyses. The TEMMP also specifies mitigation measures for traffic on the AWAR when caribou are in the area, namely that the AWAR must be closed to non-essential mine traffic when 50 or more caribou are within 100 m of the road.

FIGURE 1-1 MELIADINE GOLD MINE LOCATION



## 2. STUDY OBJECTIVES

The overall objective of the caribou behaviour monitoring program as stated in the TEMMP is:

- To determine if caribou activity budgets change with distance from the mine, and to document caribou response to stressor.

Per the Project Certificate (T&C 57, b), a detailed analysis of caribou responses to operations of the AWAR is required at the Mine. This report serves to summarize this analysis, investigating patterns both within years and across multiple years of collected data. The intent of the 2023 study was:

1. To conduct a study using behaviour survey methodology at the Mine site to estimate how the AWAR and Mine infrastructure may contribute to the effects of the Mine on caribou.
2. To use information from the surveys (combined across four years of data collection) to determine which factors predict caribou behaviour near the Mine site, specifically looking at distance, group size, and vehicle disturbances.

The primary hypothesis of this study was that caribou closer to the road would demonstrate a stronger response to vehicle disturbances.

## 3. BACKGROUND

### 3.1 QAMANIRJUAQ HERD

The Qamanirjuaq caribou subpopulation is a large barren-ground caribou herd numbering approximately 288,000 animals in 2017, down from over 348,000 animals reported in 2008 (Boulanger et al. 2018) but consistent with the population size in the 1980s (COSEWIC 2016).

The Beverly and Qamanirjuaq Caribou Management Board (BQCMB) rated the Qamanirjuaq herd as having “Medium” vulnerability in 2014 due to population declines since 2008 (BQCMB 2014) and upgraded this rating to “Medium-High” in 2016, a status that remains unchanged (BQCMB 2021).

Spring migration brings the caribou north along the coast of Hudson Bay, past the communities of Arviat, Whale Cove and Rankin Inlet to a broad calving ground generally centered on Qamanirjuaq Lake (BQCMB 2023).

Following calving, the caribou form into large groups of hundreds to thousands and radiate out from the calving grounds, including east towards the coast. During June and July, groups of animals from this herd migrate in proximity to the hamlet of Rankin Inlet, the Meliadine Mine and the AWAR connecting the two.

During summer and fall, the caribou generally move south and inland, gradually returning south towards their wintering areas by early December. Maps of the caribou range and movement are available on the BQCMB website (<https://arctic-caribou.com/resources/>).

### 3.2 TERRESTRIAL ADVISORY GROUP

A Terrestrial Advisory Group (TAG) was formed in 2022 and formalized via creation of the Terms of Reference in 2023 as a collaborative forum to discuss the application of Inuit Qaujimajatuqangit (IQ), Traditional Knowledge (TK) and western science to mitigation and monitoring programs for caribou movement in the Mine area. Members of the group include the local, regional, territorial, and federal governments, as well as Indigenous groups.

Wherever sample size allowed, suggestions made by the TAG have been added into the 2023 analysis. It was also suggested by the TAG that in future years, a variable for caribou movement direction relative to the road should be added and additional information collected on the speed of passing vehicles. Agnico Eagle has endeavored to incorporate the suggestions of the TAG into the 2023 analyses presented in this report.

## 4. STUDY AREA

The study area for behaviour monitoring included the existing Mine footprint, or the Meliadine Mine site and the AWAR (see Figure 1-1). Surveys were conducted on any caribou that could be visually observed from Mine infrastructure (including the AWAR) up to 3 km away with the aid of binoculars or a spotting scope.

The dominant terrain in the Mine area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and lakes. A series of low relief ridges are composed of glacial deposits, oriented in a northwest-southeast direction, which control the regional surface drainage patterns. The Mine area is approximately 60 metres above sea level in low-lying topography with numerous lakes (Final Environmental Impact Statement; Agnico Eagle 2015).

## 5. METHODS

### 5.1 FIELD SURVEYS

Survey methods followed protocols for monitoring caribou behaviour developed by the GNWT ENR (2017). In 2020, ERM refined these methods for Agnico Eagle's Nunavut mine operations. The updated methods focus on scan samples, *in lieu* of both scan and focal samples. Given time and personnel constraints, this was determined to be a more efficient use of time and produce better quality data that is suitable for statistical analysis. The updated methods also include an initial survey step to randomize which group of caribou to monitor when multiple groups are available. In 2021 these methods were further refined to reflect lessons learned in 2020. The 2021 updates included using a rangefinder to measure distance and recording additional information such as whether the caribou occurred on the east or west side of the road. The methodology used in 2022 and 2023 included the 2021 updates but was otherwise unchanged. Detailed protocols are attached in Appendix A.

Prior to the arrival of caribou in June, a wildlife biologist from ERM conducted a classroom and practical training program for Agnico Eagle environmental technicians from the Mine. The ERM wildlife biologist with an assistant was tasked with conducting behaviour observations as a primary role during July, while Meliadine technicians conducted behaviour observations opportunistically during other fieldwork in alignment with the TEMMP.

The overall method for the field surveys was to identify caribou groups visible from the mine site and AWAR, to select some groups for observation and to record the behaviour of individuals in groups of different sizes including their responses without any disturbance and in response to mine-related activities and natural factors. Surveys were conducted in late June and early July during the post-calving and early summer periods, when caribou pass through the Mine area in large numbers.

Field methods included the recording of site information at the location of each survey, including GPS coordinates, weather conditions, road structure, and location of the caribou group in relation to the surveyors and the road. Individuals in the observed -group were categorized when the survey started and every three minutes (referred to here as a "time interval") until 30 minutes had elapsed.

Behaviour categories and their definitions were standardized following GNWT ENR (2017) classifications. The behaviour categories were feeding, lying down, standing, alert, walking, and trotting or running.

At each three-minute interval, surveyors recorded the numbers of individuals in the group exhibiting each behaviour at that time. If the group was too large to be counted in each interval (>100 individuals), an identifiable subset of the group was surveyed during each interval and the total group size was recorded on the datasheet. In the case that a disturbance event occurred during the survey, the time and type of disturbance was recorded. A disturbance is defined as any human-caused loud noise, low-flying aircraft, or vehicle travelling on the road.

Alert behaviour and trotting or running were considered disturbance “response behaviours” and were grouped together in the subsequent data analysis. In this report, alert and running behaviours are referred to collectively as response behaviours, but it is important to note that this is irrespective of whether there were disturbances recorded. Caribou may exhibit these behaviours without a disturbance occurring. Walking was also assessed as a response behaviour in some analyses, which are specifically noted in the results.

## 5.2 DATA ANALYSIS

The objective of the data analysis was to quantify trends in the survey data, and determine whether factors such as distance to infrastructure, group size, or disturbances could be used to explain caribou behavior. The primary hypothesis was that caribou closer to the road would demonstrate a stronger response to disturbances. An initial exploratory analysis was conducted to visualize the data and determine the appropriate method for analyzing the data.

A regression analysis was conducted to test for statistically significant trends in the data. To increase the statistical power to detect changes in caribou behaviour, the behaviour categories were grouped for analysis into “response” behaviours (alert and running) and non-response behaviours (feeding, lying down, standing, and walking).

Following the 2021 analysis there was a suggestion from the TAG to explore whether the proportion of walking caribou changed as a response to disturbance. This was done to see if walking would be better categorized as a response behaviour or a non-response behaviour. To test this, a model that included walking, running, and alert behaviours was conducted in addition to the original model with just running and alert behaviours.

Generalized linear mixed-effects models (GLMMs) were used to assess the differences in the proportion of response behaviours in surveyed animals as a function of various controlling variables, including the occurrence of disturbances. Proportions were modelled using a binomial distribution. Because small groups naturally have greater variability in values (i.e., more likely that “all” or “none” of caribou are alarmed when there are only two caribou) an offset was included for the total number of caribou with tallied behaviour. This regression framework provides a means to control for environmental variables, repeated measurements, and spatial correlation. Random effects were included for survey ID, and Year to control for spatial and temporal autocorrelation.

Statistical analyses were conducted using R Statistical Software version 4.3.1 (R Core Development Team 2023). Two dependent variables were tested:

1. The first dependent variable tested was the proportion of response behaviours (alert and running) in each 3-minute interval in each survey.
2. The second dependent variable tested was the proportion of walking plus response behaviours in each 3-minute interval in each survey.

The two dependent variables were each modelled against a suite of potentially important variables to determine if there was any statistical relationship with response behaviour. Based on an initial assessment of which variables were most statistically relevant, the variables included in this

analysis were group size, distance to road, wind speed, and a binary variable identifying whether a disturbance occurred during each 3-minute interval.

For each dependent variable, GLMMs were constructed and tested for model fit, as evidenced by the Akaike Information Criterion (AIC). AIC is a number that is helpful for comparing models as it includes measures of both how well the model fits the data and how complex the model is (simpler is usually better). The top models were identified as having a low AIC and were within a 2-unit difference in AIC ( $\Delta AIC \leq 2$ ) of the top-ranked model (i.e., the model with the lowest AIC; Burnham & Anderson 2004). This is the industry standard for identifying models that are essentially 'equally good' at explaining the data. Models with a difference in AIC ( $\Delta AIC$ ) of 2 to 4 from the top model are generally considered to have 'limited support' (Burnham & Anderson 2004).

## 6. RESULTS AND DISCUSSION

### 6.1 CARIBOU DISTRIBUTION RELATIVE TO THE MINE

During late June and early July in the four years surveyed (2020-2023), caribou GPS collar locations were provided to the Mine through a data sharing agreement by the Government of Nunavut (GN). These data indicated when caribou were approaching the Mine site. In the field, confirmation of caribou presence using height of land and road surveys were conducted three times per day by Agnico Eagle environment technicians to trigger management actions (as per the TEMMP; Agnico Eagle 2022). These data informed the decision to begin behaviour surveys for caribou as they approached the site.

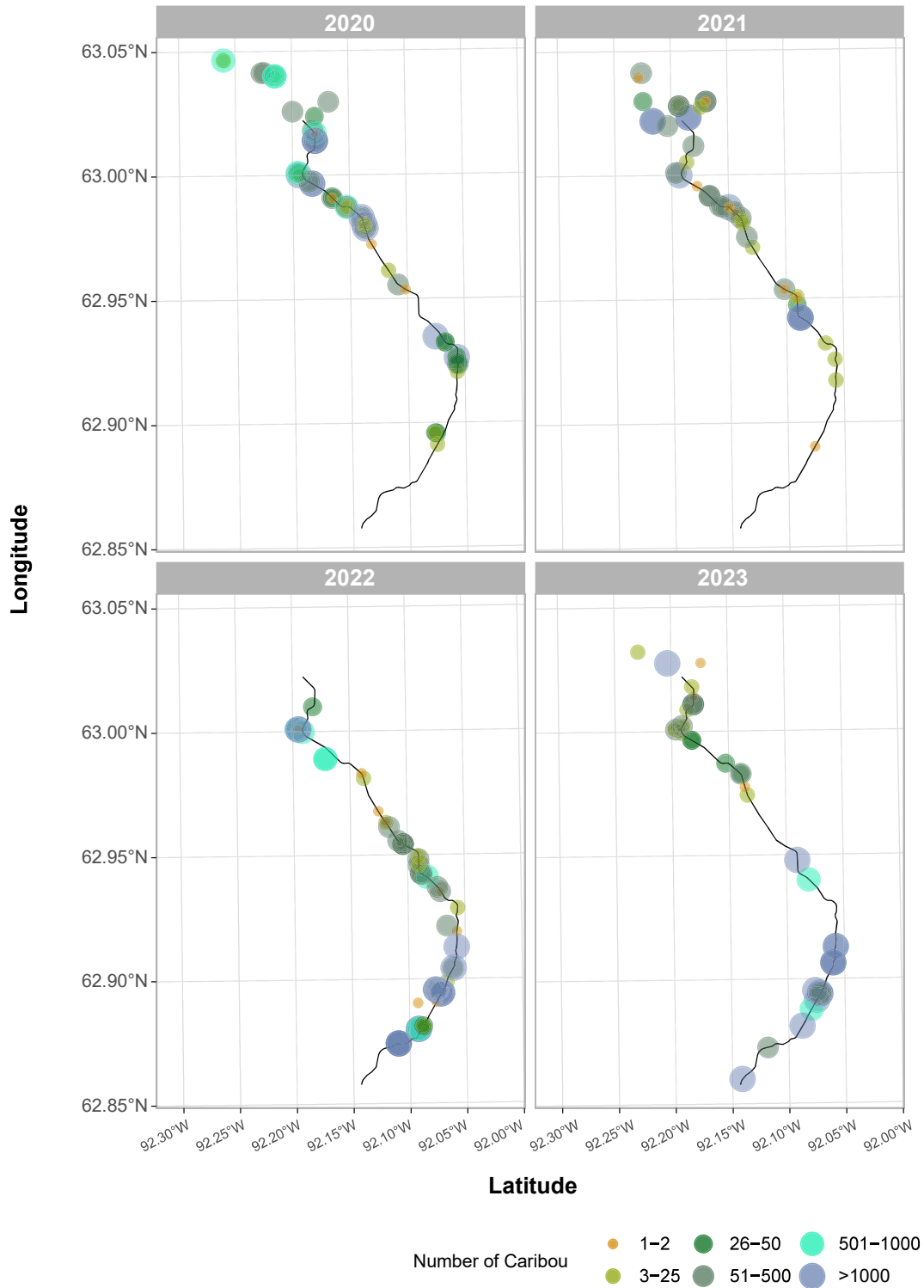
Survey locations by date are presented in Figure 6.1-1. From June 17 to July 9, 2023, groups of caribou from the Qamanirjuaq herd were surveyed passing through or near the study area, with numbers peaking around June 25. This was slightly earlier than the peak in 2022, 2021 and at least one week earlier than the peak in 2020. The length of time during which caribou could be seen from the AWAR increased from 16 days in 2020, to 18 days in 2021, to 23 days in both 2022 and 2023. In 2020 and 2021 most surveys were conducted from the northern portion of the AWAR, but in 2022 most surveys were conducted from the mid to southern portion of the AWAR representing areas where caribou were most commonly observed. Surveys in 2023 were distributed relatively evenly between the north and south ends of the AWAR, and around the mine site.

### 6.2 FIELD SURVEYS COMPLETED

In total, 42 behaviour surveys were conducted in 2023 during the period (June 17 to July 17) when groups of caribou were near the Mine. This is compared to the 56, 46, and 69 surveys completed in 2020, 2021, and 2022, respectively (Table 6.2-1). Surveys were conducted opportunistically whenever caribou were encountered during daily reconnaissance drives, primarily along the AWAR but also around the mine site when the opportunity arose. These numbers represent the upper limit of what could be achieved in each year given the logistical challenges of: 1) the caribou being on-site for a short period; and 2) the safety risk of vehicles being stopped by caribou on the road, leaving surveyors stranded for long periods of time.

In general, during the post-calving and early summer periods (June-July), barren-ground caribou aggregate into large groups (COSEWIC 2016; Russell and Gunn 2019). There were several days where only a single group of more than 1,000 individuals and up to 50,000 individuals was encountered. To diminish the risk of pseudo-replication, surveyors targeted different subsets of large groups when repeating surveys of that group. This should be considered when assessing the robustness of subsequent statistical analyses. A logistical constraint on sample size will likely also have to be considered for future behaviour surveys at Meliadine, which will always occur during the high-density post-calving season.

Overall, the survey methodology worked well for the Mine location and circumstances, and the survey results were generally consistent between all years 2020 to 2023. All reported results use the combined data from 2020, 2021, 2022, and 2023, unless otherwise stated.



Notes: Colour and size indicate group size, and the location of the All-Weather Access Road is indicated by the black line.

**Figure 6.1-1: Locations of Behaviour Surveys by Date**

TABLE 6.2-1 MELIADINE CARIBOU BEHAVIOUR SURVEYS DATA SUMMARY

Year	Type of Survey	Caribou Group Size						Total
		Small Group			Large Group			
		1-2	3-25	26-50	51-500	501-1,000	>1,000	
2020	Total # of surveys	5	11	9	14	6	11	<b>56</b>
	Surveys with disturbances	4	2	3	11	3	6	<b>29</b>
	Surveys with observed road crossings	2	2	0	1	1	0	<b>6</b>
2021	Total # of surveys	8	11	2	16	0	9	<b>46</b>
	Surveys with disturbances	5	7	0	8	0	7	<b>27</b>
	Surveys with observed road crossings	0	3	0	6	0	3	<b>12</b>
2022	Total # of surveys	11	9	3	18	8	20	<b>69</b>
	Surveys with disturbances	9	7	1	15	4	17	<b>53</b>
	Surveys with observed road crossings	3	4	0	6	0	2	<b>15</b>
2023	Total # of surveys	3	11	4	8	2	14	<b>42</b>
	Surveys with disturbances	2	1	1	3	0	5	<b>12</b>
	Surveys with observed road crossings	0	1	4	1	0	6	<b>12</b>

General observations on survey methodology and results included:

- Surveys were well distributed across a range of group sizes (Table 6.2-1). Surveyors reported that the addition of a reconnaissance survey and random selection of which group to survey assisted with a relatively even distribution of survey intensity across group sizes. In 2023, all group sizes were sampled at least twice, but most groups were in the categories of 3-25 caribou, or more than 1,000 caribou.
- Of the 213 surveys completed across four years, more than half recorded at least one disturbance during the survey (Table 6.2-1). In 2023, 29% of surveys recorded a disturbance. Mine traffic was suspended during periods when groups of caribou were near the road, which coincided with the timing of nearly all behaviour surveys. An exception was made for approved convoys of mine vehicles that occurred approximately three times per week for crew change and exchange of essential goods. Note that surveys were conducted specifically to record responses to disturbances, so the proportion of surveys with disturbances is higher than the actual proportion of caribou exposed to disturbances.
- The road was not closed to ATV traffic from Rankin Inlet while caribou were present from 2020 to 2022. In 2023, the AWAR was closed near Rankin Inlet by the GN Conservation Officer and Kangiqliq Hunters and Trappers Organization to all traffic (including local hunters) during

periods of increased caribou sensitivity. Despite this closure, ATVs were still able to access the AWAR via existing side trails. In total, 28% of disturbances were from ATV traffic, 56% were from light trucks (pickups), and 5% were from convoys. Light trucks included trucks from community groups conducting monitoring, the Kangiqliniq Hunters and Trappers Organization and KivIA, the GN wildlife officers, the pickup used for caribou surveys, or other Mine environment pickups. A disturbance caused by the survey vehicle stopping at the start of the survey was unavoidable in some cases and accounted for 5% of disturbances.

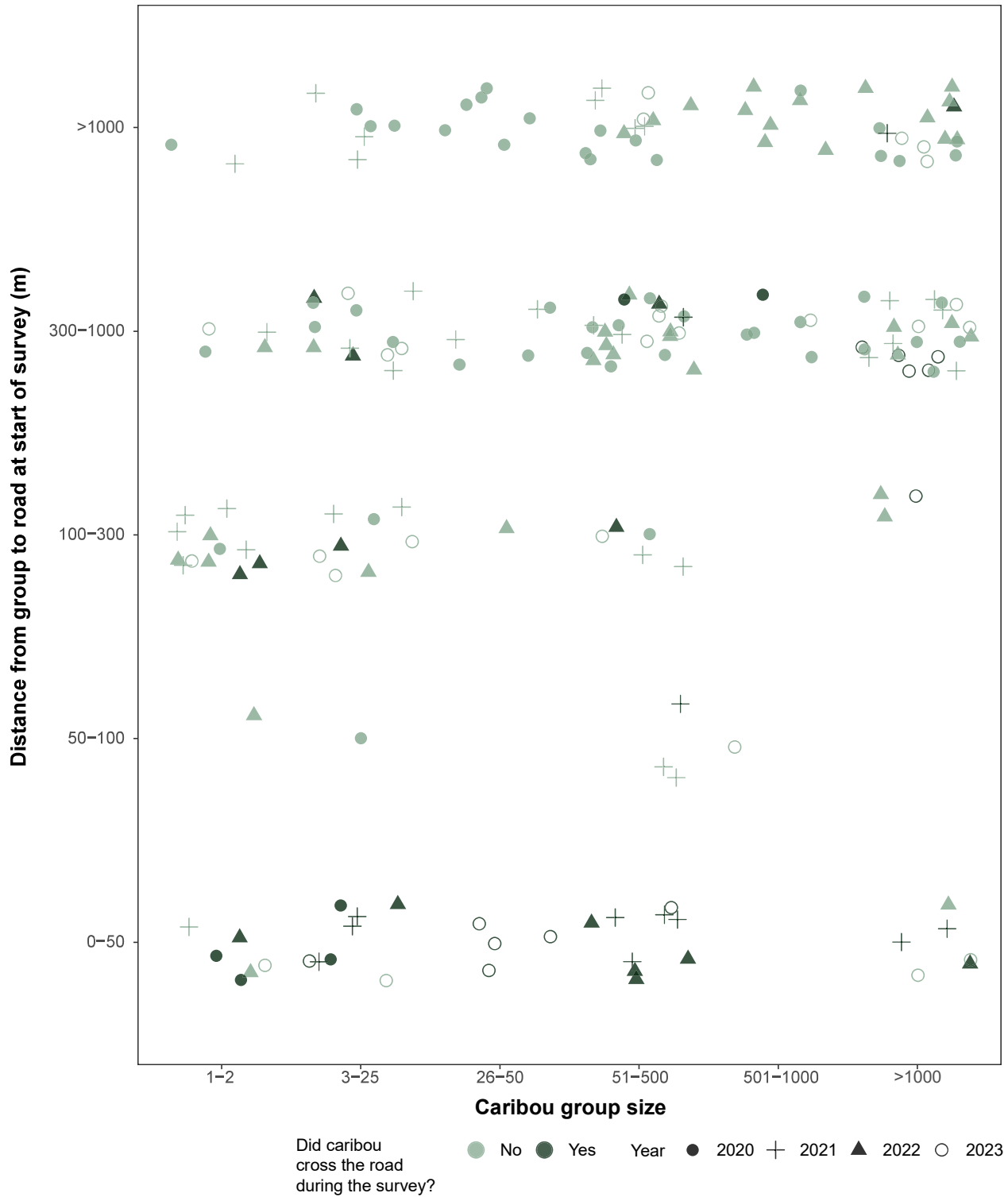
- The AWAR was closed to mine traffic as a mitigation measure during many of the surveys, leaving a small number of essential vehicles on the road, generally pickup trucks. It is expected that the ratio of ATVs to total traffic would therefore be higher during road closures because total traffic is much reduced.
- Caribou surveys were considered an essential activity by the Mine, allowing the survey pickup truck to be used on the AWAR even when the road was closed to normal mine traffic. However, vehicles stopped following guidance in the TEMMP when caribou were on or near the road.
- The methodology allowed for the estimation of baseline behaviour, response to disturbance, and return to baseline behaviour. Few surveys (6%) ended before caribou returned to baseline behaviour. Thus, 30 minutes appears to be an appropriate survey length.
- Most caribou behaviours were calm, generally foraging, and not moving quickly (non-response). The one exception was smaller groups who moved more than larger groups, exhibiting more walking and trotting.
- Caribou were observed crossing the road in 28% of surveys in 2023, 22% of surveys in 2022, 25% of surveys in 2021, and 10% of surveys in 2020, primarily in small groups of less than 25 individuals. Large groups of caribou were also observed crossing the road in each year, including groups of over 10,000 caribou.
- In 2020, distance was inconsistently estimated. Hence, distance was categorized into blocks of 0 to 50 m, 50 to 100 m, etc. Though distance was estimated with a rangefinder from 2021 to 2023, the data were still binned into distance intervals to allow the four years of data to be analyzed together with an adequate sample size.

## 6.3 EXPLORATORY ANALYSIS RESULTS

The exploratory analysis was conducted to determine if there were any trends or interactions in the following variables: road crossing, group size, distance to the infrastructure (AWAR/mine), weather and timing, side of the road (east or west), number of disturbances, and response time following disturbances. All results use the combined data from 2020 to 2023, unless otherwise stated. Exploratory analyses are focused on exploring potential trends in the data, with results being a qualitative interpretation of the patterns observed. Statistical analyses are presented in Section 6.4.

### 6.3.1 ROAD CROSSING

Results of the exploratory analysis indicated that groups closer to the road at the start of the survey were more likely to cross the road during the survey (Figure 6.3-1). This trend was seen in all survey years.



Notes: Distance from surveyors to the caribou is considered equivalent to distance from the road in this report.

**Figure 6.3-1: Caribou Group Size Versus Distance from the Caribou to the Road at the Start of the Survey**

### 6.3.2 GROUP SIZE AND DISTANCE TO INFRASTRUCTURE

Plotting the caribou group size against the distance of caribou groups to the road at the start of the survey revealed that small groups (less than 50 individuals) were observed in equal proportions across all distances, regardless of year (Figure 6.3-1). Large groups tended to be observed further from the road at the start of the survey, and smaller groups closer to the road when data are combined across years.

### 6.3.3 BEHAVIOUR TYPE, GROUP SIZE AND DISTANCE TO INFRASTRUCTURE

Average proportions of each behaviour type by group size and by distance to road are presented in Figure 6.3-2. When analyzed by group size (panel a), the results suggest that the proportion of response behaviours "Alert" and "Trotting" are inconsistent across group sizes and years.

When analyzed by distance to road (Figure 6.3-2, panel b), the results suggest that the proportion of response behaviours was higher closer to the road than further away from 2020 to 2022, though this pattern was not observed in 2023 where qualitative exploratory analysis suggests no clear trend in response to distance to road.

The level of response behaviours by small groups (<25) was higher than large groups (>1,000) in all years surveyed. This was especially true near the road (i.e., within 50 m when the survey started). In 2021, 2022, and 2023 distance to road and distance to observer were collected separately, therefore distance to road was used except for 2020 where distance to observer was used as a proxy.

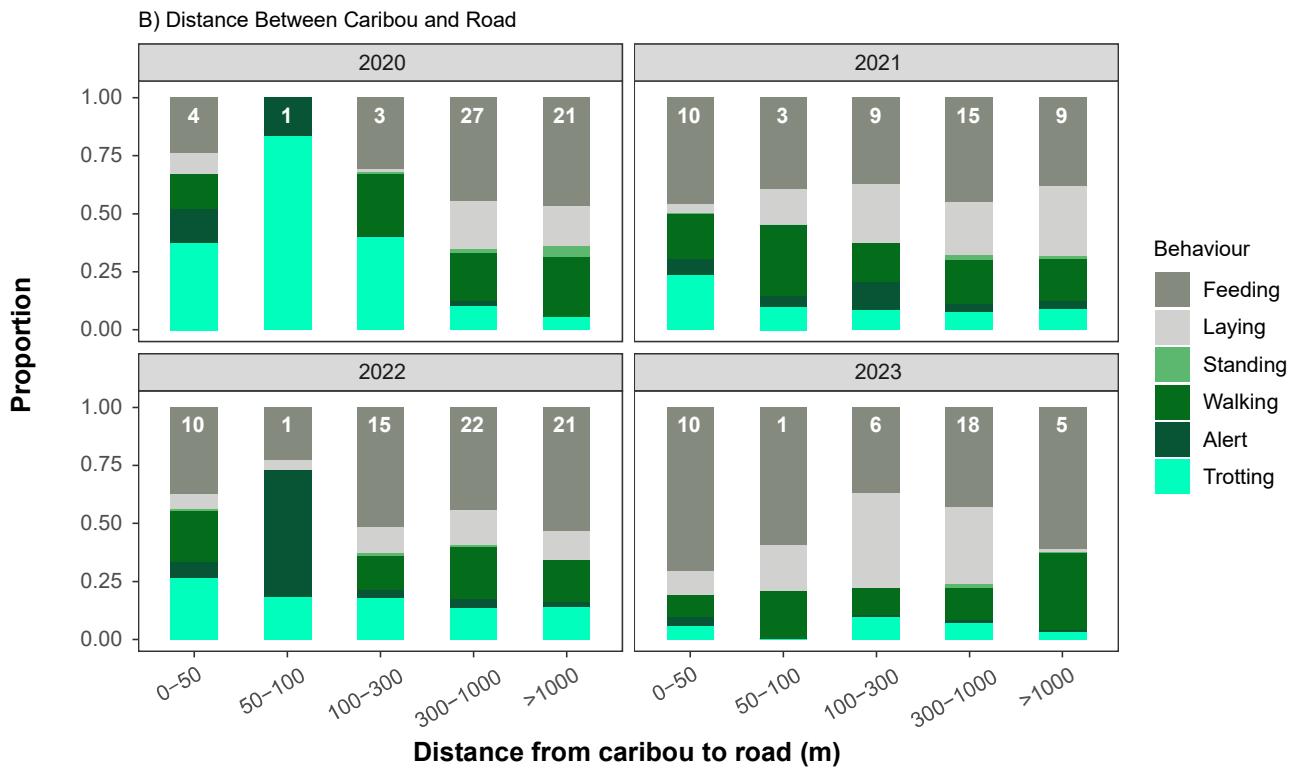
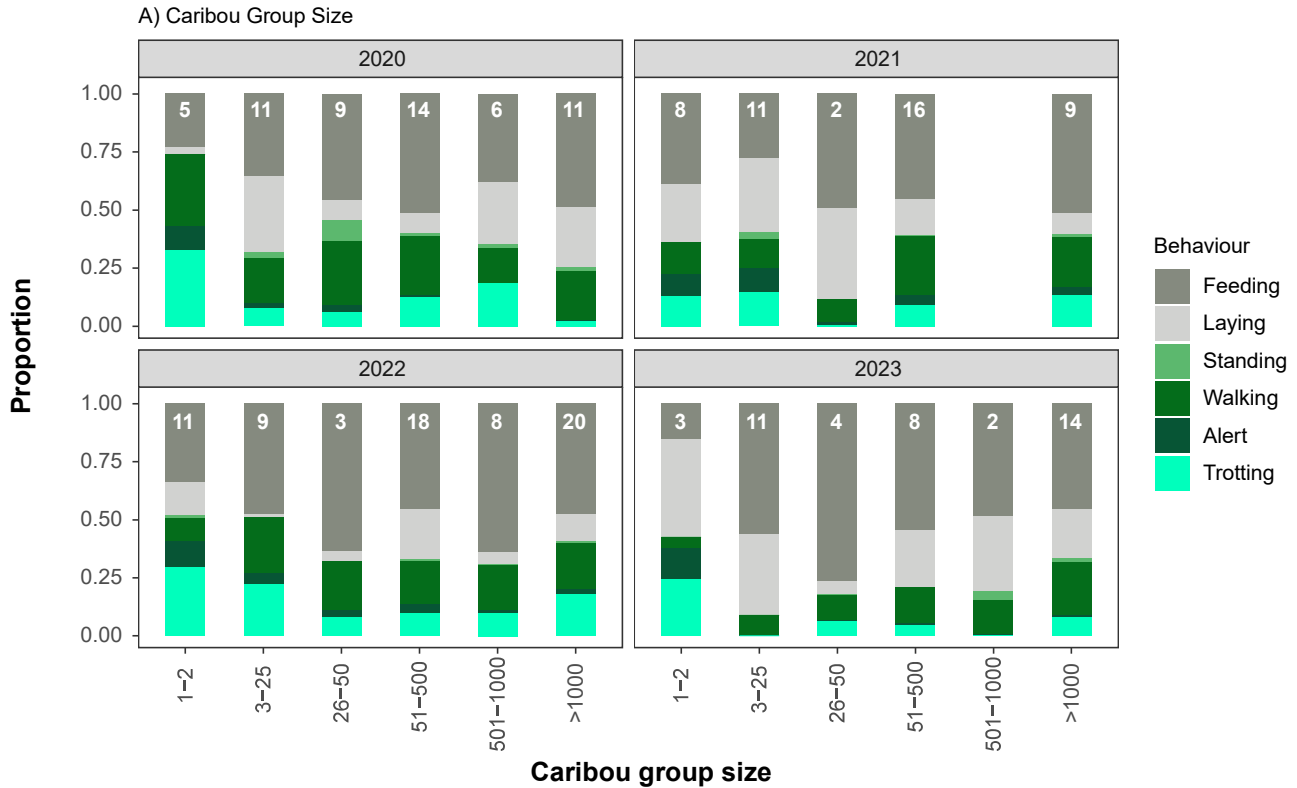
### 6.3.4 BEHAVIOUR TYPE AND ENVIRONMENTAL VARIABLES

Figure 6.3-3 shows the relationship between: 1) the proportion of response behaviours and 2) environmental variables temperature, wind speed, and date. This comparison was included to explore the possibility that environmental factors such as heat or high winds were influencing caribou behaviour during the survey. No trend is visible in the data and trend lines fit to the abiotic environmental data are nearly flat with wide confidence intervals, suggesting that environmental factors do not have a substantial effect on behaviour relative to other factors. Date was also included to explore the hypothesis that caribou behaviour may change as the season transitions from the more sensitive post-calving season into summer; however, the results indicated that date was not associated with caribou behaviour.

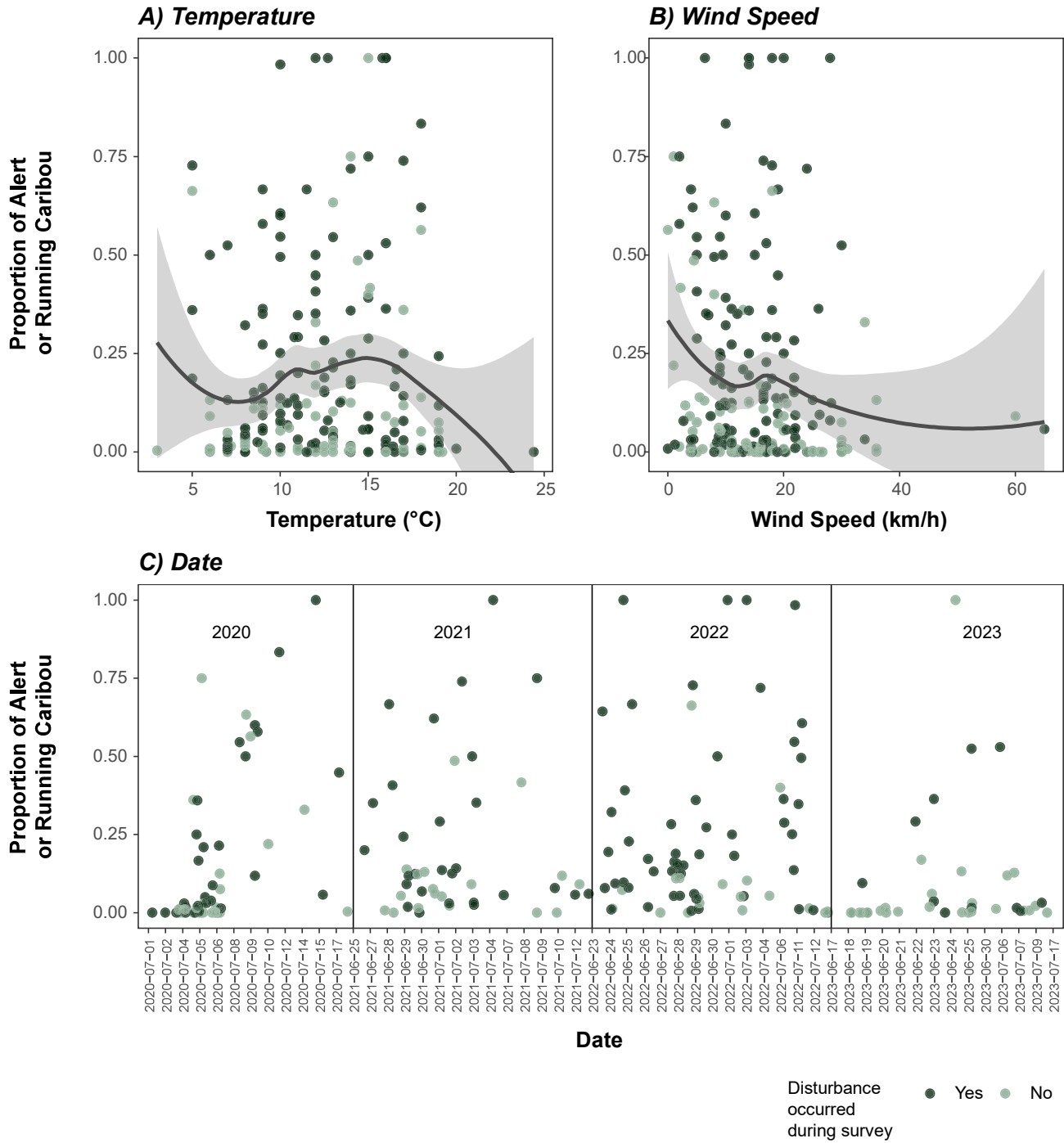
No relationship was observed between wind speed and caribou behavior. However, observations were largely collected in June, with a smaller proportion in early July, generally before the majority of mosquitos emerge, and therefore there is less likely to be an effect of insects and wind relief from insects at this time of year.

### 6.3.5 UPSTREAM OR DOWNSTREAM OBSERVATIONS

The movement pattern for caribou in the Mine area is variable. In some years, caribou primarily cross the road travelling east to west, and in other years it is the opposite. In all four years of data collection, most of the observed caribou were travelling northwest to southeast from their calving grounds, around the west side of Meliadine Lake and on to the coast to feed.



**Figure 6.3-2: Average Proportion of Each Behaviour Type Observed at the Start of the Survey**



Notes: Colour indicates whether or not a disturbance occurred during the survey.  
 In the top two panels, an exploratory loess smooth fit is shown in grey with the 95% confidence intervals shaded in light grey.

**Figure 6.3-3: Proportion of Alert or Running Caribou by Temperature, Wind Speed and Date**

This aligns with observations from community members in Rankin Inlet and the KivIA, i.e., “*The majority of collared caribou going Northward when the lake is frozen. Some come through the South end then cross at KM 25-27 then go East*” (Jeff Tulugak, KivIA, personal communication). Because of this, it is hypothesised that behaviour may vary depending on whether the caribou had crossed the road already (East, or the “downstream” side) or whether they were anticipating doing so (West, or the “upstream” side).

One hypothesis is that caribou may be hesitant to cross the road, but that once they cross the road they move away quickly. If this were the case, the prediction would be that groups of caribou would be observed close to the road on the upstream side with fewer groups or groups further away on the downstream side. This predicted distribution was not observed. Instead, groups of caribou were observed near the road on both sides of the road, and frequently crossed in both directions. Figure 6.3-4 compares the distance to the road at the start of the survey with the location relative to the road (East or West). More surveys occurred on caribou further from the road, but this was independent of which side of the road the caribou were on.

When proportion of each behaviour type was compared between surveys on the East and West (Figure 6.3-4), the two subsets were almost identical in 2020 and 2021, and more response behaviours were observed on the East (downstream) side of the road in 2022 and 2023.

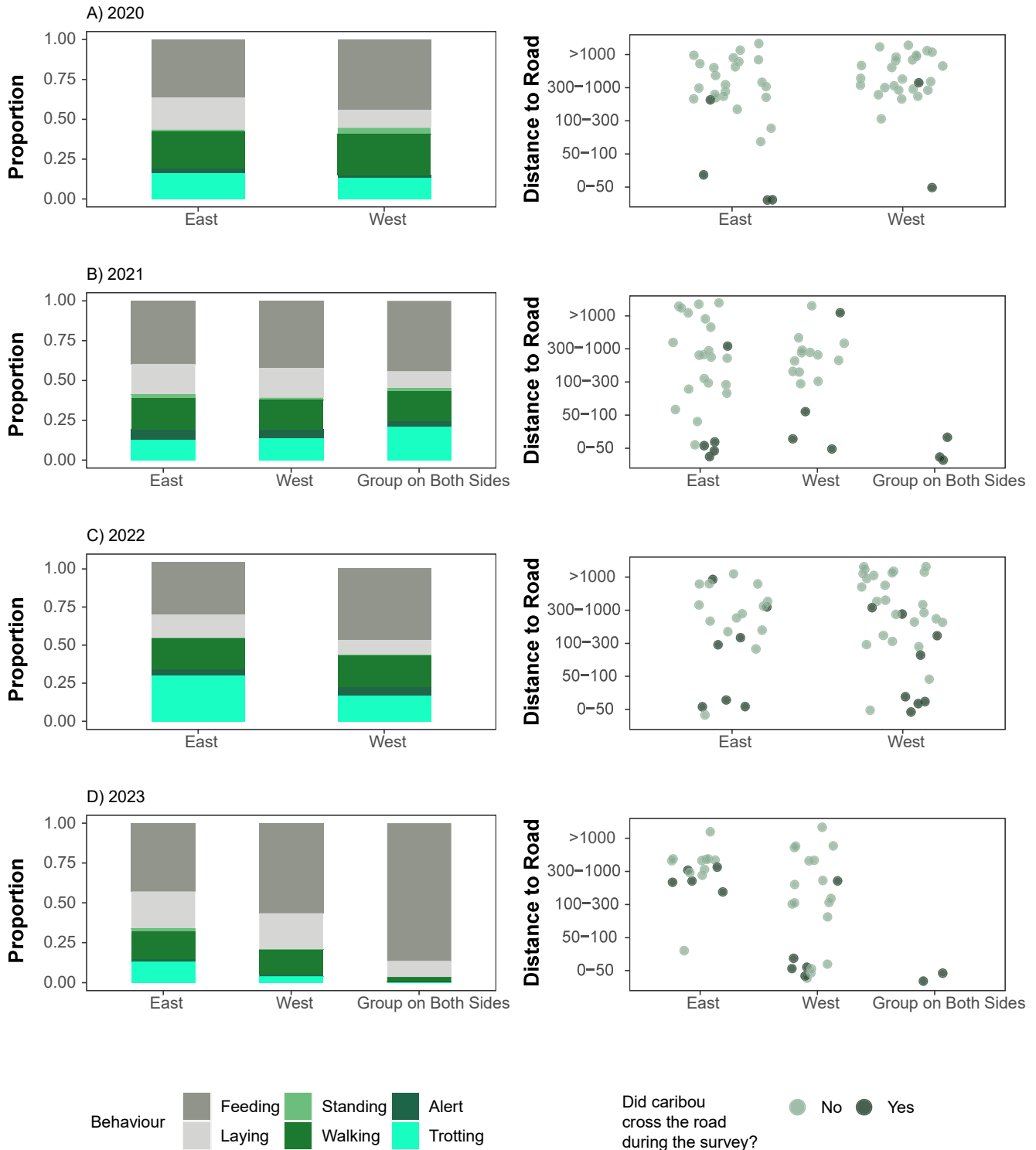
### 6.3.6 NUMBER OF DISTURBANCES

When duration of response (i.e., time taken for caribou to return to a baseline condition following a disturbance) is compared with the proportion of response behaviours, surveys with a higher proportion of caribou responding to the disturbance tend to take longer to recover to a baseline condition (Figure 6.3-5 panel a). Interestingly, it appears that surveys with multiple disturbances don't consistently produce a larger response or a longer one. Although the long-lasting full-group responses are in surveys with multiple disturbances, there are surveys with multiple disturbances that don't have large reactions or longer-lasting (>15 minute) response durations.

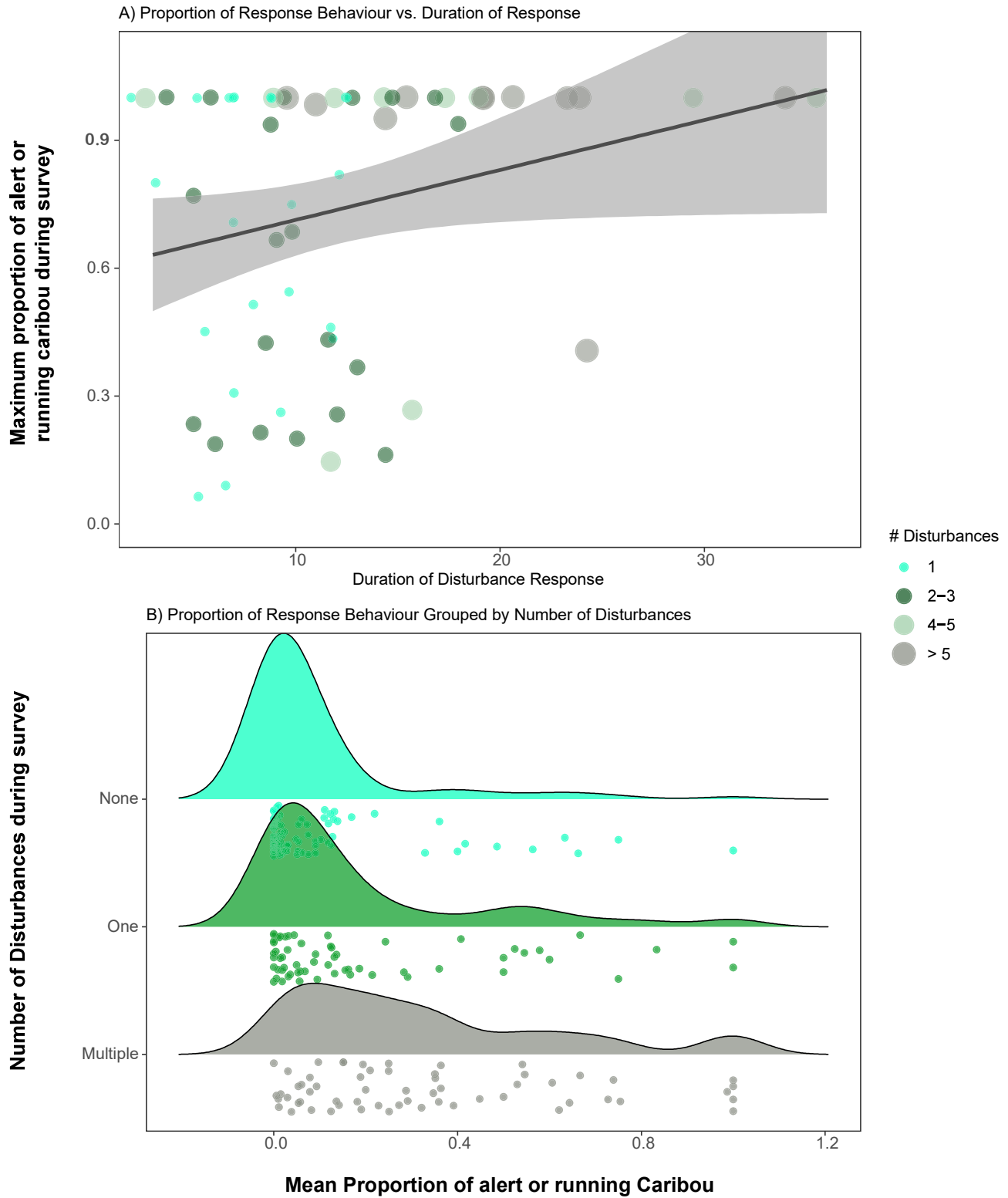
Figure 6.3-5 (panel b) shows a density plot for the proportion of response behaviours in three subsets of surveys: those with no disturbances, those with one disturbance, and those with multiple disturbances. The results suggest a slightly higher proportion of alert or running caribou in surveys when one or more disturbances occurred. Surveys with multiple disturbances do not appear to have a greater overall response than surveys with one disturbance. It should be noted that this figure is an average proportion of response behaviours across the entire 30-minute survey, so in some instances the proportion of response behaviours may have been obscured by the large number of intervals with no response behaviour.

### 6.3.7 RESPONSE TO DISTURBANCES

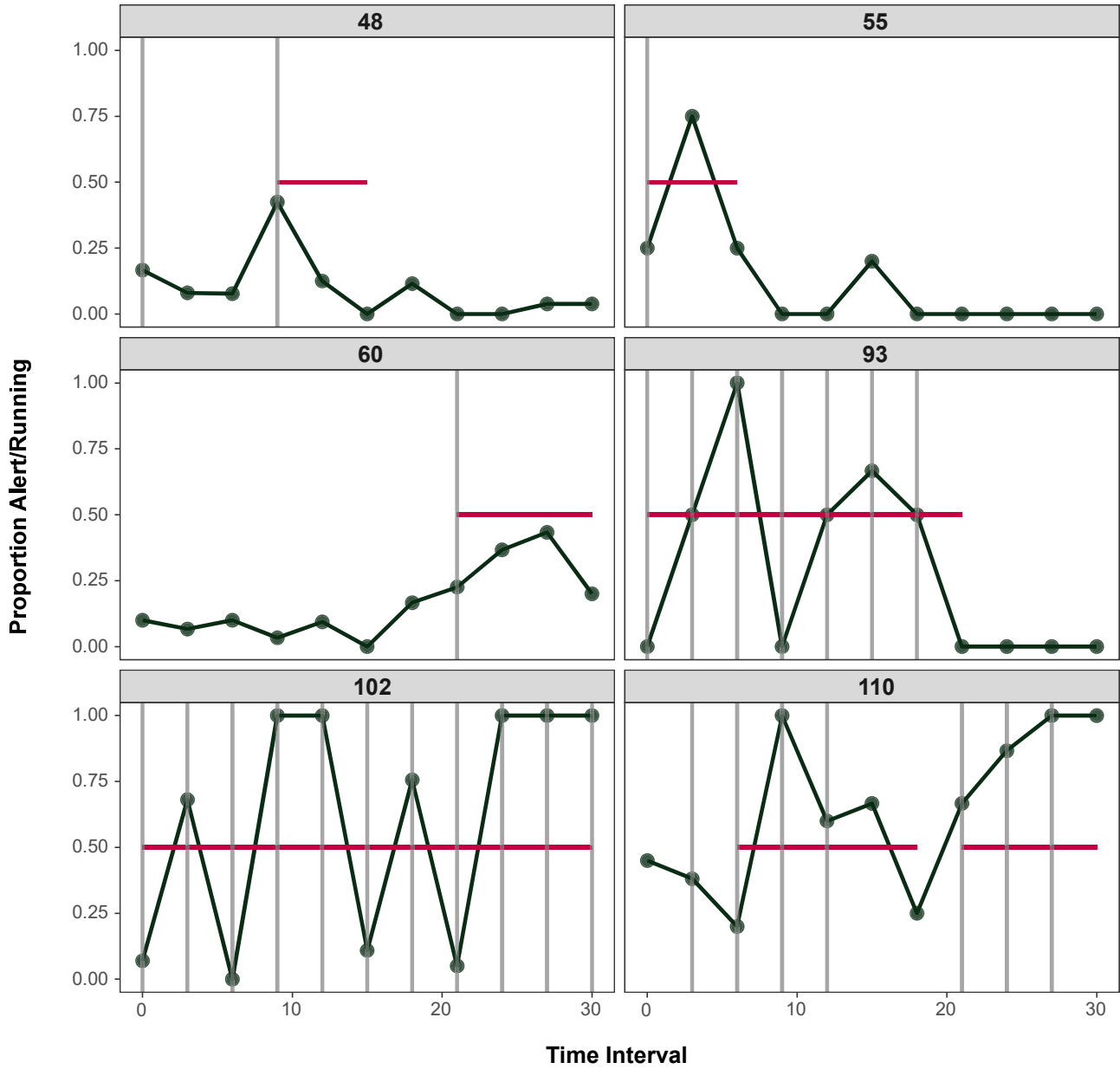
Summarizing data over the entire 30-minute survey is useful for broad comparisons but has the disadvantage that response behaviour can be washed out in a relatively uneventful survey. To examine the response to disturbances within a survey, the proportion of response behaviours was plotted by three-minute interval for each survey, as shown for a subset of surveys in Figure 6.3-6 (see Appendix C for plots of all surveys).



**Figure 6.3-4: Average Proportion of Each Behaviour Type Observed on East and West Side of Road**



**Figure 6.3-5: Comparison of Response Behaviours by Number of Disturbances**



Notes: See Appendix C for all surveys from 2020, 2021, 2022, and 2023.

**Figure 6.3-6: Proportion of Response Behaviour during Each Survey – Example Subset**

In Figure 6.3-6, the response behaviours of “alert” and “trotting or running” are combined to create the total proportion of responding caribou in any given time interval and plotted over time within the 30-minute survey. Disturbances are denoted with a vertical bar. A spike in response behaviours in the interval during a disturbance or immediately following a disturbance, suggests that the caribou are responding to the disturbance. Disturbance response time is denoted with a horizontal red bar, with the end of the bar representing either a lower proportion of response behaviours than prior to the disturbance, or a 40% reduction in response behaviours from the peak following disturbance.

The results show that even in the absence of disturbances, an average of 0-10% of caribou typically exhibit response behaviours at any given time. Figure 6.3-6 and Appendix C suggest that following a disturbance event, there was commonly a spike in the proportion of caribou with response behaviours increasing from 0-10% up to 60-90% of the group. The proportion of caribou with response behaviours returned to a pre-disturbance level quickly, often within two intervals (less than 6 minutes). For example, when a vehicle passed, most caribou would look up (which is classified as a response behaviour) then return to feeding or standing (pre-disturbance behaviour).

There was some variability in the proportion of response behaviours. During some surveys, there was a spike in response behaviours when no vehicle or other obvious disturbance was observed. There are several things that may account for this, including a disturbance that could not be detected by surveyors, insect harassment, or gregarious behaviour (i.e., one caribou reacting triggers a chain reaction). In some surveys of varying group sizes and distances to the road (approximately 16% of surveys from 2020 to 2023) a vehicle passed by (which would be considered as a disturbance), but there was no increase in response behaviours observed in the caribou group during the subsequent time period.

## 6.4 STATISTICAL ANALYSIS RESULTS

As group size and distance to road were identified as being potentially correlated during the exploratory analysis, a Chi-square test was conducted between the two variables to determine if they were too closely related to be included in a model together. A Chi-square ( $\chi^2$ ) statistic can be used to test for the correlation between two categorical variables. The resulting Chi-square statistic was significant ( $p = 0.0002$ ), indicating that group size is associated with distance to road. To prevent overfitting the models, two separate models were run that included group size as an independent variable and distance to road as an independent variable, respectively. To bolster the sample size for statistical analyses, all analyses in this section were conducted on the pooled dataset of 2020 to 2023 data with Year as a random effect.

The final models had many parameters, and it was difficult to attain model convergence. As a result, model variables that had little or no explanatory power and were not variables of interest (such as Temperature) were dropped from the final model sets. Three response (dependent) variables were tested in three separate model sets as described in the methods: proportion of response behaviour (alert or running), proportion of walking and response behaviour, and duration of response following disturbance.

The estimates and significance levels for the best-fitting models (one each with group size or distance to road) that used response behaviour as the dependent variable are presented in

Tables 6.4-1A and 6.4-1B, for the best-fitting model that used walking and response behaviour as the dependent variable in Tables 6.4-2A and 6.4-2B, and for the best-fitting model that used duration of response in the time to event model in Table 6.4-3.

**TABLE 6.4-1A SUMMARY OF MODEL COEFFICIENTS AND SIGNIFICANCE LEVELS FOR RESPONSE BEHAVIOUR MODEL WITH DISTANCE TO ROAD (N = 208)**

Effect Type	Group	Variable	Estimate	Standard Error	P-value
Fixed	-	(Intercept)	0.02	0.014	-
		Distance to road:	-	-	< 0.001 ***
		• 0-50 m	Reference	Reference	-
		• 50-100 m	1.828	2.29	-
		• 100-300 m	1.499	1.041	-
		• 300-1,000 m	0.152	0.088	-
		• >1,000 m	0.04	0.025	-
		Disturbance during interval	4.162	0.21	< 0.001 ***
	Wind speed (km/h)	0.961	0.022	0.09 •	
Random	Survey ID	SD for random effect	2.659	-	-
	Year	SD for random effect	0.825	-	-

Note: Statistically significant p-values <0.05 are indicated with a single asterisk. Highly significant values (p<0.001) are indicated with three asterisks. P-values <0.10 and >0.05 are indicated with a dot.

**TABLE 6.4-1B SUMMARY OF MODEL COEFFICIENTS AND SIGNIFICANCE LEVELS FOR RESPONSE BEHAVIOUR MODEL WITH CARIBOU GROUP SIZE (N = 208)**

Effect Type	Group	Variable	Estimate	Standard Error	P-value
Fixed	-	(Intercept)	0.508	0.345	-
		Caribou group size:	-	-	< 0.001 ***
		• 1-3	Reference	Reference	-
		• 3-25	0.018	0.011	-
		• 26-50	0.003	0.002	-
		• 51-500	0.003	0.002	-
		• 501-1,000	0.003	0.002	-
		• >1,000	0.003	0.002	-
		Disturbance during interval	4.175	0.21	< 0.001 ***
	Wind speed (km/h)	0.968	0.018	0.08 •	
Random	Survey ID	SD for random effect	2.21		
	Year	SD for random effect	0.743		

Note: Statistically significant p-values <0.05 are indicated with a single asterisk. Highly significant values (p<0.001) are indicated with three asterisks. P-values <0.10 and >0.05 are indicated with a dot.

**TABLE 6.4-2A SUMMARY OF MODEL COEFFICIENTS AND SIGNIFICANCE LEVELS FOR WALKING AND RESPONSE BEHAVIOUR MODEL WITH DISTANCE TO ROAD (N = 208)**

Effect Type	Group	Variable	Estimate	Standard Error	P-value
Fixed	-	(Intercept)	0.101	0.054	-
		Distance to road:	-	-	<0.001 ***
		• 0-50 m	Reference	Reference	-
		• 50-100 m	2.248	2.359	-
		• 100-300 m	1.59	0.921	-
		• 300-1,000 m	0.247	0.12	-
		• >1,000 m	0.215	0.112	-
		Disturbance during interval	2.086	0.088	< 0.001 ***
	Wind speed (km/h)	0.964	0.019	0.09 *	
Random	Survey ID	SD for random effect	2.226	-	-
	Year	SD for random effect	0.483	-	-

Note: Statistically significant p-values <0.05 are indicated with a single asterisk. Highly significant values (p<0.001) are indicated with three asterisks. P-values <0.10 and >0.05 are indicated with a dot.

**TABLE 6.4-2B SUMMARY OF MODEL COEFFICIENTS AND SIGNIFICANCE LEVELS FOR WALKING AND RESPONSE BEHAVIOUR MODEL WITH CARIBOU GROUP SIZE (N = 208)**

Effect Type	Group	Variable	Estimate	Standard Error	P-value
Fixed	-	(Intercept)	1.7	0.895	-
		Caribou group size:	-	-	< 0.001 ***
		• 1-3	Reference	Reference	-
		• 3-25	0.051	0.026	-
		• 26-50	0.011	0.007	-
		• 51-500	0.012	0.006	-
		• 501-1,000	0.008	0.005	-
		• >1,000	0.012	0.006	-
	Disturbance during interval	2.091	0.089	< 0.001 ***	
	Wind speed (km/h)	0.964	0.015	0.08 *	
Random	Survey ID	SD for random effect	1.879	-	-
	Year	SD for random effect	0.348	-	-

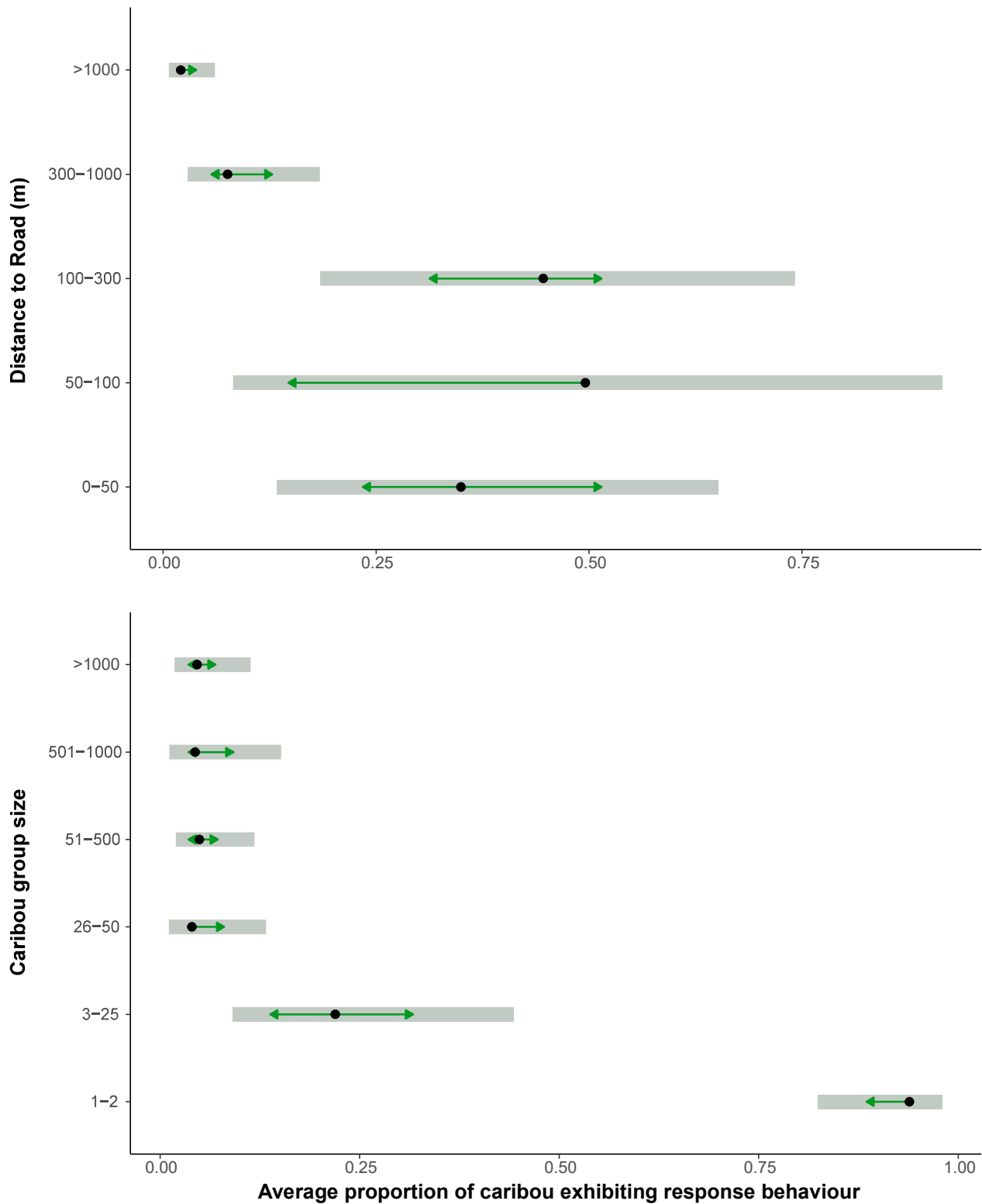
Note: Statistically significant p-values <0.05 are indicated with a single asterisk. Highly significant values (p<0.001) are indicated with three asterisks. P-values <0.10 and >0.05 are indicated with a dot.

In Tables 6.4-1 and 6.4-2, the statistics presented include the type of term in the model (fixed versus random effects), and variable estimate (Odds Ratio), which can be interpreted as the expected effect on the dependent variable as the independent variable increases. For example, in Table 6.41 the  $<1$  estimate for windspeed indicates that as the wind speed increases, the proportion of caribou with response behaviours decreases. However, estimates should always be considered in tandem with the standard error; if the standard error is larger than the estimate, the estimate has little precision. For random effects, the estimate indicates the standard deviation of the random term. The p-value statistic indicates whether there is a relationship between the variable and the response, taking into account the other variables in the model. Significant p-values ( $<0.05$ ) for variables with more than two categories were followed up with pairwise posthoc tests to determine which groups were different. A p-value of less than 0.05 suggests that the variable is an important determinant of the response, as it indicates there was less than 5% probability that we would see an association as strong as we did if there was no relationship.

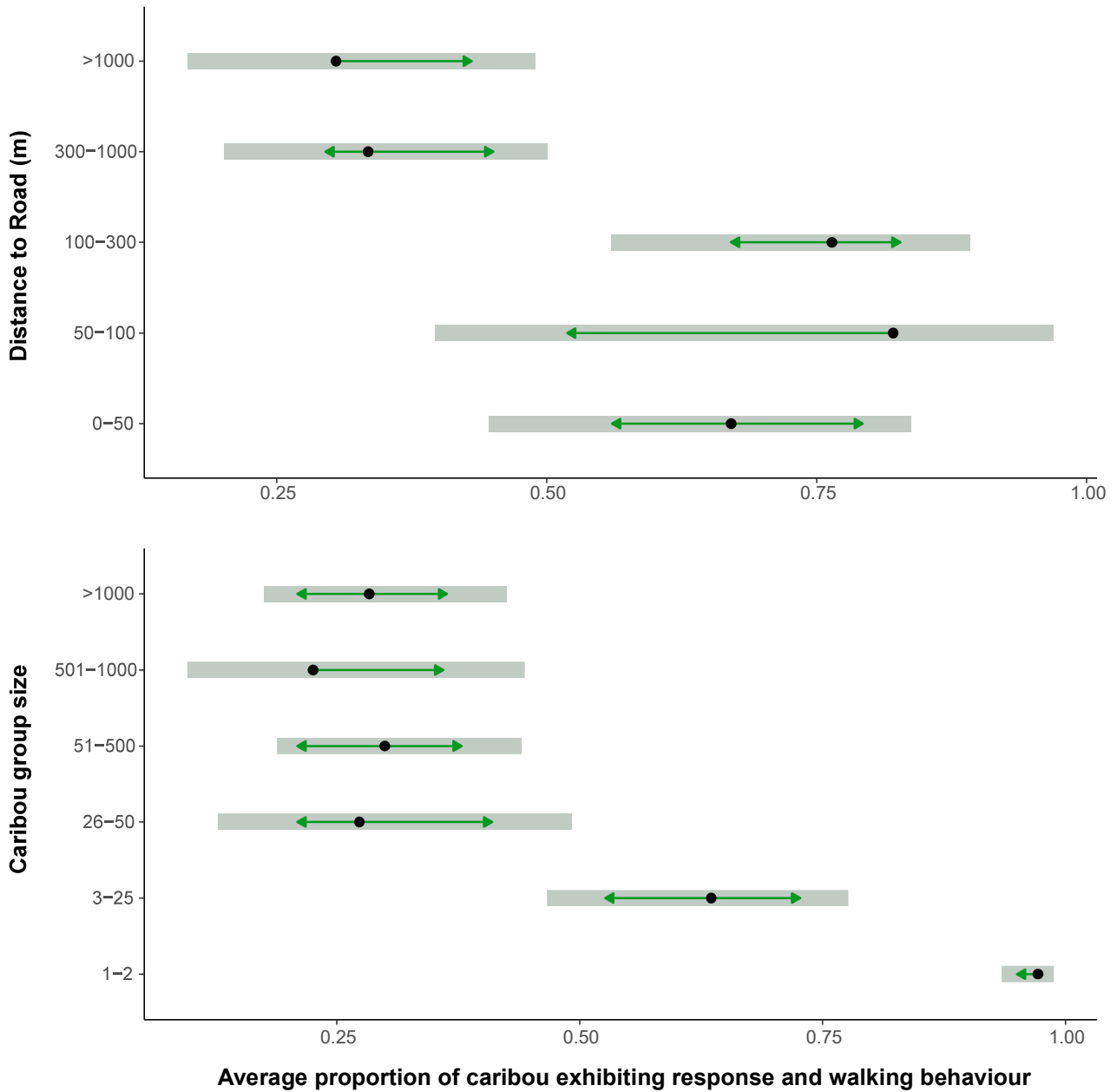
Tables 6.4-1 and 6.4-2 suggest that in both models, whether a disturbance occurred during an interval was a significant predictor of the proportion of animals exhibiting response behaviour during that interval. In both models for response alone, the Odds Ratio is approximately 4, suggesting that there is a 4 times higher odds of response behaviour in intervals containing a disturbance averaged across group size or distance to road. In the models with walking behaviour included, there is approximately 2 times higher odds of exhibiting this behaviour in intervals where a disturbance occurred.

The models also suggest that both distance to road and caribou group size are significantly associated with the proportion of caribou exhibiting response behaviour. Post-hoc pairwise test results are illustrated in Figures 6.4-1 and 6.4-2. The shaded grey bars indicate the 95% confidence intervals around the estimates of average proportion of caribou exhibiting response behaviour. The points indicate the means (averaged over whether a disturbance occurred), and the green arrows the pairwise comparisons among groups. Where these arrows do not overlap suggests a significantly different response between the groups.

For the response models, there is no difference in proportion of disturbed caribou up to 300 m distance from the road, similarly, there is no strong evidence for a difference between the largest distance bins. This suggests a change in behaviour that occurs at approximately 300 m distance from the road, with those closest exhibiting a higher proportion of response behaviour. Similarly, the smallest group size had the largest proportion of response behaviour and this was different from all other group sizes. The next largest size bin (3-26 animals) also showed a significantly higher proportion of response compared to the larger group sizes which were all similar to each other. Taken together, these results suggest that small groups of caribou near the road are more likely to have a higher response to disturbance compared to larger groups further from the road. The response and walking models had the same pattern of results.



**Figure 6.4-1: Pairwise Comparisons of Average Proportion of Caribou Exhibiting Response Behaviour among Categories of Distance to Road and Caribou Group Size**



**Figure 6.4-2: Pairwise Comparisons of Average Proportion of Caribou Exhibiting Response and Walking Behaviour among Categories of Distance to Road and Caribou Group Size**

### 6.4.1 RESULTS SUMMARY

The results of the statistical analysis provided support for the key hypothesis that caribou tend to respond to disturbances, particularly when they are close to the road or in smaller groups. Additional analyses focused on convoys in future years may provide additional information on responses directly to multi-vehicle convoys vs. singular vehicles, as done at the Meadowbank Mine showing returns to baseline behaviours approximately 15 minutes after a convoy (ERM 2023).

The proportion of caribou walking was also linked to disturbances, leading to inclusion in post-hoc models as a response behaviour, which was not possible due to data sparsity in previous years. Pairwise comparisons showed that increased proportions of response behaviours were observed for both groups of 25 or less caribou, as well as groups within 300 m of roads.

These results are consistent with other surveys recorded on barren-ground caribou during the post-calving and early summer periods, which suggest that caribou behavioural responses to all-season haul roads tend to taper off beyond approximately 500 m (Curatolo et al. 1987; Johnson and Lawhead 1989; Dyer et al. 2001). However, zone of influence estimates are highly variable in the literature and this method of data collection is not designed to estimate it. In addition, responses to roads and infrastructure have previously been linked to increased harvest from roadways (Plante et al. 2018; Russell and Gunn 2019), a factor which was not included in this analysis.

## 7. SUMMARY

The behaviour monitoring data from 2023 were combined with data from 2020, 2021, and 2022, to determine if caribou activity budgets change with distance from the mine, and to document caribou response to stressors. All results outlined in this report use all three years, unless otherwise stated. The program and combined data resulted in several key findings:

- The monitoring protocols adapted from the GNWT ENR worked well at the Mine site.
- Forty-two surveys were conducted in 2023 with peak caribou activity observed around June 25. This aligned with the timing observed in 2022 and was slightly earlier than the peak in 2020 and 2021. The data from 2020 to 2023 were combined for a total of 213 surveys across four years.
- Caribou mostly exhibited the non-response behaviours of standing, laying, feeding, and the variable walking which may be considered both a response or non-response behaviour.
- Observations were well distributed across a range of caribou group sizes from 1 to 2 individuals to >1,000.
- Small groups tended to have a higher proportion of response behaviours (running, alert) than larger groups, irrespective of disturbances. Groups within 300 m of the road also tended to have a higher proportion of response behaviours than those further away. This was apparent in 2020, 2021, 2022, and 2023.
- Groups of caribou were observed near the road in equal proportions on both the upstream and downstream sides of the road. Increased response behaviours were observed on the downstream (East) side of the road in 2022 and 2023.
- Statistical analysis indicated a trend for caribou at greater distance from the road (>300 m) to have a lower proportion of response behaviours.
- Groups of 25 or less caribou showed increased proportions of response behaviours as compared to larger groups.
- Following a disturbance event, the proportion of response behaviours in a group of caribou rose, but typically returned to baseline behaviours within two sampling periods (less than six minutes). Caribou were statistically more likely to be walking (a potential response or non-response variable), alert, or running within survey intervals where there was a disturbance (i.e., vehicle traffic).
- The use of convoys to consolidate multiple essential vehicles into a single disturbance event is an effective mitigation measure for reducing disturbance to caribou.
- The proportion of caribou with response behaviours in a group was unrelated to measured environmental variables including temperature and wind speed.
- Approximately half of the surveys included a disturbance event, typically from essential Mine vehicles, mostly pickups, and all-terrain vehicles (ATVs) used by community members on the AWAR for travel and harvesting. The AWAR was closed to Mine vehicles (with the exception of approved convoys or the survey vehicle) when caribou were near the road. All Mine vehicles are required to stop when caribou are on the road.

Analyses summarized here provide support for the key hypothesis that caribou tend to respond to disturbances, particularly when they are close to the road or in smaller groups. Statistical results suggest different reactions based on the number of disturbances experienced, with more disturbances resulting in increased time until caribou return to baseline behaviours.

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# APPENDIX A DETAILED METHODS FOR CARIBOU BEHAVIOUR SURVEYS



## Meadowbank Gold Mine

### Caribou Behaviour Monitoring

September 15, 2021

Project No.: 0597635

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### APPENDIX A MEADOWBANK GOLD MINE: CARIBOU BEHAVIOUR MONITORING DATA SHEET

## 1. INTRODUCTION

Agnico Eagle Mines Ltd. (Agnico Eagle) would like to determine whether caribou behaviour changes in response to mine activities. The purpose of caribou behaviour surveys is to provide information to characterize the effects of the physical road and mine-related activities on caribou behaviour, including the All Weather Access Road (AWAR) and Haul Road.

The planned monitoring program is designed to collect data on caribou behaviour using standardized, scientifically-defensible methods. The data will be used to monitor Project effects.

### 1.1 Objectives

Following discussions with the Kivalliq Inuit Association and Government of Nunavut during the spring of 2021, the objectives of the behaviour monitoring program for caribou have been updated to the following:

- Evaluate the baseline behaviour of caribou (behaviour in the absence of disturbance);
- Evaluate the response of caribou to disturbances;
- Compare the behaviour of caribou between the following categories, if there is sufficient data:
  - 1) in large vs. small groups,
  - 2) near vs. far from the road,
  - 3) when the road is open vs. closed,
  - 4) east vs. west of the road, (upstream and downstream), and
  - 5) spring migration vs. summer and fall periods.

## 2. STUDY AREA

The study area for behaviour monitoring is anywhere that caribou may interact with the mine, including the All Weather Access Road (AWAR), the Meadowbank Mine site, Whale Tail site and the Haul Road connecting Meadowbank to Whale Tail.

### 3. STANDARD OPERATING PROCEDURES

The purpose of caribou behaviour surveys is to provide information to characterize the effects of the physical road and mine-related activities on caribou behaviour, including the All Weather Access Road (AWAR) and Haul Road. The overall method for the surveys is to identify caribou groups visible from the road, to select some groups for observation, and to record the behaviour of individuals in groups of different sizes including their behaviour without any disturbance and responses to both mine-related activities and natural factors.

Notes to guide the work include:

- Systematic surveys will be conducted along all Project roads during spring, summer and fall periods.
- The survey team will consist of a driver/observer and a second observer when available.

Surveys should be performed:

- During spring, summer and fall when caribou may be in the Project area,
- Of caribou at various distances from the road and group sizes, and
- If surveying effects of a convoy, conduct two surveys, one at least an hour before convoy deployment so that a pre-disturbance measurement can be made, and a second survey during the convoy passing by caribou.

#### 3.1 General Field Data

For each survey day, the appropriate general field data will be recorded onto field data sheets supplied in Appendix A and B. A new data sheet will be used for each survey, including additional sheets as necessary to record all observations. General information includes:

- Survey date and start and end times.
- Field personnel (full names on the data sheet header and initials thereafter).
- Weather conditions during and prior to sampling (e.g., snow in the last 24 hours, current wind conditions).
- Site description: provide location and description (GPS coordinates, road name and distance marker).
- Photographs or video (if possible):
  - Take a photo of the caribou every time an observation is recorded so that the observations can be verified by a biologist.
  - For any photographs taken, record the picture IDs in the comments field on the field data sheet.
  - Write descriptions of any photos taken for specific reasons.
- General observations/notes of the environment/sampling procedures.
- Any deviation from the SOPs outlined below.

*Note: When in doubt take pictures and make field notes explaining the situation, your response or consequent changes in methods. It is better to have more data/notes than not enough when interpreting the results later on.*

## 3.2 General Equipment List

- A GPS unit with waypoints of road km markings.
- Field data sheets (Appendix A and B), clipboard, pencils, or iPad with data form.
- A timer capable of alarm setting for repeat time intervals (i.e., can be set to go off every three minutes, like a smart phone).
- Binoculars or spotting scope.
- Compass (or use compass function on GPS unit).
- Portable weather station (temperature and wind speed).
- Camera.
- Rangefinder.

## 3.3 Field Methods

### 3.3.1 Group Selection

The survey day will begin with a reconnaissance survey to determine how many caribou groups are present near the road, how large they are, and where they are. This will be accomplished by driving from the mine site along the road and noting relevant information about the groups and their sizes along the way (using the standard, tablet-based road survey form). Observers will preferentially choose groups to survey to across group sizes and distances from the road. Ideally, caribou would be sampled in an even distribution across these variables and along the AWAR and Haul Road. However, the nature of caribou and field sampling mean that observers may need to survey what caribou are available, rather than what is “ideal”.

Allow approximately one hour to survey each group. If the length of the survey day permits all groups to be surveyed then they should all be surveyed. If there are more groups to survey than the time in the day, then do the following:

1. Look at how many of each group size (bullet list below) have been surveyed to date. If one of them is under-represented and there is a group of that size on the road, then go survey that group. If there is more than one group of that size, choose it randomly using the procedure in step 4.
  - 1 or 2 caribou
  - 3 to 25 caribou
  - 26 to 50 caribou
  - >50 caribou
2. During 2020, few groups of caribou within 300 m of the road were observed or sampled. Preferentially choose groups of caribou within 300 m of the road, with a soft target of approximately 1/3 of samples in this area.
3. If any Project-tolerant caribou are observed (e.g., caribou observed near the road or mine site for more than 72 hours in summer and 48 hours in other seasons; TEMP 2020), then select these animals for sampling. In Appendix A data sheet, record that the group is Project tolerant in the notes field.
4. If there are multiple groups available, choose groups to fill in an even distribution of group sizes and distances from roads.

Record all caribou groups observed during the reconnaissance survey in the standard, tablet-based survey form and submit that data along with the results of behaviour monitoring.

### 3.3.2 Selection of an Observation Site

Find a safe parking location and follow site safety protocols. The observation location may be the vehicle itself or a safe location off the road. If observers exit the vehicle, the observation location should be chosen where observer activity is not likely to influence caribou behaviour and where the observer can remain comfortable for a period of approximately 45 minutes without needing to move. Ideally, the vehicle should be stopped a minimum of ~250-300 m from the caribou – adapt this distance as needed. If the animals are staring at the truck or moving away, then the truck is too close.

### 3.3.3 Data Recording

Allow 15 minutes between arrival and the time at which behavioural observations begin. This is to allow animals to return to behaviour that may have been interrupted by the arrival of observers. In the time before recording behaviour, fill in the top portion of the form with location, weather, and group size information.

After 15 minutes, begin recording data in the form in Appendix A. The start time to record is the time that observations begin.

#### 3.3.3.1 Location

**Location:** Collect a waypoint of the location from which the observations will be made. Note the waypoint number and the UTM coordinates on the data sheet.

**Road Condition:** If observing caribou on a road, record whether the AWAR or Haul Road are open or closed.

**Distance:** Estimate the distance to the group using a laser rangefinder and, using a compass or the GPS unit compass feature, record the bearing (0° to 360°) to the group being observed. If the group of caribou is large and spread over a considerable distance from the road, estimate the distance to nearby caribou and the caribou furthest away that will be sampled. If some caribou in the group are too far away to sample, then do not include them in the distance estimate.

**Behaviour:** At each time interval during the survey, observers should record the number of individuals in the group exhibiting behaviour in each category. For clarity, observers should record zero values for behaviours not observed.

**East vs. West:** Note if the group is on the east or west side of the road. At the end of the 30 minute observation period return to the top of the form and record (Y or N) if the group crossed the road during the survey period. If monitoring at the mine site or Whale Tail, leave this section blank.

**Sex:** Note the sex of the group. This can be difficult in large groups, so record in the following categories: mostly males, mostly females, mostly females with calves, juveniles, or mixed group.

#### 3.3.3.2 Weather Conditions

Use the portable weather station to record:

- Air temperature;
- Wind speed;
- Wind direction;
- Precipitation; and
- Humidity (if the weather station has this function).

### 3.3.3.3 Road Structure

At the location of the caribou group, record the road characteristics:

- Height of the road above the tundra (m);
- Slope of the road side (with of the slope in m);
- Approximate height of snow bank (m); and
- Any structures, such as bridges, present.

### 3.3.3.4 Caribou Behaviour

Individuals in the group being observed will be categorized when the survey starts and at three minute intervals. Standardized behaviour categories will be used (Section 3.3.4). The standardization of behaviour is necessary for clarity and data analysis. If the observed behaviour does not fit within any of the categories then observers have the option of noting other behaviour in the comments field. However, this should be used only rarely as most behaviour should fit in the primary categories listed below. If noting a new/different behaviour, please take a photo or video of the caribou.

The data to record at each three-minute interval are the numbers of individuals in the group exhibiting each behaviour at that time. Do not attempt to characterize the behaviour that occurred during the interval. If the group is too large to be counted in each interval, choose an identifiable subset of the group, count the individuals exhibiting each behaviour at each time interval, and add a comment that a subset of the group was sampled.

Indicate the total group size at the top of the data form, not the size of the subset whose behaviour was recorded. Count the number of caribou up to 100 animals, and then record group size in categories above 100; 100-200 animals, etc. (see Appendix A).

Practically, the easiest way to do this is to have the observer scan across the group of caribou from Left to Right, calling out the behaviour of each animal, while the recorder adds tick marks to the data sheet. When complete, count up the tick marks.

### 3.3.3.5 Disturbance Events

Caribou behaviour is expected to vary in response to some disturbance events. The bottom of the data form should be used to record any potential disturbance events evident to the observer regardless of whether caribou respond to them. The main categories of events are included in the data sheet:

- Light truck;
- Haul truck;
- Road maintenance vehicle (e.g., grader);
- ATV or skidoo;
- Aircraft; and
- Predator (note species).

Record the number and approximate speed of the vehicle (regular driving speed, or moving slowly, ~10 km/h, past caribou).

Record the time of the disturbance event (0:00 to 30:00 of the survey), indicate which type of disturbance was observed in the appropriate column. Record any additional comments and records of photographs taken in the final column.

Record whether the vehicle stopped when approaching caribou or continued to drive slowly. If possible, coordinate with passing vehicles on the road to have some vehicles stop for 10 minutes, and others drive by slowly.

### 3.3.4 Behaviour Classification

With the exception of Alert behaviour, the primary behaviour categories and their definitions follow classifications from the Government of Northwest Territories (GNWT 2017). The categories appear as columns on the data form, with descriptions on the form. The behaviour categories are:

- **Feeding** – standing or walking posture, with the muzzle touching or nearly touching the ground; can be ingesting food or not; head down or moving from side to side.
- **Lying down** – bedded on the ground, either upright or lying on its side, in a resting or ruminating position.
- **Standing** – stationary in an upright, standing posture with head elevated above the ground, and usually above the knees; if cow is nursing, if possible record the time spend nursing.
- **Alert** – head up scanning horizon or focused on a source of disturbance (e.g., vehicle, predator, human).
- **Walking** – similar to standing posture but moving at a slow gait (<5 km/h).
- **Trotting/running** – similar to standing posture but moving rapidly in symmetrical or asymmetrical gait.

Other behaviours that may be observed (record in comments field on form) are:

- **Nursing** – calf is suckling cow.
- **Sparring** – two males in contact.
- **Insect response behavior** – twitching, stamping, tossing head.

In the comments, record if any animals are moving towards the road, parallel or away from the road.

## 4. DATA MANAGEMENT

Please scan all data sheets at the end of the day. Data from behaviour surveys should be entered into Excel. Data from group selection surveys (standard tablet data form) and behaviour surveys should be delivered at the end of each month to ERM for QA/QC.

## 5. CLOSURE

This SOP has been produced for Agnico Eagle Meadowbank Division by ERM Canada. Please contact the authors with any questions.

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## 6. REFERENCES

GNWT-ENR. 2017. *Caribou behaviour monitoring field protocols*. Government of the Northwest Territories Environment and Natural Resources, 10 page unpublished document. Yellowknife, NT.

TEMP. 2020. Meadowbank Division. *Terrestrial Ecosystem Management Plan*. Version 8, April 2020.

**APPENDIX A      MEADOWBANK GOLD MINE: CARIBOU BEHAVIOUR  
MONITORING DATA SHEET**

## Meadowbank Gold Mine: Caribou Behaviour Monitoring Data Sheet

Date:	Time (24 hr [00:00 to 24:00]) Start:		End:			
Observers:						
Location Waypoint number:	UTM Easting:	UTM Northing:	Road name and distance marker:			
Distance from caribou to observer location (use rangefinder). _____ (if group diffuse, estimate average distance) Bearing: _____						
Is group location East or West of the Road at start of survey? Circle one: <b>E</b> <b>W</b> Did the group cross the road during the survey? Circle one: <b>Y</b> <b>N</b>						
Caribou group size: Exact count (up to 100): _____ Estimated size for larger groups. Circle one: <b>101-200</b> <b>201-500</b> <b>501-1000</b> <b>&gt;1000</b>						
Record sex of group (mostly males, females with calves, mostly juveniles, or mixed group): _____						
Temperature: _____ °C Wind speed: _____ km/h Wind direction: _____ ° Humidity: _____ % Days since last snow or wind event: _____						
Weather observations: _____						
Road: Open?	Closed?	Road Height:	Road Side Width:			
Structures/snowbank Present: _____						
Observation time from start of survey	Number of animals exhibiting each behaviour type			Comments and photo numbers (Note if any caribou crossed road or travelled along road)		
	Feeding	Lying Down	Standing		Walking	Alert
0 minutes						
3 minutes						
6 minutes						
9 minutes						
12 minutes						
15 minutes						
18 minutes						
21 minutes						
24 minutes						
27 minutes						
30 minutes						
<b>Observed disturbance events</b>						
(record time from start of survey and check type of disturbance. Record whether vehicle stopped (s) or drove slowly (d) past caribou)						
Time from start of survey	Light truck	Haul Truck	Road maintenance vehicle (e.g., grader)	ATV	Aircraft	Predator (note species)
						Comments and photo numbers. Note other disturbances here

## Categories and Definitions of Behaviour<sup>1</sup>:

- **Feeding** – standing or walking posture, with the muzzle touching or nearly touching the ground; can be ingesting food or not; head down or moving from side to side.
- **Lying down** – bedded on the ground, either upright or lying on its side, in a resting or ruminating position.
- **Standing** – stationary in an upright, standing posture with head elevated above the ground, and usually above the knees; if cow is nursing, if possible record the time spend nursing.
- **Alert** – head up scanning horizon or focused on a source of disturbance (e.g., vehicle, predator, human).
- **Walking** – similar to standing posture but moving at a slow gait (<5 km/h).
- **Trotting/running** – similar to standing posture but moving rapidly in symmetrical or asymmetrical gait.

Other behaviours that may be observed (record in comments field on form) are:

- **Nursing** – calf is suckling cow.
- **Sparring** – two males in contact.
- **Insect response behavior** – twitching, stamping, tossing head.

<sup>1</sup> Primary source: GNWT-ENR 2017 caribou behaviour monitoring field protocols, courtesy of GNWT Yellowknife, NT.

# APPENDIX B DATA FROM CARIBOU BEHAVIOUR SURVEYS

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Observers	UTM_E	UTM_N	Road Name and Distance Marker	Distance from Caribou to Observer Location (m)	Distance from Caribou to Road	Bearing to Caribou Group	Is group east or west of survey?	Did the group cross the road during the survey?	Caribou Group Size	Temperature (°C)	Wind Speed (km/h)	Wind Direction	Days since Last Snow or Wind Event
1	17-Jun-23	DM, MM	540996	6986104	AWAR 27	100-300	NA	235	West	No	4	8	24	312.3	0
2		DM, MM	540999	6985761	AWAR 27	100-300	NA	NA	West	No	4	8	24	312.3	0
3		DI, IL	542936	6984430	AWAR 24.5	300-1000	0	NA	West	Yes	50-100	11	13.8	223.7	0
4		IL, DI	543914	6983012	AWAR 22.5	10-300	NA	NA	NA	No	18	8	15.9	206.2	0
5	18-Jun-23	AT, IL	541417	6987855	AWAR 29.5	300-1000	NA	NA	East	No	3	14	17.1	42.2	1
6		IL, AT	540982	6986068	AWAR 27.5	300-1000	NA	NA	West	No	9	15	20.3	12.5	1
7	19-Jun-23	DI, IL	540679	6985948	AWAR Esker KM 27	0-50	NA	90	West	No	6	7	26.2	344.1	2
8		IL, DI	540674	6985953	AWAR Esker KM 27	NA	NA	315	West	No	3	7	26.7	337.3	2
9		IL, DI	540738	6985955	AWAR Esker KM 27	51-100	NA	NA	West	No	9-Aug	7	26.6	341.4	2
10		IL, AT	540905	6985896	AWAR 27.25	100-300	NA	180	West	No	11-Jul	9.2	26.2	345.3	2
11		IL, AT	541429	6985458	AWAR 26	NA	0	NA	E-W	Yes	50-100	9.2	26.2	345.2	2
12		IL, AT	541420	6985458	AWAR 25	1000	0	270	West	Yes	50-100	11	26.2	345.3	2
13	20-Jun-23	IL, AT	538997	6989402	AWAR 30	51-100	0	90	West	Yes	6	7.2	8.1	129.2	3
14		IL, AT	541481	6987076	AWAR 28	100-300	0	90	E-W	Yes	201-500	6	8.5	164.3	3
15		AT, IL	541213	6986826	AWAR 28	300-1000	NA	NA	West	No	11	6	5.1	98.7	3
16	21-Jun-23	IL, AT	540709	6985933	AWAR 27	1000	NA	90	West	No	201-500	13.9	12.8	219.9	4
17	22-Jun-23	NM, IL	543615	6983959	AWAR KM 23	>1000m	30	180	West	Yes	40	12	16	180	NA
18		NM, IL	543615	6983959	AWAR KM 23	300-1000m	500	180	East	No	300	11	17	90	NA
19	23-Jun-23	NM, JC	541489	6987063	AWAR KM 27	300-1000m	400	180	East	No	150	8	20	270	NA
20		NM, JC	541489	6987063	AWAR KM 26	300-1000m	NA	180	East	No	150	8	22	270	NA
21		NM, JC, IL	540980	6986096	AWAR KM 27	100-300m	300	270	West	No	101-200	9	23	230	NA
22		NM, AT, SG	543802	6983375	AWAR KM 23	0-50m	20	270	West	No	1	8	26	200	NA
23	24-Jun-23	IL, HB	541509	6987406	AWAR 29	100-300	NA	NA	West	No	1	8	20.2	330.9	0
24		NM, SG	541815	6988926	EXPLO KM 0	300-1000m	NA	360	East	No	1	15	14	220	NA
25	25-Jun-23	NM JC	540320	6988907	AWAR KM 14	300-1000m	NA	90	East	No	>1000	6	36	320	0
26		NM, JC	547876	6976232	AWAR KM 14	300-1000m	500	90	East	No	>1000	6	36	320	NA
27		NM, JC	547876	6976232	AWAR KM 14	>1000m	1000	90	West	Yes	>1000	6	36	320	0
28		NM JC	547770	6975506	AWAR KM 13	300-1000m	NA	180	West	No	>1000	7	30	320	0
29		NM, JC	547770	6975506	AWAR KM 13	300-1000m	50	180	West	No	>1000	7	30	320	0
30		NM, JC	547770	6975506	AWAR KM 13	>1000m	800	200	West	No	>1000	7	30	320	0
31		JC, NM	547036	6973832	AWAR KM 12	300-1000m	0	90	West	No	>1000	7	30	320	0
32		NM, JC	546801	6973418	AWAR KM 11	300-1000m	100	180	East	No	501-1000	10	25	320	0
33	6-Jul-23	MF, MM	546961	6974262	AWAR KM 12	300-1000m	NA	170	East	Yes	>1000	10	19	130	NA
34		MF, MM	547163	6974163	AWAR KM 12	>1000m	NA	250	West	No	>1000	11	16	110	NA
35		MF, SS	543699	6970277	AWAR KM 7	100-300m	NA	330	East	Yes	>1000	16	17	155	NA
36	7-Jul-23	MF, MM	547184	6974118	AWAR KM 12	300-1000m	NA	220	East	Yes	>1000	9	14	90	NA
37		MF, MM	547181	6974115	AWAR KM 11	300-1000m	NA	203	East	Yes	>1000	9	12	95	NA
38		MF, SS	546391	6972670	AWAR KM 10	>1000m	NA	320	West	No	>1000	14	18	140	NA
39		MF, SS	544844	6971696	AWAR KM 8	300-1000m	NA	88	West	No	201-500	16	20	95	NA
40	9-Jul-23	MF, MM	547185	6974113	AWAR KM 10	>1000m	NA	190	East	No	201-500	8	18	NA	NA
41		MF, MM	546660	6979228	AWAR KM 19	300-1000m	NA	12	East	No	501-1000	7	31	202	NA
42		MF, MM	546156	6980093	AWAR KM 20	300-1000m	NA	324	East	Yes	>1000	7	34	270	NA
43	17-Jul-23	DM, IL	546172	6979871	AWAR 19	300-1000	NA	NA	West	No	2000+	10	20.4	299.4	0

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Weather Observations	Road Height (cm)	Road Side Width (cm)	Structures Present	Feeding 0	Laying 0	Standing 0	Walking 0	Alert 0	Trotting 0	Comments 0
1	17-Jun-23	Cloudy-sunny	NA	NA	AWAR	4	0	0	0	0	0	NA
2		Cloudy-sunny	NA	NA	AWAR	3	0	0	1	0	0	NA
3		Cloudy	NA	NA	AWAR	40	5	0	5	0	0	NA
4		Cloudy-sunny	NA	NA	AWAR	11	7	0	0	0	0	NA
5	18-Jun-23	Cloudy	NA	NA	AWAR	3	0	0	0	0	0	NA
6		Cloudy	NA	NA	AWAR	2	7	0	0	0	0	NA
7	19-Jun-23	Sunny	NA	NA	AWAR	3	0	0	3	0	0	NA
8		Sunny	NA	NA	AWAR	3	0	0	0	0	0	NA
9		Sunny	NA	NA	AWAR	5	2	0	1	0	0	The one walking cross the road
10		Sunny	NA	NA	AWAR	2	5	0	0	0	0	NA
11		Sunny	NA	NA	AWAR	49	1	0	0	0	0	NA
12		Sunny	NA	NA	AWAR	40	10	0	0	0	0	NA
13	20-Jun-23	Partly sunny	NA	NA	AWAR	6	0	0	0	0	0	Cross AWAR W to E
14		Partly sunny	NA	NA	AWAR	20	10	0	0	0	0	They are on both side AWAR mostly east
15		Partly sunny	NA	NA	AWAR	3	8	0	0	0	0	NA
16	21-Jun-23	Partly sunny	NA	NA	AWAR	23	5	0	2	0	0	NA
17	22-Jun-23	Clear	100	100	30m from road	10	0	0	10	0	3	NA
18		Clear	100	100	500m from road	40	15	0	0	0	0	Convoy coming
19	23-Jun-23	Clear	100	100	400m from road	20	0	0	0	0	3	Convoy playing
20		Cloudy, started to rain at 24 minutes	100	100	NA	4	20	0	0	9	0	NA
21		Rain passed, sun coming out	100	100	300m from road	27	3	0	0	0	0	NA
22		Clear	100	100	20m from road	0	0	0	0	1	0	NA
23	24-Jun-23	Cloudy/rain	NA	NA	AWAR	0	1	0	0	0	0	NA
24		Clear, sunny, good visibility	100	100	About 100m from WRSF3	0	0	0	0	0	1	Zigzagging
25	25-Jun-23	Overcast	100	100	500m from the road	23	27	0	1	0	0	NA
26		Overcast	100	100	500m from road	2	61	0	0	0	0	NA
27		Overcast, windy, no bugs	100	100	1000m from road	21	0	0	3	1	7	NA
28		Wind 30 gusting 50	100	100	0M from road	28	0	0	3	0	0	NA
29		Overcast, wind gusting at 50 km/h	100	100	50m from road	30	15	1	0	0	0	NA
30		Cloudy, windy	100	100	800m from road	19	25	0	0	0	0	Hunter approaching
31		Partly cloudy	100	100	0m to road	10	0	0	8	2	13	NA
32		Partly cloudy	100	100	100 m from road	22	5	1	2	0	0	One nursing
33	6-Jul-23	Overcast, cool; buggy	100	150	Bridge	10	0	0	25	0	0	Crossing road. Drinking in lake
34		Buggy; clear	100	200	NA	30	0	0	0	0	0	NA
35		NA	50	250	NA	25	0	0	5	0	0	NA
36	7-Jul-23	Overcast, few bugs	100	250	Bridge	24	0	0	4	0	0	NA
37		Drizzling	100	200	Bridge	3	18	2	8	0	0	NA
38		Clear, broken clouds	150	300	NA	32	0	0	0	0	0	NA
39		Clear, broken clouds	150	180	Tentcity cabins	30	0	0	0	0	0	NA
40	9-Jul-23	Overcast, breezy	100	150	NA	28	5	0	2	0	0	NA
41		Breezy, overcast	90	200	NA	26	0	0	8	0	0	NA
42		Windy, overcast	80	300	Excavators, new quarry	12	0	3	15	0	0	NA
43	17-Jul-23	Cloudy-sunny	NA	NA	AWAR	10	0	1	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Feeding 3	Laying 3	Standing 3	Walking 3	Alert 3	Trotting 3	Comments 3	Feeding 6	Laying 6	Standing 6	Walking 6	Alert 6	Trotting 6	Comments 6
1	17-Jun-23	2	0	0	0	0	0	NA	0	0	0	2	0	0	180 m away from observers
2		1	0	0	3	0	0	NA	3	0	0	1	0	0	NA
3		45	0	0	5	0	0	NA	45	5	0	0	0	0	NA
4		8	10	0	0	0	0	NA	8	10	0	0	0	0	NA
5	18-Jun-23	2	0	0	1	0	0	NA	2	0	0	1	0	0	NA
6		2	7	0	0	0	0	NA	3	6	0	0	0	0	NA
7	19-Jun-23	3	0	0	3	0	0	NA	6	0	0	0	0	0	NA
8		2	0	0	1	0	0	NA	3	0	0	0	0	0	NA
9		4	3	0	0	0	0	Lost the one that cross	3	4	0	2	0	0	Gain one more
10		0	0	0	7	0	0	NA	10	0	0	1	0	0	Gain 4 more
11		47	0	0	3	0	0	Crossing the road back and forth	47	0	0	3	0	0	NA
12		25	25	0	0	0	0	NA	25	25	0	0	0	0	NA
13	20-Jun-23	6	0	0	0	0	0	NA	6	0	0	0	0	0	NA
14		24	6	0	0	0	0	NA	20	5	0	5	0	0	More cross on east side
15		0	11	0	0	0	0	NA	0	11	0	0	0	0	NA
16	21-Jun-23	24	0	0	6	0	0	Starting to move	24	0	0	6	0	0	NA
17	22-Jun-23	25	0	0	6	0	0	NA	20	0	0	8	2	0	Crossing the road
18		40	15	0	5	0	0	Convoy 2 km away, stopping	30	10	0	7	2	0	Convoy 2km away and stopped
19	23-Jun-23	12	0	0	8	0	4	Moving towards road	10	0	0	10	2	2	NA
20		5	24	0	0	4	0	Truck stopped	5	28	0	0	0	0	NA
21		26	3	0	0	1	0	NA	25	5	0	0	0	0	NA
22		1	0	0	0	0	0	NA	1	0	0	0	0	0	NA
23	24-Jun-23	0	1	0	0	0	0	NA	0	1	0	0	0	0	NA
24		0	0	0	0	0	1	NA	0	0	0	0	0	1	Switched directions, hesitant about the waterline
25	25-Jun-23	30	56	0	0	0	0	NA	27	59	0	0	0	0	NA
26		1	58	2	0	1	0	One nursing	2	57	0	0	1	0	NA
27		23	4	0	2	0	4	NA	20	0	0	9	0	1	NA
28		24	0	0	3	0	0	NA	22	8	0	4	0	0	Laying beside road
29		19	14	0	0	0	0	NA	28	12	0	0	0	0	NA
30		19	26	0	0	0	0	Hunter stationary nearby	14	28	0	0	0	0	NA
31		6	0	0	0	7	20	NA	12	0	0	7	0	17	NA
32		24	5	0	1	0	0	NA	20	5	0	7	0	0	NA
33	6-Jul-23	33	0	0	0	2	2	NA	30	0	0	3	0	1	NA
34		15	0	0	15	0	0	NA	15	10	0	5	0	0	NA
35		30	0	0	0	0	0	NA	0	0	0	20	2	10	Moving fast atv
36	7-Jul-23	30	0	0	0	0	0	NA	28	0	1	1	0	0	NA
37		3	15	1	10	1	0	NA	2	15	4	12	0	0	NA
38		10	0	0	20	0	0	NA	0	0	2	28	1	0	NA
39		25	5	1	3	0	0	NA	25	4	0	3	0	0	NA
40	9-Jul-23	28	0	0	3	0	0	NA	30	0	1	2	0	1	Slowly moving while feeding
41		38	0	0	0	0	1	NA	21	9	4	1	2	0	NA
42		0	4	0	10	0	2	NA	3	4	5	14	0	2	NA
43	17-Jul-23	11	0	0	0	0	0	NA	11	0	0	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Feeding 9	Laying 9	Standing 9	Walking 9	Alert 9	Trotting 9	Comments 9	Feeding 12	Laying 12	Standing 12	Walking 12	Alert 12	Trotting 12	Comments 12
1	17-Jun-23	0	0	0	0	0	0	Out of sight	NA	NA	NA	NA	NA	NA	NA
2		2	1	0	1	0	0	NA	2	2	0	0	0	0	NA
3		48	0	0	0	0	2	NA	48	2	0	0	0	0	NA
4		7	11	0	0	0	0	NA	5	13	0	0	0	0	NA
5	18-Jun-23	3	0	0	0	0	0	NA	3	0	0	0	0	0	NA
6		3	6	0	0	0	0	NA	3	6	0	0	0	0	NA
7	19-Jun-23	6	0	0	0	0	0	NA	6	0	0	0	0	0	NA
8		3	0	0	0	0	0	NA	1	0	0	0	0	0	Lost 2 behind hill
9		5	4	0	0	0	0	NA	5	4	0	0	0	0	NA
10		11	0	0	0	0	0	NA	6	0	0	0	0	0	NA
11		50	0	0	0	0	0	NA	50	0	0	0	0	0	Lost 4 behind a hill
12		20	30	0	0	0	0	NA	33	0	0	15	2	0	NA
13	20-Jun-23	6	0	0	0	0	0	NA	4	0	0	1	1	0	NA
14		21	5	0	4	0	0	NA	24	3	0	3	0	0	NA
15		0	11	0	0	0	0	NA	0	11	0	0	0	0	NA
16	21-Jun-23	23	0	0	6	0	1	NA	12	0	0	18	0	0	NA
17	22-Jun-23	10	0	0	10	2	4	ATV approaching, 50% on each side of road now	0	0	0	20	2	8	NA
18		30	0	0	10	3	0	Convoy moving again	30	0	0	0	2	0	Convoy
19	23-Jun-23	25	0	2	2	0	2	NA	25	0	0	0	0	2	NA
20		5	28	0	0	0	0	NA	3	30	0	0	0	0	NA
21		20	8	0	0	1	0	NA	14	14	0	0	2	0	NA
22		1	0	0	0	0	0	NA	0	0	0	0	1	0	NA
23	24-Jun-23	0	1	0	0	0	0	Stand up/alert	0	1	0	0	0	0	NA
24		0	0	0	0	0	1	Going back in the direction it came from	0	0	0	0	1	0	NA
25	25-Jun-23	24	64	0	2	1	0	NA	33	60	0	1	0	0	NA
26		4	58	0	0	0	0	NA	5	57	0	0	0	0	NA
27		26	0	0	1	0	3	NA	21	0	0	9	0	0	NA
28		23	10	0	2	0	0	Light rain started	13	8	0	11	0	7	NA
29		28	13	0	0	0	0	NA	25	18	0	0	0	0	NA
30		14	17	0	4	0	1	Hunter out of sight, moving slowly	15	15	NA	2	0	0	NA
31		11	0	0	0	1	5	NA	0	0	0	0	0	0	NA
32		20	4	0	6	0	0	NA	19	8	0	3	0	0	NA
33	6-Jul-23	0	0	0	35	0	0	Moving west	0	0	0	20	0	15	NA
34		20	0	3	7	0	0	NA	25	0	0	5	0	0	NA
35		0	0	0	30	0	0	NA	0	0	0	20	6	7	NA
36	7-Jul-23	29	0	0	0	0	1	NA	25	0	0	0	1	4	NA
37		0	3	20	6	1	0	Standing on road	4	0	24	3	0	0	NA
38		28	2	0	0	0	0	NA	26	0	0	4	0	0	NA
39		15	20	1	0	0	0	NA	10	20	0	0	0	0	NA
40	9-Jul-23	30	0	0	0	2	0	NA	24	0	0	5	0	1	NA
41		13	28	1	2	0	0	NA	9	24	2	1	0	0	NA
42		0	3	0	28	0	0	NA	0	0	0	30	0	0	NA
43	17-Jul-23	11	0	0	0	0	0	NA	10	1	0	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Feeding 15	Laying 15	Standing 15	Walking 15	Alert 15	Trotting 15	Comments 15	Feeding 18	Laying 18	Standing 18	Walking 18	Alert 18	Trotting 18	Comments 18
1	17-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2		1	3	0	0	0	0	NA	0	4	0	0	0	0	200m away from observer
3		48	2	0	0	0	0	NA	48	0	0	2	0	0	NA
4		3	15	0	0	0	0	NA	5	13	0	0	0	0	NA
5	18-Jun-23	3	0	0	0	0	0	NA	3	0	0	0	0	0	NA
6		2	7	0	0	0	0	NA	2	7	0	0	0	0	NA
7	19-Jun-23	6	0	0	0	0	0	NA	6	0	0	0	0	0	NA
8		3	0	0	0	0	0	NA	3	0	0	0	0	0	NA
9		4	5	0	0	0	0	NA	3	6	0	0	0	0	NA
10		0	0	0	7	0	0	All went behind a hill	NA	NA	NA	NA	NA	NA	NA
11		50	0	0	0	0	0	NA	48	0	0	2	0	0	NA
12		0	0	0	0	0	50	Most were alert and started to run	10	0	0	0	0	0	90% are gone
13	20-Jun-23	6	0	0	0	0	0	NA	6	0	0	0	0	0	NA
14		23	5	0	0	0	2	NA	24	6	0	0	0	0	NA
15		0	11	0	0	0	0	NA	0	11	0	0	0	0	NA
16	21-Jun-23	12	0	0	18	0	0	NA	14	0	0	16	0	0	NA
17	22-Jun-23	0	0	0	20	0	14	Most cross road. ATV did not approach	10	0	0	10	0	8	All crossed
18		0	0	0	0	0	60	All trotting	0	0	0	30	2	30	Convoy passed
19	23-Jun-23	25	8	0	0	0	2	NA	17	4	0	0	0	0	NA
20		5	28	0	0	0	0	NA	4	29	0	0	0	0	NA
21		13	13	0	0	0	1	NA	13	16	0	1	0	0	NA
22		1	0	0	0	0	0	NA	1	0	0	0	0	0	NA
23	24-Jun-23	0	1	0	0	0	0	NA	0	1	0	0	0	0	NA
24		0	0	0	0	0	1	NA	0	0	0	0	0	1	NA
25	25-Jun-23	23	77	0	3	0	0	NA	25	77	0	0	0	0	NA
26		8	45	0	1	0	0	NA	14	55	0	0	0	1	NA
27		19	0	0	4	0	7	NA	19	0	0	4	0	7	NA
28		25	5	0	7	0	0	NA	20	5	0	8	0	1	NA
29		29	16	0	0	0	0	NA	22	19	0	0	0	0	NA
30		23	12	0	5	0	0	NA	16	10	1	0	0	0	One nursing
31		0	0	0	0	0	0	NA	0	0	0	0	0	0	NA
32		17	6	0	10	0	0	NA	14	4	0	13	0	0	NA
33	6-Jul-23	5	0	0	25	0	5	NA	10	0	0	20	0	5	NA
34		28	0	0	2	0	0	NA	10	0	0	20	0	0	NA
35		0	0	0	0	0	30	NA	0	0	0	0	0	30	NA
36	7-Jul-23	28	0	0	1	0	1	NA	22	0	0	8	0	0	NA
37		25	0	0	5	0	0	Crossed road	20	0	3	8	0	0	NA
38		29	0	0	0	0	1	NA	25	0	0	2	0	3	NA
39		28	0	0	1	1	0	NA	30	0	0	0	0	0	NA
40	9-Jul-23	22	0	0	14	0	0	NA	14	0	0	20	1	0	NA
41		4	23	8	0	0	0	NA	2	21	9	6	0	0	NA
42		4	0	2	28	0	2	NA	4	0	0	25	0	0	NA
43	17-Jul-23	9	2	0	0	0	0	NA	9	2	0	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Feeding 21	Laying 21	Standing 21	Walking 21	Alert 21	Trotting 21	Comments 21	Feeding 24	Laying 24	Standing 24	Walking 24	Alert 24	Trotting 24	Comments 24
1	17-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2		4	0	0	0	0	0	NA	4	0	0	0	0	0	NA
3		48	0	0	2	0	0	NA	43	0	0	7	0	0	NA
4		6	12	0	0	0	0	NA	5	13	0	0	0	0	NA
5	18-Jun-23	3	0	0	0	0	0	NA	2	1	0	0	0	0	NA
6		3	6	0	0	0	0	NA	3	6	0	0	0	0	NA
7	19-Jun-23	0	0	0	0	0	0	All gone, went on other side of esker	NA	NA	NA	NA	NA	NA	NA
8		3	0	0	0	0	0	NA	1	0	0	2	0	0	NA
9		3	6	0	0	0	0	NA	0	9	0	0	0	0	NA
10		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11		47	0	0	3	0	0	0	48	2	0	0	0	0	NA
12		5	0	0	5	0	0	90% gone	5	0	0	0	0	0	95% gone
13	20-Jun-23	4	0	0	2	0	0	Cross AWAR E to W	1	0	0	5	0	0	NA
14		23	4	0	0	0	0	NA	26	4	0	0	0	0	NA
15		0	9	0	2	0	0	NA	0	9	0	2	0	0	NA
16	21-Jun-23	5	0	0	15	0	0	Losing sight of caribou	2	0	0	20	0	0	NA
17	22-Jun-23	30	0	0	10	0	3	More appearing over ridge	20	0	0	1	1	7	More joining, main group 300m off road
18		0	0	0	50	0	30	NA	0	0	0	0	0	60	NA
19	23-Jun-23	16	10	0	0	0	0	NA	13	14	0	0	0	0	NA
20		4	28	0	1	0	0	NA	2	31	0	0	0	0	NA
21		14	18	0	0	1	0	NA	8	22	0	0	0	0	NA
22		0	0	0	0	1	0	NA	0	0	0	0	0	1	NA
23	24-Jun-23	0	1	0	0	0	0	NA	0	1	0	0	0	0	NA
24		0	0	0	0	0	0	Out of sight	0	0	0	0	0	1	NA
25	25-Jun-23	11	92	0	0	0	0	NA	9	93	0	0	0	0	NA
26		12	31	0	8	0	0	NA	18	39	0	0	1	0	NA
27		25	0	0	4	0	1	NA	24	0	0	4	0	2	NA
28		20	8	0	6	0	0	NA	8	3	0	3	0	2	NA
29		21	19	0	0	0	0	NA	22	20	0	0	0	0	NA
30		16	8	1	3	0	0	One nursing	11	8	0	6	1	0	NA
31		0	0	0	0	0	0	NA	0	0	0	0	0	0	NA
32		20	6	0	10	0	0	NA	15	7	0	8	0	0	NA
33	6-Jul-23	30	0	0	4	0	1	NA	0	0	0	35	0	0	NA
34		22	2	0	6	0	0	NA	6	0	0	20	2	2	NA
35		0	0	0	0	0	30	NA	0	0	0	0	0	30	NA
36	7-Jul-23	15	0	0	5	0	10	NA	22	0	2	1	2	2	1 crossed
37		0	0	0	30	0	0	Started raining	5	0	0	25	0	0	NA
38		16	0	0	15	0	0	NA	5	0	0	25	0	0	NA
39		35	0	0	0	0	0	NA	30	0	0	0	0	0	NA
40	9-Jul-23	0	0	0	5	0	0	Rest out of sight	10	0	1	22	0	2	NA
41		5	19	2	9	0	0	NA	12	15	0	0	0	0	NA
42		25	0	0	5	0	1	NA	20	0	0	15	0	0	NA
43	17-Jul-23	9	2	0	0	0	0	NA	9	2	0	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Feeding 27	Laying 27	Standing 27	Walking 27	Alert 27	Trotting 27	Comments 27	Feeding 30	Laying 30	Standing 30	Walking 30	Alert 30	Trotting 30	Comments 30
1	17-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2		4	0	0	0	0	0	NA	4	0	0	0	0	0	NA
3		43	0	7	0	0	0	NA	45	0	0	5	0	0	Start crossing road
4		3	15	0	0	0	0	NA	3	15	0	0	0	0	NA
5	18-Jun-23	2	1	0	0	0	0	NA	2	1	0	0	0	0	NA
6		3	6	0	0	0	0	NA	3	6	0	0	0	0	NA
7	19-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8		3	0	0	0	0	0	NA	3	0	0	0	0	0	NA
9		0	9	0	0	0	0	NA	9	0	0	0	0	0	NA
10		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11		45	5	0	0	0	0	NA	45	5	0	0	0	0	NA
12		5	0	0	0	0	0	95% gone	5	0	0	0	0	0	95% gone
13	20-Jun-23	6	0	0	0	0	0	Cross AWAR W to E	5	0	0	1	0	0	NA
14		26	4	0	0	0	0	NA	24	6	0	0	0	0	NA
15		2	9	0	0	0	0	NA	0	9	0	0	0	0	Lost 2 down the hill
16	21-Jun-23	4	0	0	4	0	0	lost 90% caribou	4	0	0	0	0	0	Lost 95% caribou
17	22-Jun-23	40	1	0	2	0	0	NA	30	3	0	0	0	2	NA
18		0	0	0	60	0	10	NA	0	0	0	60	0	0	NA
19	23-Jun-23	13	14	0	0	0	0	NA	15	15	0	0	0	0	NA
20		3	30	0	0	0	0	NA	3	30	0	0	0	0	NA
21		7	28	0	0	0	0	NA	3	30	0	0	0	0	NA
22		0	0	0	1	0	0	NA	0	1	0	0	0	0	NA
23	24-Jun-23	0	1	0	0	0	0	NA	0	1	0	0	0	0	NA
24		0	0	0	0	0	0	Out of sight	0	0	0	0	0	0	Out of sight
25	25-Jun-23	9	93	0	0	0	0	NA	10	93	0	1	0	0	NA
26		27	37	0	0	1	1	NA	29	30	0	2	0	0	NA
27		28	0	0	1	0	1	NA	18	0	0	2	0	10	NA
28		12	6	0	1	0	0	Some are moving out of sight	12	6	0	5	0	0	NA
29		12	22	0	0	0	0	NA	13	19	0	0	0	0	NA
30		22	13	0	5	2	2	NA	31	5	0	0	0	0	NA
31		0	0	0	0	0	0	NA	0	0	0	0	0	0	NA
32		16	9	0	6	0	0	NA	16	9	0	4	0	1	NA
33	6-Jul-23	5	0	0	15	0	15	No disturbance seen	30	0	0	5	0	0	NA
34		5	0	0	25	0	0	NA	2	0	2	26	0	0	NA
35		0	0	0	0	0	0	Out of sight	0	0	0	0	0	0	Out of sight
36	7-Jul-23	25	0	1	1	2	0	NA	11	0	0	0	0	19	Bugs
37		0	0	0	30	0	0	NA	28	0	0	2	0	0	NA
38		15	0	1	14	0	0	NA	15	0	0	20	0	0	NA
39		32	3	0	0	0	0	NA	28	5	0	1	1	0	NA
40	9-Jul-23	6	0	0	27	0	1	NA	32	0	0	3	0	0	NA
41		9	17	4	4	0	0	NA	10	22	0	6	0	0	NA
42		5	0	0	24	2	0	NA	30	0	0	2	0	0	NA
43	17-Jul-23	9	2	0	0	0	0	NA	9	2	0	0	0	0	NA

APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Disturbance 0	Disturbance Comments 0	Disturbance 3	Disturbance Comments 3	Disturbance 6	Disturbance Comments 6	Disturbance 9	Disturbance Comments 9
1	17-Jun-23	3 ATV	2:10, 3 ATV caribou running away from road	NA	NA	NA	NA	NA	NA
2		NA	NA	NA	NA	NA	NA	NA	NA
3		NA	NA	NA	NA	NA	NA	NA	NA
4		NA	NA	NA	NA	NA	NA	NA	NA
5	18-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
6		NA	NA	NA	NA	NA	NA	NA	NA
7	19-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
8		NA	NA	NA	NA	NA	NA	NA	NA
9		NA	NA	NA	NA	NA	NA	NA	NA
10		NA	NA	NA	NA	NA	NA	NA	NA
11		NA	NA	NA	NA	NA	NA	NA	NA
12		NA	NA	NA	NA	NA	NA	NA	NA
13	20-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
14		NA	NA	NA	NA	NA	NA	NA	NA
15		NA	NA	NA	NA	NA	NA	NA	NA
16	21-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
17	22-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
18		NA	NA	NA	NA	NA	NA	NA	NA
19	23-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
20		Light truck	Caribou monitoring truck travelling very slow. All laying before	NA	NA	NA	NA	NA	NA
21		NA	NA	NA	NA	NA	NA	NA	NA
22		Light truck	Own vehicle	NA	NA	NA	NA	NA	NA
23	24-Jun-23	NA	NA	NA	NA	NA	NA	ATV	9 min open pit blast second before 1 ATV went by, video taken
24		NA	NA	NA	NA	NA	NA	NA	NA
25	25-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA
26		NA	NA	NA	NA	NA	NA	NA	NA
27		NA	NA	NA	NA	NA	NA	NA	NA
28		NA	NA	NA	NA	NA	NA	NA	NA
29		NA	NA	NA	NA	NA	NA	NA	NA
30		NA	NA	NA	NA	NA	NA	NA	NA
31		ATV	Slow	NA	NA	NA	NA	NA	NA
32		NA	NA	NA	NA	NA	NA	NA	NA
33	6-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA
34		NA	NA	NA	NA	NA	NA	NA	NA
35		ATV	NA	NA	NA	ATV	NA	NA	NA
36	7-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA
37		NA	NA	NA	NA	NA	NA	NA	NA
38		NA	NA	NA	NA	NA	NA	NA	NA
39		ATV	NA	ATV	Side by side	NA	NA	NA	NA
40	9-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA
41		NA	NA	NA	NA	NA	NA	NA	NA
42		NA	NA	NA	NA	NA	NA	NA	NA
43	17-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA

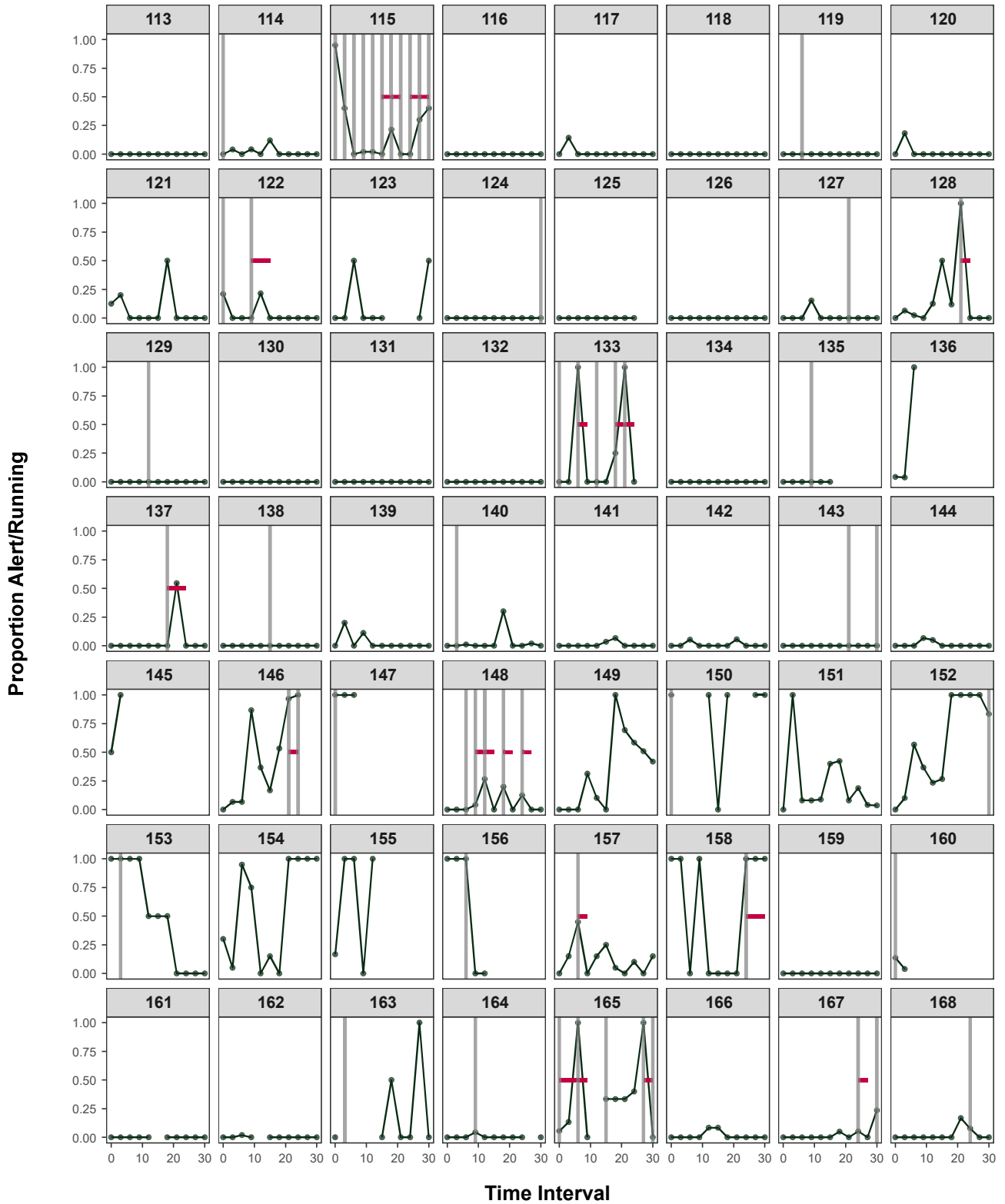
APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Disturbance 12	Disturbance Comments 12	Disturbance 15	Disturbance Comments 15	Disturbance 18	Disturbance Comments 18	Disturbance 21	Disturbance Comments 21	Disturbance 24	Disturbance Comments 24
1	17-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5	18-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	19-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12		NA	NA	Ambulance	15:59 ambulance had to pass, caribou all went running back west	NA	NA	NA	NA	NA	NA
13	20-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
14		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
15		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
16	21-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17	22-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
18		Light truck	10 haul trucks are busses, 4	NA	NA	NA	NA	NA	NA	ATV	NA
19	23-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
21		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
22		NA	NA	NA	NA	NA	NA	NA	NA	ATV	NA
23	24-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
24		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
25	25-Jun-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
26		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
27		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
28		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
29		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
30		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
32		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33	6-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
34		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
35		ATV	ATV herding herd	ATV	Herding	ATV	ATV herding	ATV	Driving fast	ATV	NA
36	7-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
37		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
38		NA	NA	NA	NA	NA	NA	NA	NA	Light truck	Slow
39		Light truck	Slow drive	Light truck	NA	NA	NA	NA	NA	Light truck	NA
40	9-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
41		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
42		NA	NA	NA	NA	Light truck	Slow crawl	NA	NA	NA	NA
43	17-Jul-23	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

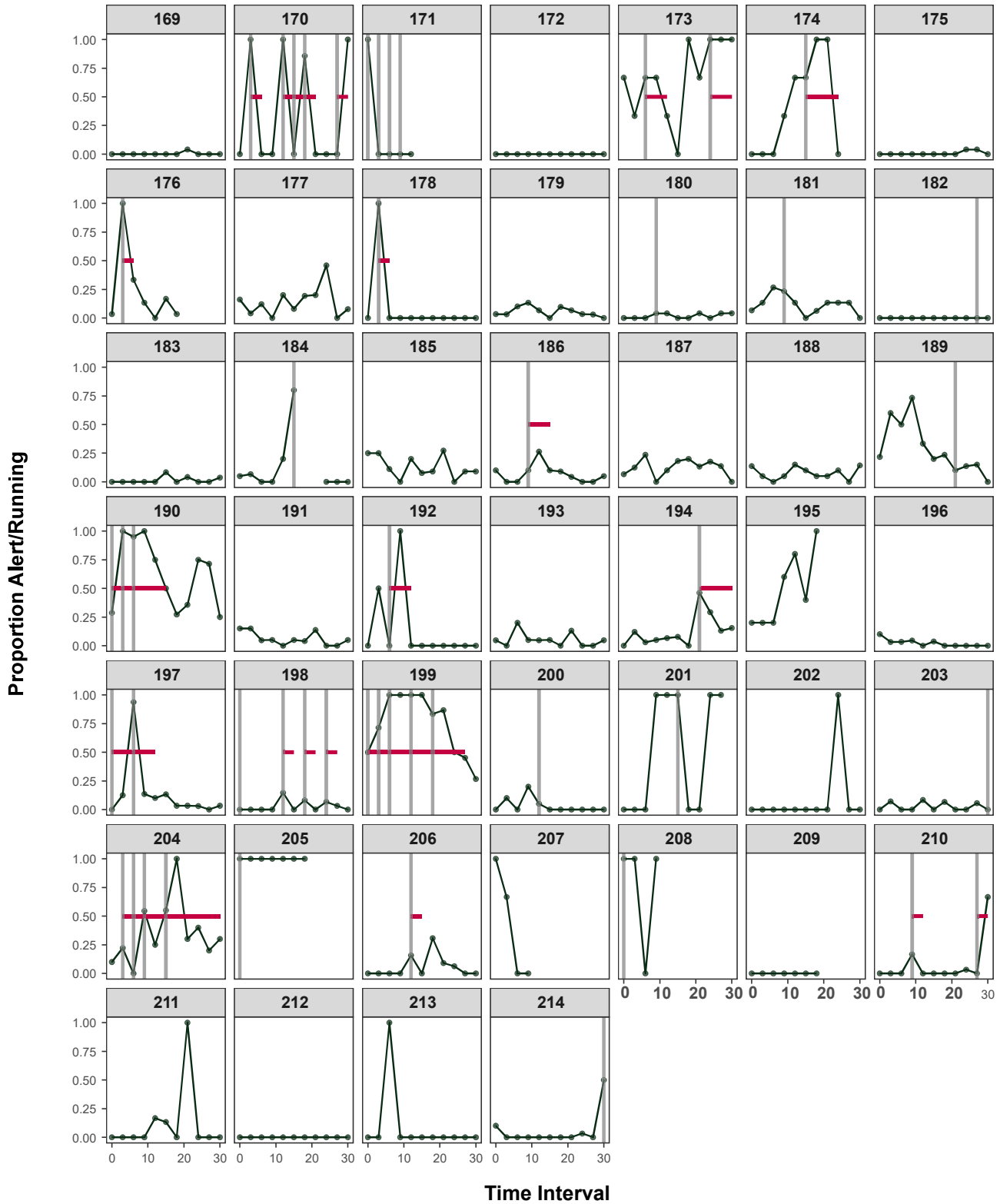
APPENDIX B: DATA FROM CARIBOU BEHAVIOUR SURVEYS

Survey ID	Date	Disturbance 27	Disturbance Comments 27	Disturbance 30	Disturbance Comments 30	General Comments
1	17-Jun-23	NA	NA	NA	NA	NA
2		NA	NA	NA	NA	NA
3		NA	NA	NA	NA	NA
4		NA	NA	NA	NA	NA
5	18-Jun-23	NA	NA	NA	NA	NA
6		NA	NA	NA	NA	NA
7	19-Jun-23	NA	NA	NA	NA	NA
8		NA	NA	NA	NA	NA
9		NA	NA	NA	NA	NA
10		NA	NA	NA	NA	NA
11		NA	NA	NA	NA	NA
12		NA	NA	NA	NA	NA
13	20-Jun-23	NA	NA	NA	NA	NA
14		NA	NA	NA	NA	NA
15		NA	NA	NA	NA	NA
16	21-Jun-23	NA	NA	NA	NA	NA
17	22-Jun-23	NA	NA	NA	NA	Group grew to 100 over survey. All cows and calves. 1 to 1 cows to calves
18		NA	NA	NA	NA	Cows and calves 1:1
19	23-Jun-23	NA	NA	NA	NA	Started to rain
20		NA	NA	NA	NA	Cows and calves 1:1
21		NA	NA	NA	NA	Very unaffected caribou
22		NA	NA	NA	NA	NA
23	24-Jun-23	NA	NA	NA	NA	Seemed stressed
24		NA	NA	NA	NA	Very large group spread from KM8 to KM14 and up to 8 km east of road
25	25-Jun-23	NA	NA	NA	NA	The group extends from KM8 to KM14
26		NA	NA	NA	NA	Group general moving to the north and east
27		NA	NA	NA	NA	Large group spread out over several square kilometers
28		NA	NA	NA	NA	Part of a larger huge group
29		NA	NA	NA	NA	Part of enormous group.
30		Hunter	Possible hunting out of sight, seeing some reaction	NA	NA	Ended early because we left
31		NA	NA	NA	NA	NA
32		NA	NA	NA	NA	NA
33	6-Jul-23	NA	NA	NA	NA	10,000+. Buggy day. Crossed road calmly
34		NA	NA	NA	NA	10,000+, moving west calmly
35		NA	NA	NA	NA	8,000
36	7-Jul-23	NA	NA	NA	NA	3,000
37		NA	NA	NA	NA	3,000
38		ATV	NA	NA	NA	3,000
39		NA	NA	Light truck	NA	NA
40	9-Jul-23	NA	NA	NA	NA	300+
41		NA	NA	NA	NA	Hiding from strong winds
42		NA	NA	NA	NA	15,000
43	17-Jul-23	NA	NA	NA	NA	NA

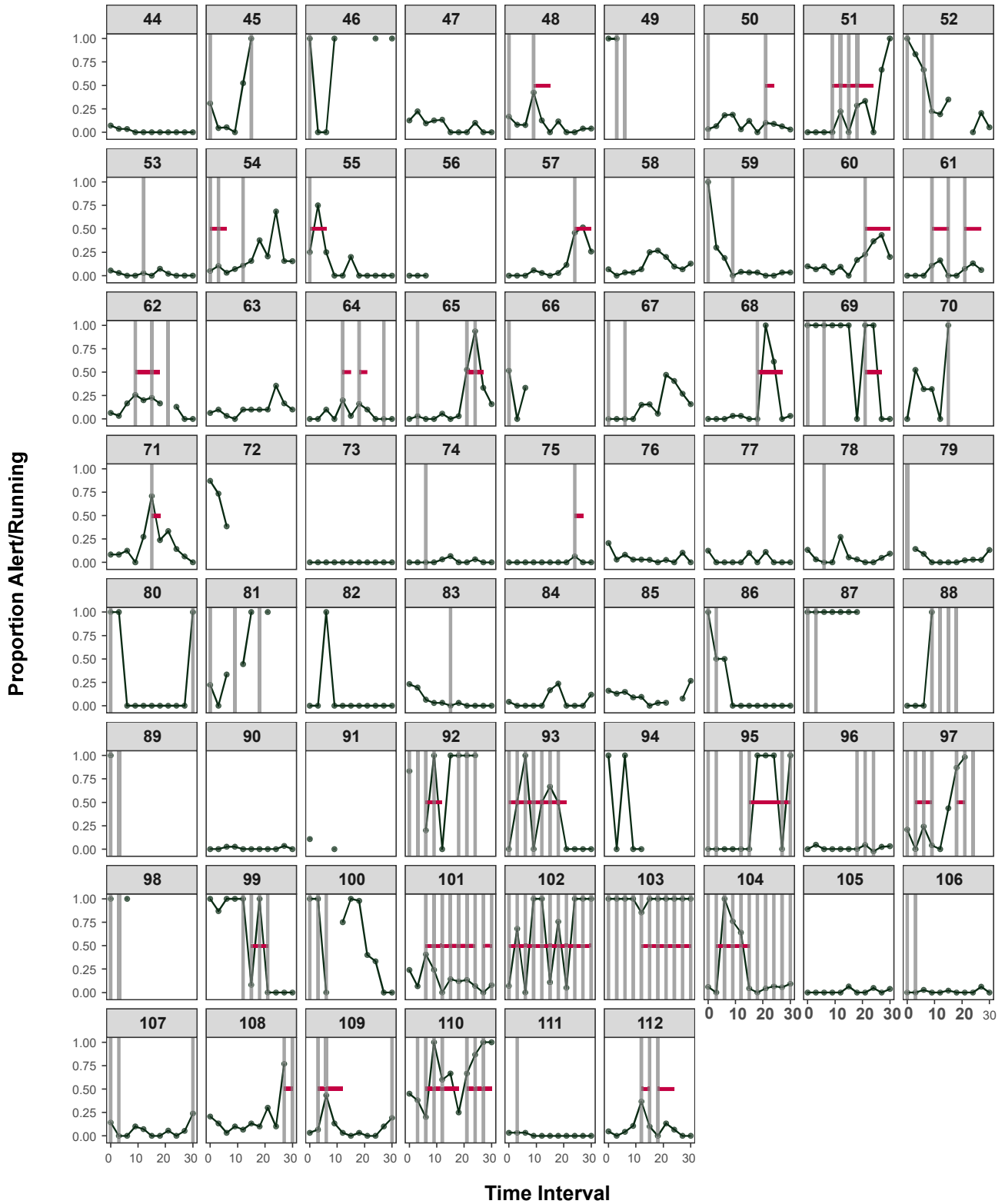
## APPENDIX C PROPORTION OF ALERT AND RUNNING CARIBOU IN EACH SURVEY



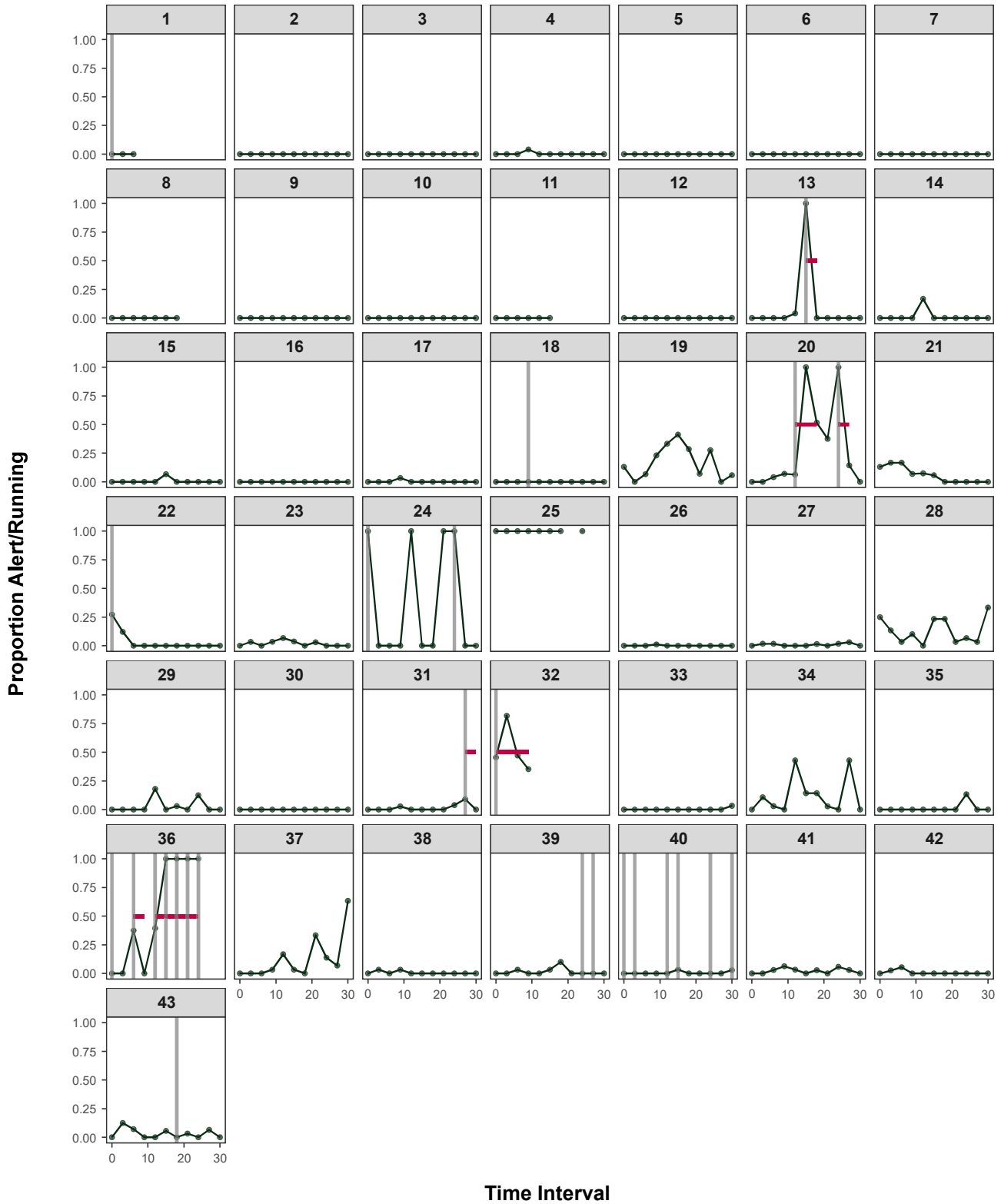
**Figure C-1: Proportion of Response Behaviour during Each Survey – 2020**



**Figure C-2: Proportion of Response Behaviour during Each Survey – 2021**



**Figure C-3: Proportion of Response Behaviour during Each Survey – 2022**



**Figure C-4: Proportion of Response Behaviour during Each Survey – 2023**



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**APPENDIX G**

**Meliadine Project Caribou Trail Camera Study, 2023**



PREPARED FOR



**AGNICO EAGLE**

Agnico Eagle Mines Limited

DATE

March 2024

REFERENCE

0689548-03

# Meliadine Mine

## Caribou Trail Camera Study Compilation Report, 2020 to 2023



## ACKNOWLEDGEMENTS

# Meliadine Mine

## Caribou Trail Camera Study Compilation Report, 2020 to 2023

March 2024

This report was authored by Mitch Fennell (MSc) and Dr. Greg Sharam (PhD) of ERM Consultants Canada Ltd. (ERM), for Agnico Eagle Mines Limited (Agnico Eagle). Image data were collected by ERM and Agnico Eagle staff in 2023, using protocols described herein. Data collection and analytical approaches were designed with the collaboration of the Meliadine Terrestrial Advisory Group, whose input the authors gratefully acknowledge.

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## ACRONYMS AND ABBREVIATIONS

Agnico Eagle	Agnico Eagle Mines Limited
AI	Artificial intelligence
ATV	All-terrain vehicle
AWAR	All weather access road
BQCMB	Beverly Qamanirjuaq Caribou Management Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
GLMs	Generalized linear models
GN	Government of Nunavut
IOL	Inuit-owned land
IQ	Inuit Qaujimajatuqangit (Inuit Traditional Knowledge)
km	Kilometre
KM	Kilometre marker
m	Metre
NIRB	Nunavut Impact Review Board
NWT	Northwest Territories
TEMMP	Meliadine Mine Terrestrial Environment Management and Monitoring Plan
The Mine	The Meliadine Mine

## EXECUTIVE SUMMARY

The Meliadine Mine (the Mine), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km north of Rankin Inlet, Nunavut. A 30 km all-weather access road (AWAR) connects the Mine to Rankin Inlet. During June and July each year, groups of Qamanirjuaq caribou occur in the Mine area, regularly crossing through the Mine site and the AWAR.

During 2020 to 2023 a study was conducted using motion-triggered cameras to examine caribou interactions with the Mine infrastructure during their annual migration, focusing on the AWAR. The initial study was designed to identify features of the AWAR (i.e., slope, substrate, height, and surrounding habitat) that may facilitate higher rates of caribou passage during annual migratory movements. Cameras were also placed at locations identified by community members and Inuit Elders from Inuit Qaujimagatuqangit (IQ) where caribou more frequently crossed the road. The survey protocol in 2023 followed that used in the previous two years, with some cameras moved to the mine site and future Discovery Access Road to the Discovery site at the south end of Meliadine Lake.

This study was completed in accordance with the Meliadine Mine Nunavut Impact Review Board (NIRB) Project Certificate (#006) and associated amendments, and commitments made by Agnico Eagle to document and assess whether caribou movement near the Mine Area is affected by Mine infrastructure, including the AWAR.

Forty-four cameras were placed along the AWAR, around the Mine site, and in the Discovery area in early-June 2023 and were removed in late-July and early-August. On-road cameras were placed approximately 2 metres west of the AWAR, facing north; and took both timed and motion-triggered photos. Road survey data collected in 2020 was used and included in analyses: height above tundra, width, side-slope, surfacing material (esker vs. quarry rock, and size), and surrounding vegetation type. Vehicle data was also collected from the AWAR cameras.

Overall, the key findings across four years (2020 to 2023) of the camera study included:

- The cameras were successful at capturing many caribou crossing the AWAR, with peak caribou passage occurring three weeks earlier in 2023 (June 18 – 26) vs. 2022 (July 10 – 15), consistent with patterns of inter-annual variability observed in caribou GPS collar data.
- Caribou crossing timing and locations in 2023 were consistent with locations identified from 2020 to 2022 and with locations identified by IQ from Inuit Elders and community members. The hotspots identified by the camera data in all three years aligned more closely with the IQ identified hotspots than the collar data from 2012 to 2019.
- Road height and road-side slope at each camera location was not related to the number of caribou observed at each camera location, suggesting that differences in the structure of the AWAR do not significantly influence the locations where caribou cross. The AWAR was constructed with strict design criteria including having a side slope and material that promoted caribou crossing the road – and thus there may not be enough variability in the road construction to influence caribou crossing.

- More caribou were observed on cameras on the northern half of the road in most years. Esker material is more common as a substrate on the northern half of the road which may suggest caribou prefer crossing on esker material. However, it is more likely that this is due to broad scale caribou movement patterns.
- Median time lag from a vehicle passing to a caribou crossing when the AWAR was open was 1.7 hours, when the AWAR was open with restriction was 3.7 hours, and when the AWAR was closed was 4.3 hours. The increasing time lag between vehicle detection and caribou crossing does not necessarily suggest avoidance of traffic on the AWAR, but may instead reflect the largely reduced volume of traffic due to pre-emptive restriction on the AWAR when caribou are in the area. Vehicle results should be treated with caution, as caribou may pass behind a camera or out of range of the camera motion detector, and therefore not all caribou crossings will be captured by all cameras, despite best efforts to do so.
- Caribou were detected in the Mine and Discovery areas throughout the study period, with small groups around the mine and larger migratory groups along the proposed Discovery Road.

Overall, the results suggest that caribou are not affected by the structure of the Meliadine AWAR, but spatial differences in road crossing locations may be explained by traffic, migration timing, migratory route fidelity, or some combination of these factors. Convoys are currently used to mitigate effects of essential Mine traffic during periods when caribou are in the Meliadine area. This mitigation reduces the number of vehicle disturbances, maximizing the time when caribou do not interact with vehicles on the AWAR.

These results highlight the power of using motion-trigger cameras to draw connections between the many interacting variables that may explain caribou passage through the Mine area, which may be integrated with additional sources of data such as collar analysis and behaviour monitoring to inform potential cumulative effects of the Meliadine Mine (ERM 2023, 2024).

## 1. PROJECT OVERVIEW

The Meliadine Mine (the Mine), owned and operated by Agnico Eagle Mines Limited (Agnico Eagle), is located on Inuit Owned Land (IOL) approximately 25 km directly north of Rankin Inlet, Nunavut. A 30 km all weather access road (AWAR) connects the Mine to Rankin Inlet. The Rankin Inlet By-pass Road was constructed to the west and south of Rankin Inlet to allow mine traffic to circumvent the hamlet of Rankin Inlet when traveling from the AWAR to Itivia Harbour (i.e., Melvin Bay) southwest of Rankin Inlet (Figure 1-1).

The Meliadine Mine was approved by the Nunavut Impact Review Board (NIRB) in 2015 (Project Certificate #006) with a life of mine plan that includes production from five ore bodies. The mine plan includes open pits, underground mining and associated ore processing, waste management and ancillary infrastructure. Construction of the AWAR, camp, ore processing facilities and ancillary infrastructure began in 2017, and production began in Q2 2019. In 2019, the Meliadine Mine NIRB Project Certificate (#006 No. 001) was amended to include discharge of treated saline effluent to the marine environment via diffuser at Itivia Harbour and to convey via truck treated saline effluent along the AWAR to Itivia Harbour. In 2022, the Project Certificate (#006 No. 002) was further amended to allow for the construction of a 34 km waterline, which consists of two 16-inch diameter pipes needed to convey the treated saline effluent from the Mine to Itivia Harbour.

A caribou motion-trigger camera study was conducted in June and July 2020, 2021, 2022, and 2023 at the Meliadine Mine and along the AWAR in support of existing NIRB monitoring conditions as outlined in Project Certificate #006 and the associated amendments.

### 1.1 REGULATORY REQUIREMENTS

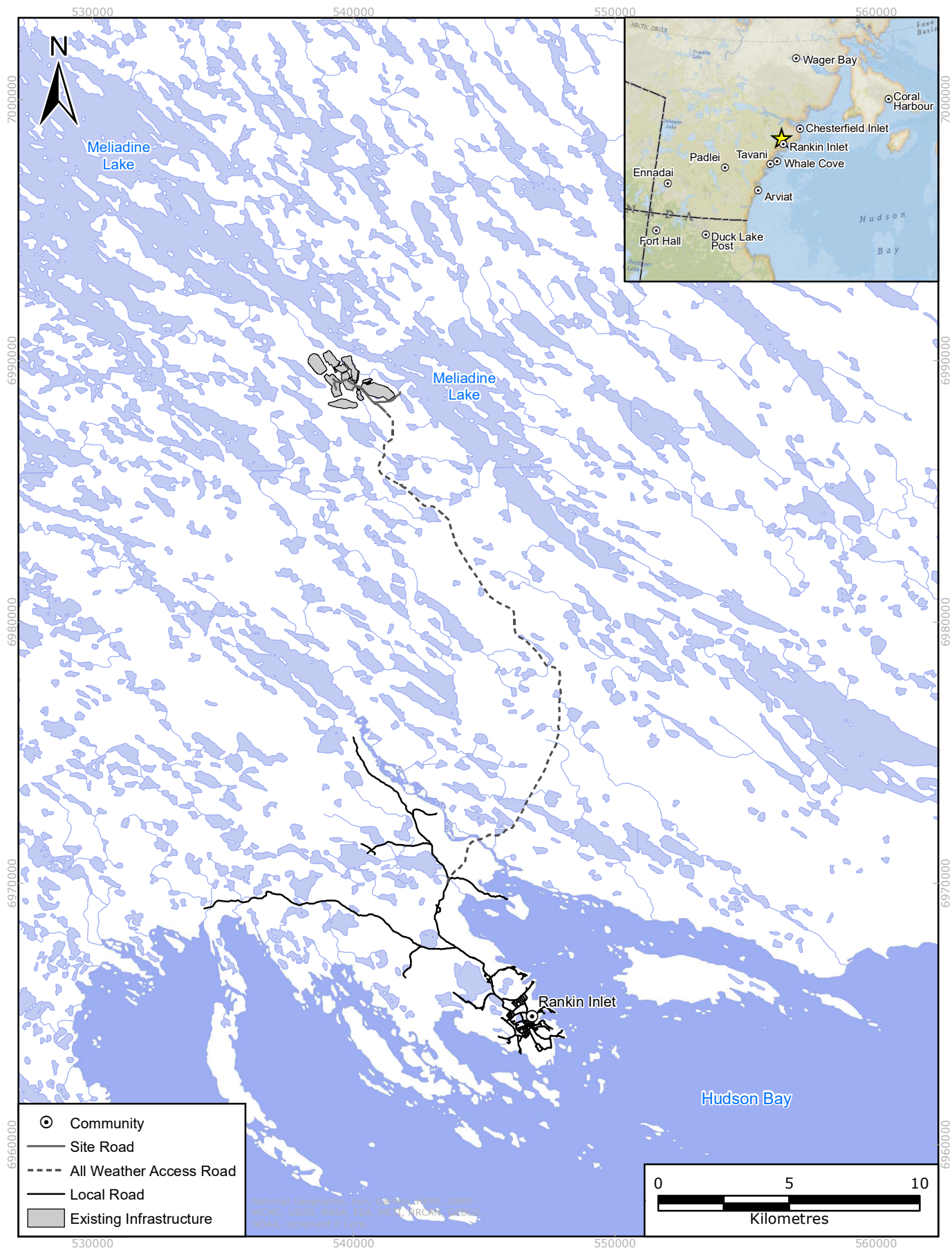
The Meliadine Mine 2015 Project Certificate, and 2019 and 2022 Project Certificate Amendments from the NIRB, Term and Condition No. 57 requires the Agnico Eagle to include in its annual NIRB report:

(T&C 57, c.) A demonstration and description of how the monitoring results, including the all-weather access road, and associated access roads/trails, and waterlines contribute to cumulative effects of the project.

The Meliadine Mine Terrestrial Environment Management and Monitoring Plan (TEMMP; Agnico Eagle 2022) includes components designed to meet these conditions, with a road surveillance monitoring program (Section 4.3) that has the following objective:

“To record the presence of wildlife and/or wildlife signs (e.g., tracks, nesting) in relation to the Mine infrastructure. Of particular importance is the frequency of wildlife entering the Mine infrastructure areas and along the AWAR corridor. This information can then be used to determine any areas of attraction to wildlife, document human-wildlife conflicts, areas/timing of wildlife mortality or potential mortality; seasonal trends of wildlife occurrence in the Project area, and effectiveness of mitigation (e.g., waste management and landfill).”

FIGURE 1-1 MELIADINE GOLD MINE LOCATION



The caribou camera program described in this report is designed to be complementary to the objectives of the caribou collaring program (TEMMP Section 4.7), which are:

- To contribute to the scientific knowledge of caribou activity near mining operations and caribou population dynamics in Nunavut; and
- To assess whether caribou movement near the Mine area is hindered by Mine infrastructure (i.e., Mine site infrastructure and the AWAR).

## 2. STUDY OBJECTIVES

The overall objective of the camera monitoring program is:

- To record the presence of wildlife in relation to the Mine infrastructure, including the frequency of wildlife entering the Mine infrastructure areas and along the AWAR corridor.  
This information may be used to determine potential areas of increased use by wildlife, annual trends of wildlife occurrence in the Mine area, and the effectiveness of mitigation efforts.

The specific objectives of the 2023 study were:

- To conduct a study using motion-trigger cameras at the Mine to estimate how the Mine infrastructure including the AWAR may affect caribou movement during seasonal migration.
- To evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2023 and compare these locations with camera data from 2020 to 2022, and with those identified by Inuit Qaujimagatuqangit (IQ) and GPS collar data.
- To test if areas with certain road characteristics might be used preferentially by caribou crossing the AWAR, specifically:
  - Material of road construction (esker vs. quarry);
  - Side slope;
  - Road height; and
  - Surrounding vegetation type.
- To evaluate what relationship (if any) there is between vehicles recorded on the road and location/timing of caribou observations.
- To provide data on caribou occurrence in the Discovery area and in proximity to the Mine site.

### 3. BACKGROUND

#### 3.1 QAMANIRJUAQ HERD

The Qamanirjuaq caribou subpopulation is a large barren-ground caribou herd numbering approximately 288,000 animals in 2017, down from over 348,000 animals reported in 2008 (Boulanger et al. 2018) but consistent with the population size in the 1980s (COSEWIC 2016).

The Beverly and Qamanirjuaq Caribou Management Board (BQCMB) rated the Qamanirjuaq herd as having “Medium” vulnerability in 2014 due to population declines since 2008 (BQCMB 2014) and upgraded this rating to “Medium-High” in 2016, a status that remains unchanged (BQCMB 2021).

Spring migration brings the caribou north along the coast of Hudson Bay, past the communities of Arviat, Whale Cove and Rankin Inlet to a broad calving ground generally centered on Qamanirjuaq Lake (BQCMB 2023).

Following calving, the caribou form into large groups of hundreds to thousands and radiate out from the calving grounds, including east towards the coast. During June and July, groups of animals from this herd migrate in proximity to the hamlet of Rankin Inlet, the Meliadine Mine and the AWAR connecting the two.

During summer and fall, the caribou generally move south and inland, gradually returning south towards their wintering areas by early December. Maps of the caribou range and movement are available on the BQCMB website (<https://arctic-caribou.com/resources/>).

#### 3.2 TERRESTRIAL ADVISORY GROUP

A Terrestrial Advisory Group (TAG) was formed in 2022 and formalized via creation of the Terms of Reference in 2023 as a collaborative forum to discuss the application of Inuit Qaujimaqatunangit (IQ), Traditional Knowledge (TK) and western science to mitigation and monitoring programs for caribou movement in the Mine area. Members of the group include the local, regional, territorial, and federal governments, as well as Indigenous groups.

Following discussion of the camera study results in 2022 and 2023 with the TAG, several modifications to the study protocol and analysis methods from previous years were suggested. These modifications included adding cameras around the mine site and in the Discovery area permitted for future development of the Mine, as well as additional statistical investigation of relationships between vehicles on the AWAR and caribou. Wherever possible, suggestions made by the TAG have been added into the 2023 analysis.

## 4. STUDY AREA

The dominant terrain in the Mine area comprises glacial landforms such as drumlins (glacial till), eskers (gravel and sand), and lakes. A series of low relief ridges are composed of glacial deposits, oriented in a northwest-southeast direction, which control the regional surface drainage patterns. The property is approximately 60 metres (m) above sea level in low-lying topography with numerous lakes (Final Environmental Impact Statement; Agnico Eagle 2015).

The study area for the camera study included the length of the AWAR from kilometre marker (KM) 7 to KM 30 (the Mine site; see Figure 1-1). During 2020 cameras were installed along the AWAR and around the mine site. In 2021 the study was repeated with a focus on the AWAR and modifications to the survey design to better capture vehicle traffic, with these modifications retained in 2022 and 2023. In 2023, cameras were also deployed around the Mine site and along the proposed Discovery Road to record caribou use of these areas in addition to the AWAR at the suggestion of the TAG.

## 5. METHODS

### 5.1 CAMERA FIELD STUDY

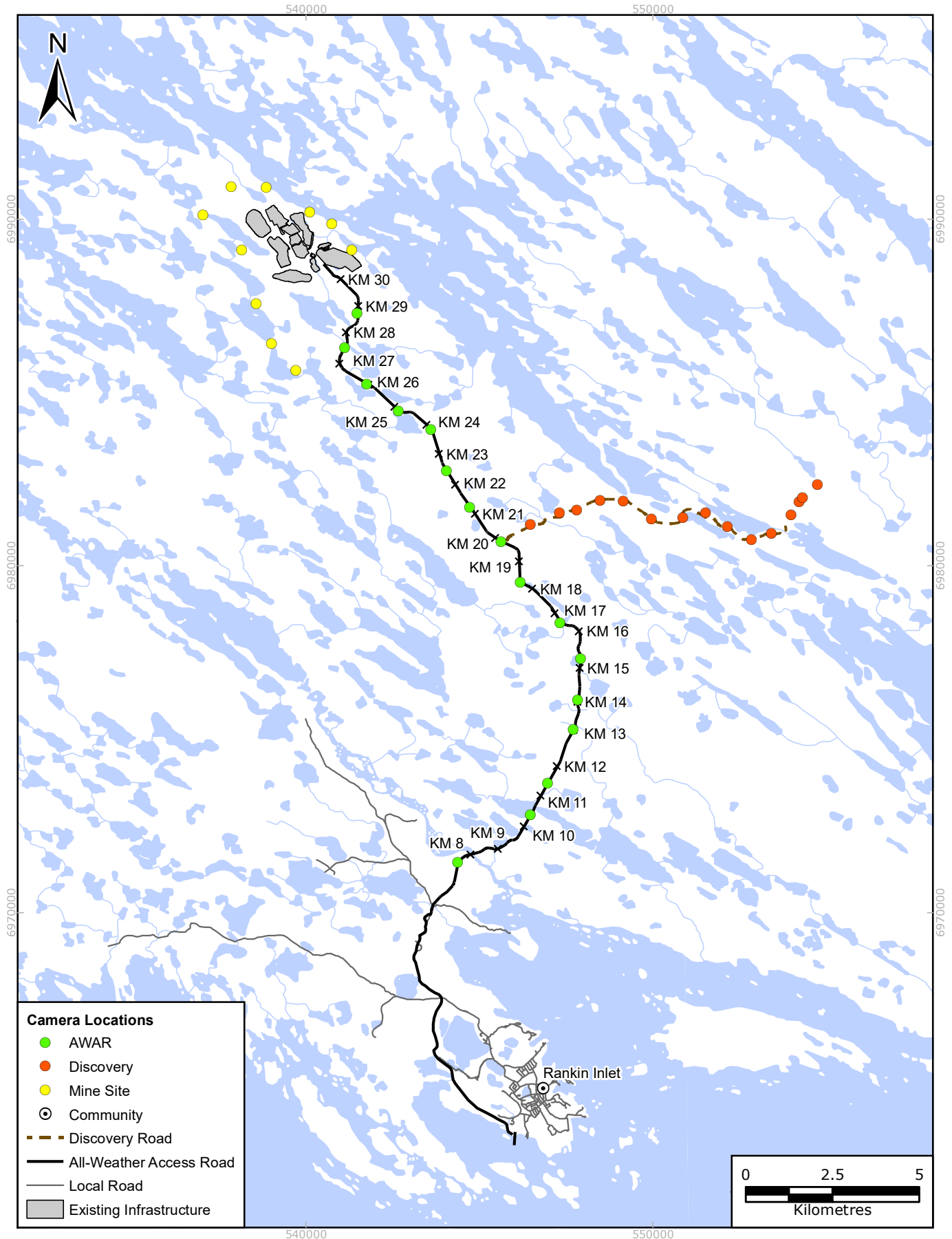
The cameras were programmed and installed in early-June by a wildlife biologist from ERM and a Meliadine Environment technician, two weeks prior to the predicted arrival of caribou in the area. The ERM wildlife biologist maintained the cameras for the duration of the study and Meliadine Environment technicians disassembled the cameras in late July when caribou were no longer in the area in substantial numbers.

Camera locations were selected to maximize coverage and representation of habitat and road types, and to best detect caribou and vehicles along the AWAR (Figure 5.1-1). The same approximate locations were used in 2020, 2021, and 2022 with five additional locations added in 2022 to extend camera coverage south along the AWAR (Table 5.1-1). In 2023 fewer cameras were deployed along the AWAR (19), with cameras instead distributed around the Mine site (10) and along the proposed Discovery Road (15):

- Thirteen (13) single cameras were installed at a spacing of approximately 1,500 m along the AWAR, starting from KM 7 and ending at the mine site at KM 30. Three (3) camera locations had two (2) cameras of different models (Bushnell Core DS vs. Wild Game Innovations Switch) deployed for comparison of detectability, for a total of nineteen (19) cameras at sixteen (16) locations.
- Through previous consultation and community meetings, community members and Inuit Elders identified locations on the AWAR where caribou are known to cross more frequently, including at KM 9, 12, 16, 22, and 27 (Public Meeting; Rankin Inlet, March 17, 2020). Cameras were placed at or near these locations.
- The camera locations were stratified by road structure, with approximately half of cameras placed in areas where the road shoulder was esker material and half where the shoulder was quarry rock. Locations were also selected to have equal representation of steep and flat road shoulders.
- All AWAR cameras were installed on the west side of the road facing north with the road in the camera field of view on the right side of images. In 2020, cameras were located up to 15 m from the road, whereas in 2021, 2022 and 2023 AWAR cameras were placed no more than 5 m from the side of the road to better capture vehicle traffic.
- Ten (10) single cameras were roughly equally spaced around the Mine site.
- Fifteen (15) single cameras were deployed along the proposed Discovery Road with roughly equal spacing between locations.

During initial camera setup in 2020, the surrounding habitat type, road structure, and GPS location were recorded. If any all-terrain vehicle (ATV) trails or caribou trails were detected near the camera site, these were noted. Any changes to these factors in subsequent years were noted. The coordinates for the AWAR cameras were used to calculate the distance to the mine and to Rankin Inlet along the AWAR.

FIGURE 5.1-1 LOCATIONS OF MOTION-TRIGGER CAMERAS AT THE MELIADINE MINE, JUNE - AUGUST 2023



**TABLE 5.1-1 CAMERA DEPLOYMENTS AT THE MELIADINE MINE FROM 2020 TO 2023**

Year	Number of AWAR Cameras	Number of Discovery Cameras	Number of Mine Site Cameras	Deployment Dates
2020	30	-	7	June 22 – July 11
2021	27	-	-	June 23 – July 13
2022	32 <sup>1</sup>	-	-	June 22 – July 22
2023	16 <sup>2</sup>	15	10	June 4 – August 14

<sup>1</sup> 34 cameras were deployed in 2022, but two did not collect data due to malfunction.

<sup>2</sup> 3 camera locations had two cameras of different models deployed for comparison of detectability, for a total of 19 cameras at 16 locations.

Cameras were installed at a height of approximately 50 centimetres, which was determined to be the optimal height for detecting movement of a passing caribou (ERM, unpublished data). Cameras on the AWAR were positioned to capture part of the road in the field of view. In 2020, cameras were not explicitly set up to capture vehicle traffic, but in 2021, 2022 and 2023 AWAR cameras were placed closer to the road (no more than 5 m) to capture traffic.

The installation setup was a simple bucket-and-stick design, where the camera was strapped onto a 2" × 4" piece of lumber that was stabilized in a bucket full of quarry rock (Photo 5.1-1). This setup was designed to be temporary and to minimize impact on the ground where it was placed. When the cameras were removed at the end of the study, all setup materials were returned to the Mine Site.



**Photo 5.1-1 Typical camera setup from the Meliadine 2023 Camera Study.**

All cameras took five pictures whenever motion was detected within approximately 40 m of the motion detector, including wildlife, vehicles, and occasionally objects moving in the wind. In addition, all Bushnell cameras (this feature is not available on the Wild Game Innovations cameras) were programmed to take one photo every 30 minutes, day or night. This was done for two reasons:

- to help capture activity happening beyond the range of the motion detector; and
- to provide assurance that the cameras were operational during the entire duration of the study (measure effort).

The cameras were checked after one week to ensure battery life, SD card space, and positioning was still adequate. Throughout the duration of the study, field technicians and the ERM field biologist regularly checked the cameras to ensure they were still in place and functioning properly.

## 5.2 ROAD STRUCTURE FIELD STUDY

In 2020, additional surveys were conducted on the as-built AWAR to help address the objective of determining whether there are road characteristics that caribou prefer to cross on. As the AWAR structure did not significantly change after this survey, the same data were used in the 2020 to 2023 analyses.

An ERM wildlife biologist and Meliadine environment technician surveyed the road structure, taking the measurements every 100 m along the road, including:

- GPS location;
- Width of the road (m);
- Height of the road above the tundra (m);
- Road-side slope angle – measured with an inclinometer (east and west side);
- Road-side material (esker or quarry stone);
- Substrate grain size, i.e., the area of the roadside shoulder covered by <0.75 inch, 0.75 to 6 inch, 6 to 12 inch, and >12 inch stones (measurement standards used by road engineers); and
- Surrounding habitat features.

## 5.3 PHOTO PROCESSING

All photos from 2022 and 2023 were pre-processed by an artificial intelligence (AI) algorithm to automatically sort photos into four categories: animals, vehicles, humans, and blank images (Beery et al. 2019; Fennell et al. 2022). ERM personnel then reviewed all photos as classified by the AI algorithm and confirmed all detections of wildlife or vehicles. In 2020 and 2021, ERM personnel reviewed all photos from the cameras and recorded every detection of wildlife and vehicles.

A detection is an event where an individual or group triggers the camera, or at least one animal is captured in a timed photo. There can be one photo or many photos in quick succession, depending on how long the caribou were in front of the camera. Hence, one detection may have many individual caribou which may not be able to be individually differentiated. The number of caribou recorded for each detection event is the largest number of caribou visible in any one photo during

the event. To ensure consistency, a detection event was defined as a time lag of at least 30 minutes between photos of the same species, which was applied programmatically to group individual photos into independent detection events.

Data recorded for each wildlife detection event included:

- The time of the first photo;
- The species of wildlife;
- The number of individuals in the group; and
- For events where multiple photos were captured, the duration of the motion-trigger event.

In 2023, four cameras spaced along the AWAR at KM 8, 13, 23, and 27 were analyzed for detailed vehicle traffic in addition to wildlife. Data recorded for each vehicle detection included:

- The time of the detection;
- The type of vehicle; and
- Whether the vehicle was travelling in a convoy or not.
- At all other AWAR cameras all vehicles detected were recorded, though not classified to vehicle type.

## 5.4 SATELLITE COLLAR DATA

Satellite collar data presented here was collected by the Government of Nunavut (collected 2012 to 2019), and previously made public via a data sharing agreement. Updated collar data may be incorporated in future versions of this report. Maps of collar data are shared by the GN with Agnico Eagle and are used to estimate when the caribou will arrive at the site (and so cameras will be deployed) and whether they have left for the season and it is safe to recover the cameras.

## 5.5 DATA ANALYSIS

The analysis in this report was designed to quantify trends in the study data both between and within years, and to determine whether factors such as road structure, vehicle traffic on the road, or placement of the cameras could be used to explain caribou occurrence and identify “hotspots” where caribou may be likely to cross the AWAR. Additionally, cameras around the Mine site and along the proposed Discovery Road provide information on caribou movement through the Meliadine area during the study period.

An initial exploratory analysis was conducted to visualize the data and determine the appropriate method for analyzing the data. Where data were complete, generalized linear models (GLMs) were used to assess the differences in the number of caribou detection events as a function of various controlling variables, including road structure. This regression framework provides a means to control for habitat, environmental variables, repeated measurements, and spatial correlation. For some comparisons in which statistical models were not useful due to a small sample size, summary statistics and correlations were calculated.

All analyses were carried out using program R version 4.3.2 (R Core Team 2023).

## 6. RESULTS AND DISCUSSION

### 6.1 FIELD WORK

In total, 44 cameras were deployed from June 2 to 4, 2023, and were removed July 28, 2023. The study concluded on July 28, 2023, when caribou had not been observed for several days at or near the Mine and collar maps indicated that they were not expected to return. Cameras were removed and the stands were disassembled. Collar maps and in-person observations indicated that most of the migration was captured during the deployment period. This amounted to 2,270 trap-nights and over 300,000 photos. More than two-thirds of all photos were from timed photos, most of which did not contain wildlife or vehicles. The remainder were from motion-triggered events. Of the 44 cameras deployed, most remained in operation for the entire deployed period. A portion of the data from Mine site cameras prior to July 16, 2023, was unavailable for analysis due to a corrupted hard drive while downloading image data in the field. Additional SD cards have been purchased for future study years to prevent the need for hard drive downloads in the field, greatly reducing the risk of future data loss.

### 6.2 CARIBOU DISTRIBUTION RELATIVE TO THE MINE

Of the 988 independent wildlife detection events from the cameras in 2023, over half were of caribou. Table 6.2-1 summarizes the relative detection rates of all species detected from 2020 to 2023.

**TABLE 6.2-1 WILDLIFE DETECTIONS (DETECTIONS PER 100 CAMERA DAYS) AT THE MELIADINE MINE IN 2020, 2021, 2022, AND 2023**

Species	2020	2021	2022	2023		
	AWAR	AWAR	AWAR	AWAR	Discovery	Mine Site
Arctic Fox	1.54	2.83	8.43	6.16	5.13	6.55
Arctic Ground Squirrel	0.35	1.62	1.42	0.60	0.42	-
Arctic Hare	0.47	0.81	3.61	4.37	-	3.79
Caribou	10.76	25.91	16.43	24.85	42.58	10.34
Gull	1.42	2.23	-	-	-	-
Raptor	0.12	0.40	-	-	-	-
Sandhill Crane	0.71	5.67	-	-	-	-
Songbird	2.72	3.44	-	-	-	-
Uncategorized Bird	4.12	22.27	3.50	4.87	9.29	35.52
Unknown	0.12	-	-	-	-	-
Waterfowl	6.02	6.07	-	-	-	-
Uncategorized Mammal	-	1.21	-	-	-	-
<b>Total</b>	<b>28.37</b>	<b>72.47</b>	<b>33.41</b>	<b>40.85</b>	<b>57.42</b>	<b>56.20</b>

Note: Detections may be from motion-triggered photos or from timed photos. Results from 2023 include cameras along the AWAR, along the proposed Discovery Road, and around the Mine site. Results from 2020 to 2022 include only the AWAR. Birds in 2022 and 2023 were not classified to species.

The first caribou recorded on cameras occurred on June 12, 2023, which was consistent with collar maps and observations of caribou from site personnel who were conducting wildlife surveys. Caribou detections peaked from June 18 to June 26, with 70 detection events and 30,567 adult caribou recorded across all cameras and detection events on June 26, though this should not be interpreted as a population estimate as the same caribou may be recorded on multiple cameras at different times throughout the day (Figure 6.2-1). This was approximately three weeks earlier than peak caribou detections in 2022, and one to two weeks earlier than peak caribou detections in 2020 and 2021 (Figure 6.2-1). This finding is generally consistent with the pattern from anecdotal summaries of collar data that caribou use of the site is variable between years.

After the peak, caribou were detected less frequently and in smaller groups until July 28, when cameras were demobilized. Caribou were detected at 37 of 44 cameras (84%) in 2023, compared to 94% of road cameras in 2022, 93% in 2021, and 73% in 2020. More caribou were detected overall in 2023 than any other survey year, with the lowest number counted in 2020 though camera effort was increased in 2023 as compared to previous years, including deployment of cameras in the Discovery and Mine site areas.

### 6.2.1 AWAR CAMERAS

One of the objectives of this study was to evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2023, and compare these locations with those identified in 2020, 2021, 2022, and with collar data and IQ. This information can be used to inform mitigation along the AWAR relating to caribou crossing.

Standardized for sampling effort each year, the number of caribou detections per 100 camera days on the AWAR cameras was 10.76, 25.91, 16.43, and 24.85 in 2020, 2021, 2022, and 2023 respectively. Figure 6.2-1 shows the number of independent caribou detections per 100 active camera days in each year (2020 to 2023) along the AWAR, which allows comparison of the number of detections recorded each year despite a differing number of cameras. The shaded outline in the background of each panel is the density of these data recorded through time, with higher values signifying a higher number of caribou detections during that period when accounting for camera effort.

Most caribou observations were concentrated in the northern half of the AWAR from 2020 to 2022, with the most observations along the AWAR in the southern half in 2023 (Figure 6.2-2). As cameras were deployed for a longer period in 2022 and 2023, there is a possibility that this is an artifact of the data representing the migration more fully than in the initial study years. Road crossing was further analyzed in 2023 using satellite collar data, as summarized in WSP 2023a and WSP 2023b.

Time of day was not related to the number of caribou detections, although there was some evidence that caribou were consistently detected earlier in the day (03:00 to 12:00) than at night in 2021, 2022, and 2023 (Figure 6.2-3). The same trend was not noted in 2020.

FIGURE 6.2-1 DATES OF CARIBOU DETECTIONS AT MELIADINE MINE AWAR CAMERAS, 2020 TO 2023

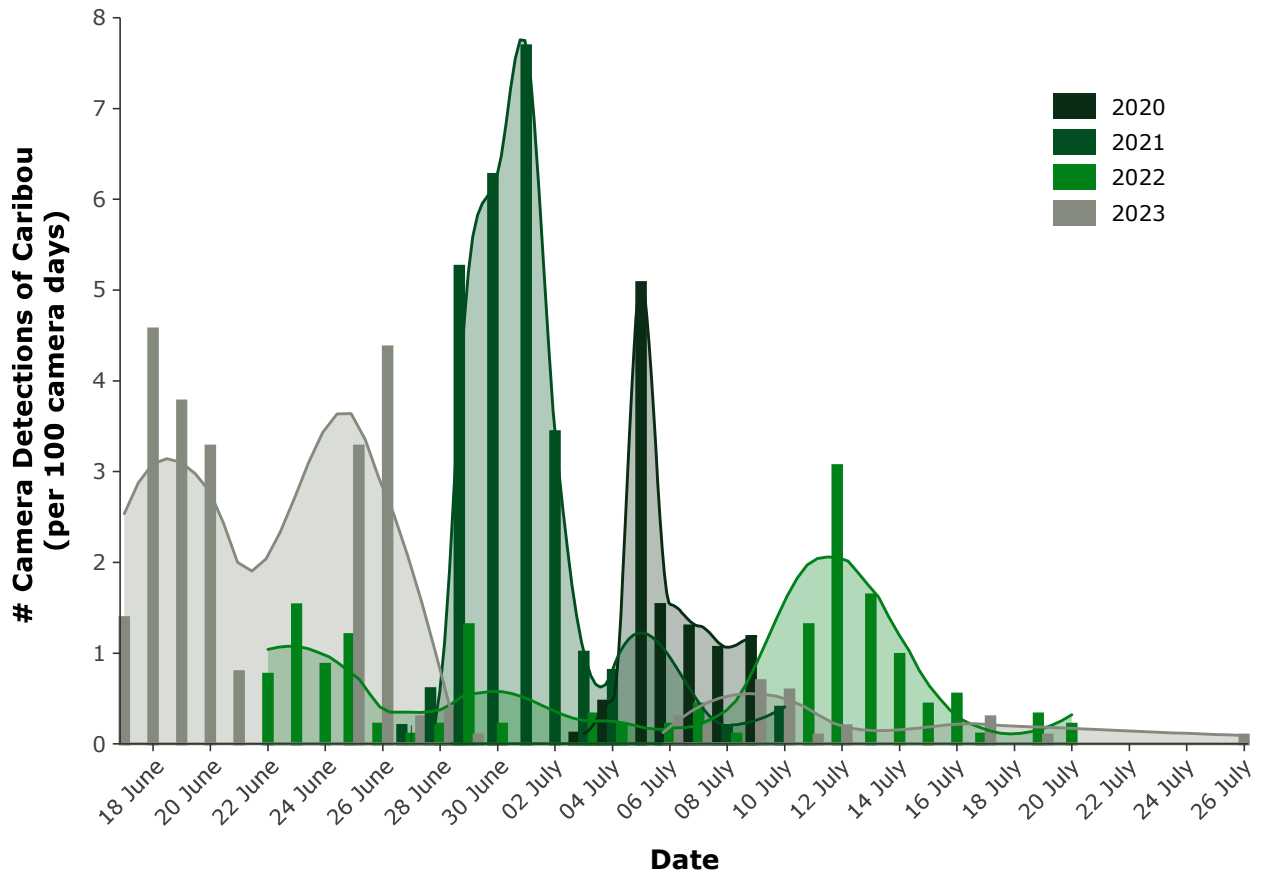


FIGURE 6.2-2 DISTRIBUTION OF CARIBOU DETECTIONS ON AWAR CAMERAS, 2020 TO 2023

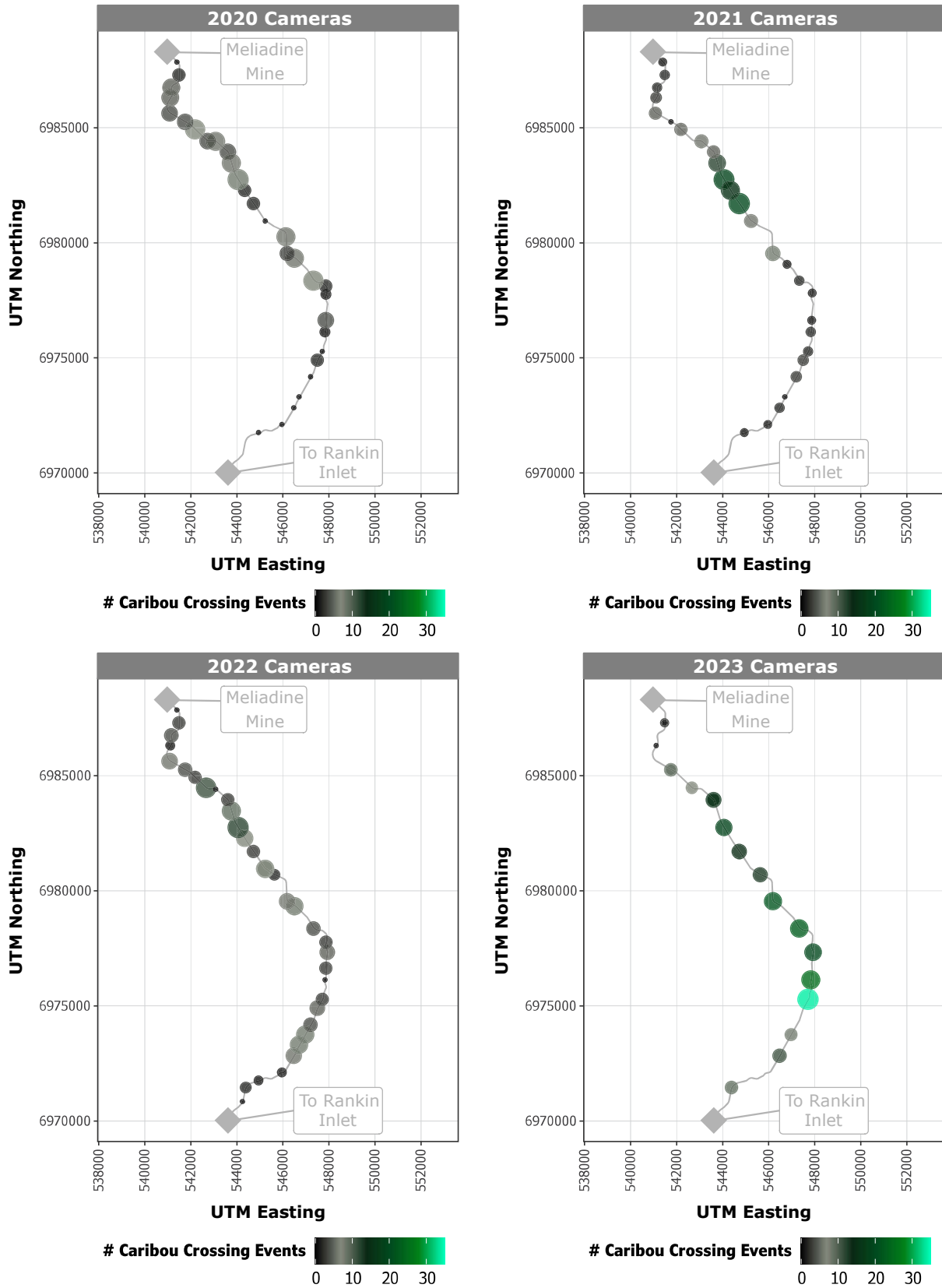
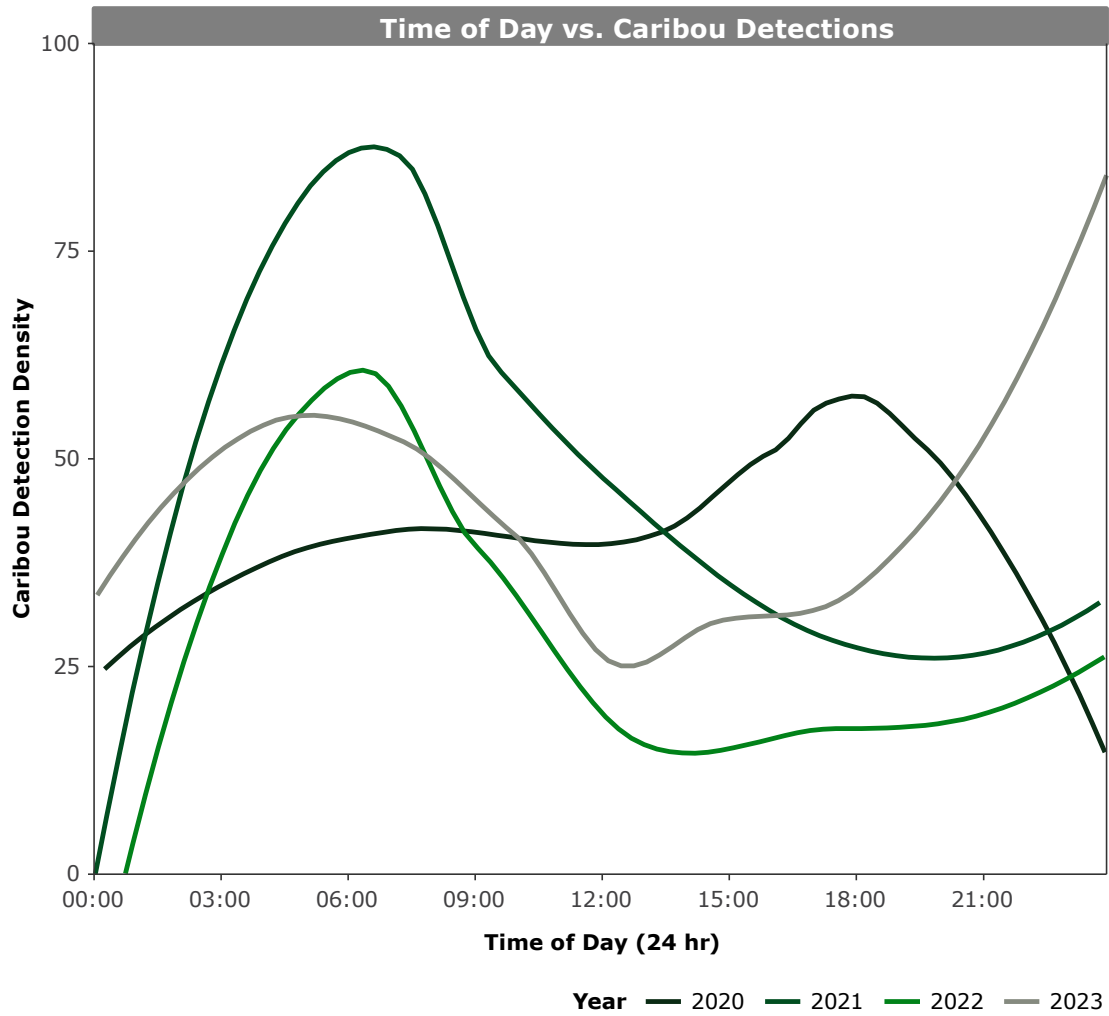


FIGURE 6.2-3 TIME OF DAY OF CARIBOU DETECTIONS ON AWAR CAMERAS, 2020 TO 2023



Overall, the results suggest that the span from KM 21-25 was a major crossing area in 2023 with 8% of all caribou detections recorded at KM 23, and an additional major crossing area identified spanning from KM 10 to KM 12 (Figure 6.2-2, Table 6.2-2). The major caribou crossing locations identified by Elders and community members in March 2020 are at KM 16, 22, and 27. The results from the 2023 cameras are highly consistent with this IQ.

**TABLE 6.2-2 DISTRIBUTION OF MELIADINE MINE AWAR CARIBOU CROSSING LOCATIONS FROM CAMERAS (2020, 2021, 2022, AND 2023) AND FROM COLLAR DATA (2012-2019)**

AWAR KM	Proportion of Camera Observations (%)				Proportion of Collar Observations (%)
	2020	2021	2022	2023	2012-2019
7	-	-	0	0	0
8	-	-	1	4	2
9	0	1	1	0	4
10	0	1	1	0	6
11	0	2	9	4	6
12	0	2	8	3	6
13	2	2	3	0	5
14	0	2	2	14	5
15	5	2	2	10	4
16	1	1	5	8	6
17	10	2	3	9	2
18	0	1	0	0	2
19	10	6	9	9	5
20	7	0	1	5	2
21	0	5	10	0	4
22	4	27	7	6	3
23	9	15	8	8	8
24	11	13	8	11	3
25	11	5	7	3	3
26	8	4	2	0	4
27	9	4	7	6	2
28	5	2	1	0	8
29	8	3	5	1	6
30	0	1	0	0	7

The distribution of caribou crossings recorded in the camera data from 2020 to 2023, and collar data from previous years (2012 to 2019) is shown in Table 6.2-2, where values for each kilometre segment of the road are expressed as the proportion of total crossing events that occurred in that segment.

The extent of agreement between the hotspots identified in each dataset can be measured by testing the correlation: an index of linear relationship between variables. A correlation value of 100% would indicate that the number of crossings per kilometre in the camera data for one year are identical to the number of crossings per kilometer in the camera data from another year. A correlation value of 0% indicates there is no similarity between the locations identified in the two datasets.

The camera data from 2023 shares a 38% correlation with the camera data from 2022, a 28% correlation with the data from 2021, and a 39% correlation with the data from 2020. All three datasets show relatively high numbers of crossings between KM 21 and 25 (an IQ identified section). Both the collar data and camera data suggest that caribou may have preferred crossing locations along the AWAR that are generally consistent across multiple years, with annual variation in the use of these different sections of road.

Overall, the AWAR hotspots identified by the camera data in all years aligned more closely with the IQ identified hotspots than the collar data from 2012-2019. This makes sense as only a small fraction of caribou are collared, and therefore crossing locations identified from collar data may be only partially detected by collar data. Some inter-annual variation is expected and may also explain the differences noted between IQ, camera data, and collar data.

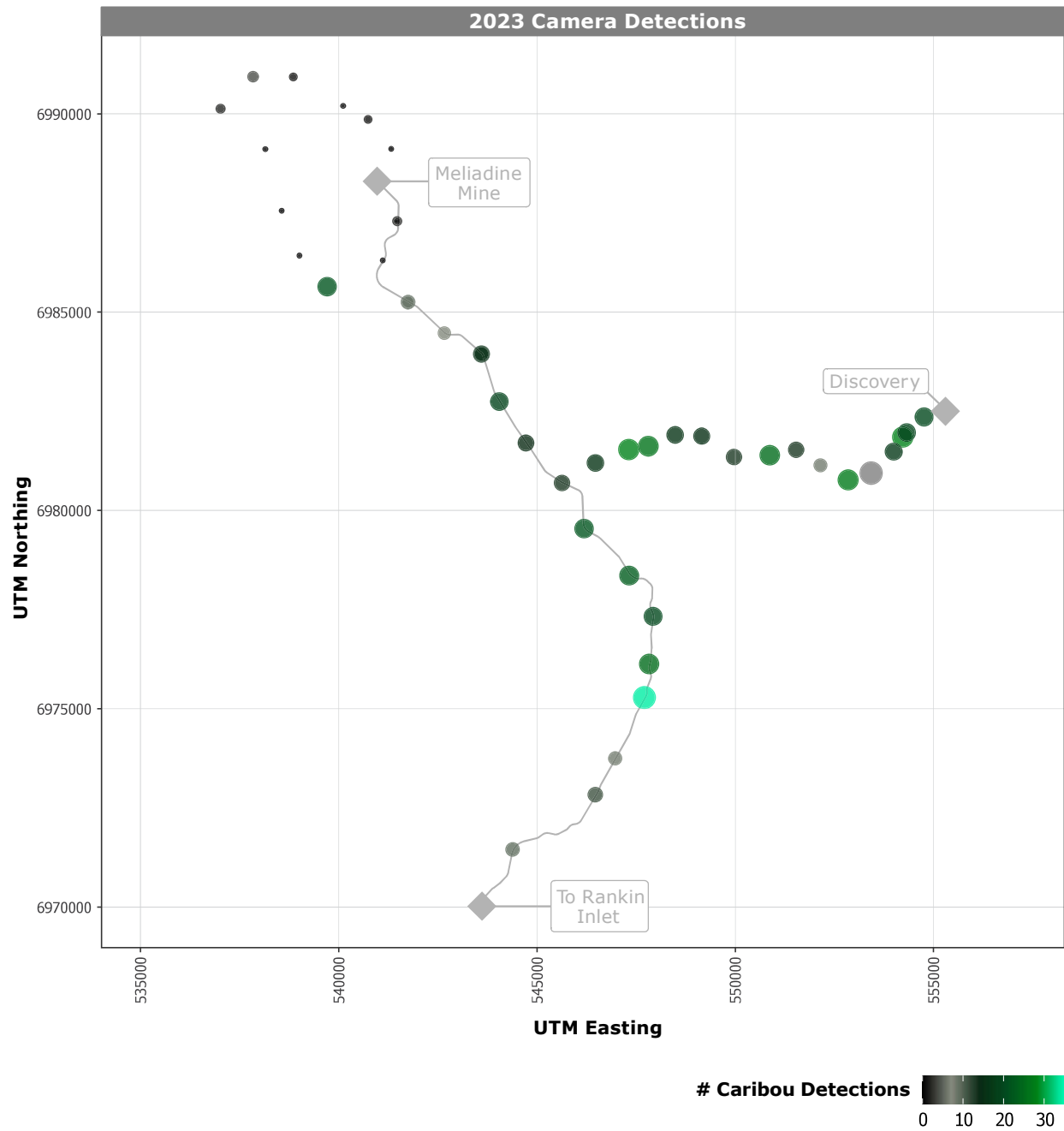
### 6.2.2 DISCOVERY CAMERAS

In 2023, the number of caribou detections per 100 camera days on the Discovery cameras was 42.58. Detections around the Discovery area are presented in Figure 6.2-4. Caribou detection density was relatively consistent across all cameras along the proposed Discovery Road, with no clear spatial pattern in detections. Most detections of caribou at Discovery occurred in late June (June 17 to June 28), with a second peak in detections around July 9.

### 6.2.3 MINE SITE CAMERAS

In 2023, the number of caribou detections per 100 camera days on the Mine site cameras was 10.34. Detections around the Mine site are presented in Figure 6.2-4. Caribou were predominantly detected south of the Mine site, closer to the AWAR. Most caribou detections around the Mine site occurred from June 17 to June 19.

FIGURE 6.2-4 CARIBOU DETECTIONS AT ALL MELIADINE MINE CAMERAS, 2023



### 6.3 ROAD STRUCTURE SURVEY RESULTS AND CARIBOU

The next objective for this study was to use the information on the number of road crossings at each camera to determine if caribou tend to use certain road conditions for crossing, specifically: material of road construction (esker vs. quarry); side slope; road height; and surrounding vegetation type.

In 2020, road surveys for structure and substrate type were completed every 100 m along the length of the AWAR from KM 8 to the mine entrance at KM 30, totaling 210 surveys. The results of these surveys are presented in Figure 6.3-1. As the road structure has not changed significantly since 2020, the results from the survey were also used for analysis from 2021 to 2023.

Road structure was generally consistent, with 88% of the roadside slope measurements falling within the “moderate” category (15-30 degrees), and only 6% classified as steep (>30 degrees). Similarly, 92% of road height measurements were either low (<1 m from the tundra; 48%), or moderate (between 1-2 m from the tundra; 44%). The maximum road height measured was 4.9 m, but this value represented an outlier as it was measured on a bridge ramp.

The surveys indicated there was a higher proportion of road with esker as the substrate material in the northern two-thirds of the AWAR, and a higher proportion of quarry rock as the substrate material in the southern third of the AWAR (Figure 6.3-1). This was likely because there is a large esker at approximately KM 18 that was used to construct most of the northern part of the road. There was also a higher proportion of lowland habitat in the southern third of the AWAR.

The road structure at the site of each camera was compared with the number of caribou detected combined across all three years (Figure 6.3-2). Neither slope nor road height was highly correlated with the number of caribou detected crossing the road, as evidenced by the flat regression line fitted to the data. This may be due to the lack of variability in road height and slope along the length of the AWAR – most of the road had moderate side slope and low height.

When data was pooled across 2020, 2021, 2022, and 2023 caribou did appear to cross the road more readily where esker material was the substrate vs. fine-grained quarry rock, though quarry rock was concentrated in the southern portion of the road where the cameras were removed earlier in 2021, and sampling effort was lower in 2020. Differences in grain size between esker and quarry rock were also relatively small, which may limit any preference by caribou.

This suggests that the apparent preference by caribou of esker over quarry rock may be an artifact of the data, and not a true effect. The presence of a higher proportion of lowland habitat in the southern portion of the AWAR, which includes marshes and lakes, may have also reduced the number of locations where caribou are likely to cross.

Prior to the 2023 caribou migration, preparatory work for waterline installation took place along the AWAR alignment. Changes included placement of the waterline “bedding” (consisting of a narrow strip of flattened earthworks) along the side of the AWAR. In 2023, waterline construction focused on section from KM 15 to KM30. While this change does not largely effect the side slope or predominant material of the AWAR shoulder, the area at the toe of the slope was compacted and surfaced with smoothed substrate as compared to 2020 when the road survey was completed.

FIGURE 6.3-1 ROAD STRUCTURE SURVEY RESULTS

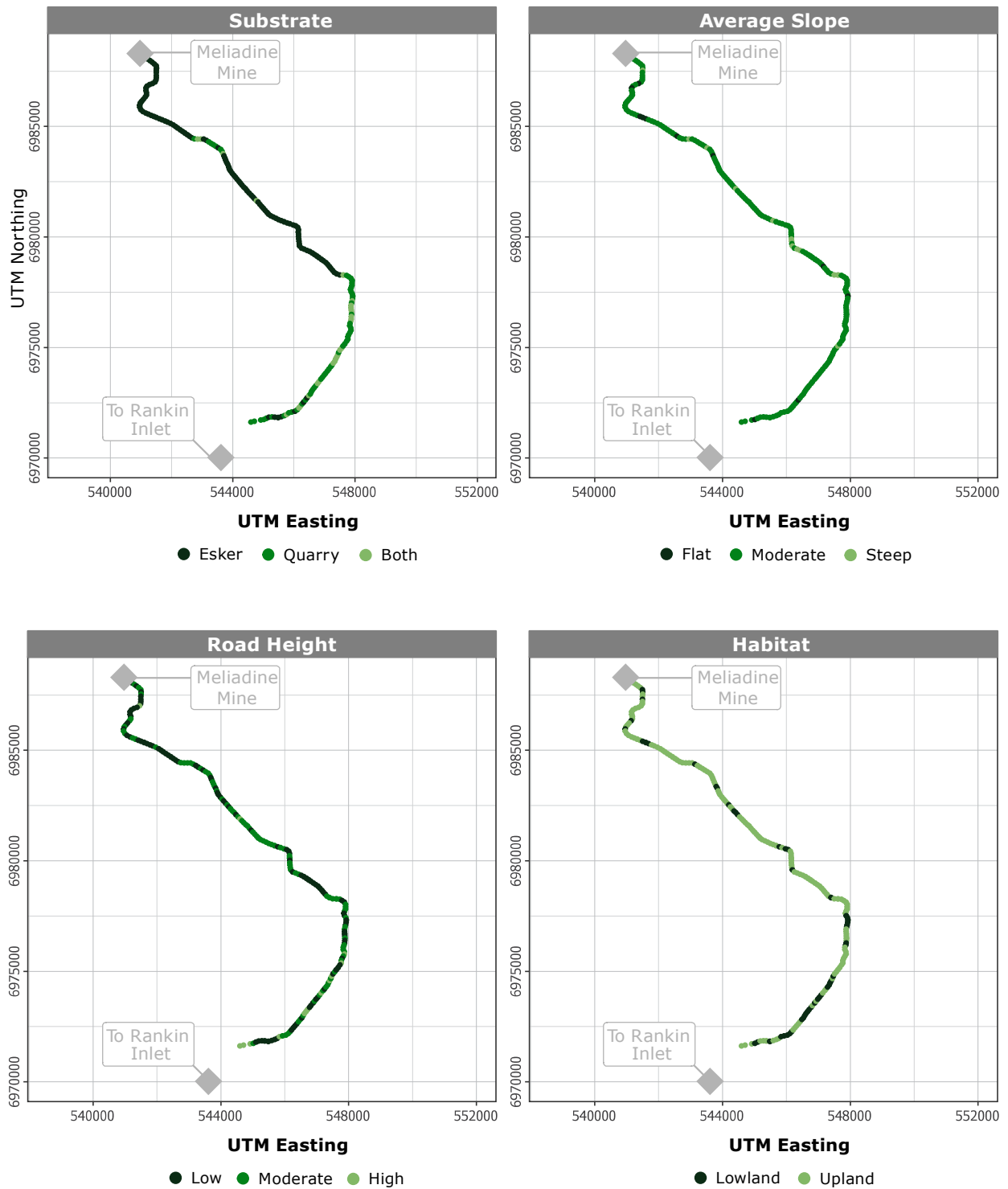


FIGURE 6.3-2 COMPARISONS OF ROAD STRUCTURE AND CARIBOU DETECTIONS, 2020 TO 2023



## 6.4 VEHICLE DETECTIONS ON THE AWAR

In 2021, 2022, and 2023, the cameras were angled to better capture vehicle traffic on the road, based on lessons learned in 2020 when vehicle traffic was only captured incidentally. Because each camera had hundreds of vehicle triggers, it was decided that only four cameras (KM 8, 13, 23, and 27) would be fully processed for detailed vehicle information, while all other cameras had only the presence of an unclassified vehicle type recorded. A summary of vehicles detected on those four cameras is presented in Table 6.4-1 and Figure 6.4-1. It should be noted that the camera at KM 8 is south of the gatehouse, and thus captures increased local traffic (largely light vehicles and ATVs).

The three primary groups of vehicles (ATVs, pickups, and heavy vehicles) exhibited slightly different patterns of observations:

- There were more ATVs and light trucks in the southern section of the road compared to the northern section. This is consistent with a scenario of people traveling out from Rankin Inlet and either stopping along the road prior to the gatehouse or turning off to side trails and cabins along the road. Fewer ATVs were detected at KM 27 near the Mine.
- In 2023, the AWAR was closed near Rankin Inlet (approximately KM 6 of the AWAR) by the GN Conservation Officer and Kangiqliniq Hunters and Trappers Organization to all traffic during periods of increased caribou sensitivity, which may have reduced the number of ATVs observed. Despite this closure, ATV traffic was able to access the AWAR from pre-existing side trails.
- Heavy vehicles are relatively consistent between all four cameras, with more detections near KM 23 where hauling of materials for the waterline was occurring in late July when groups of caribou were no longer observed in the area and normal activity had resumed on the AWAR.

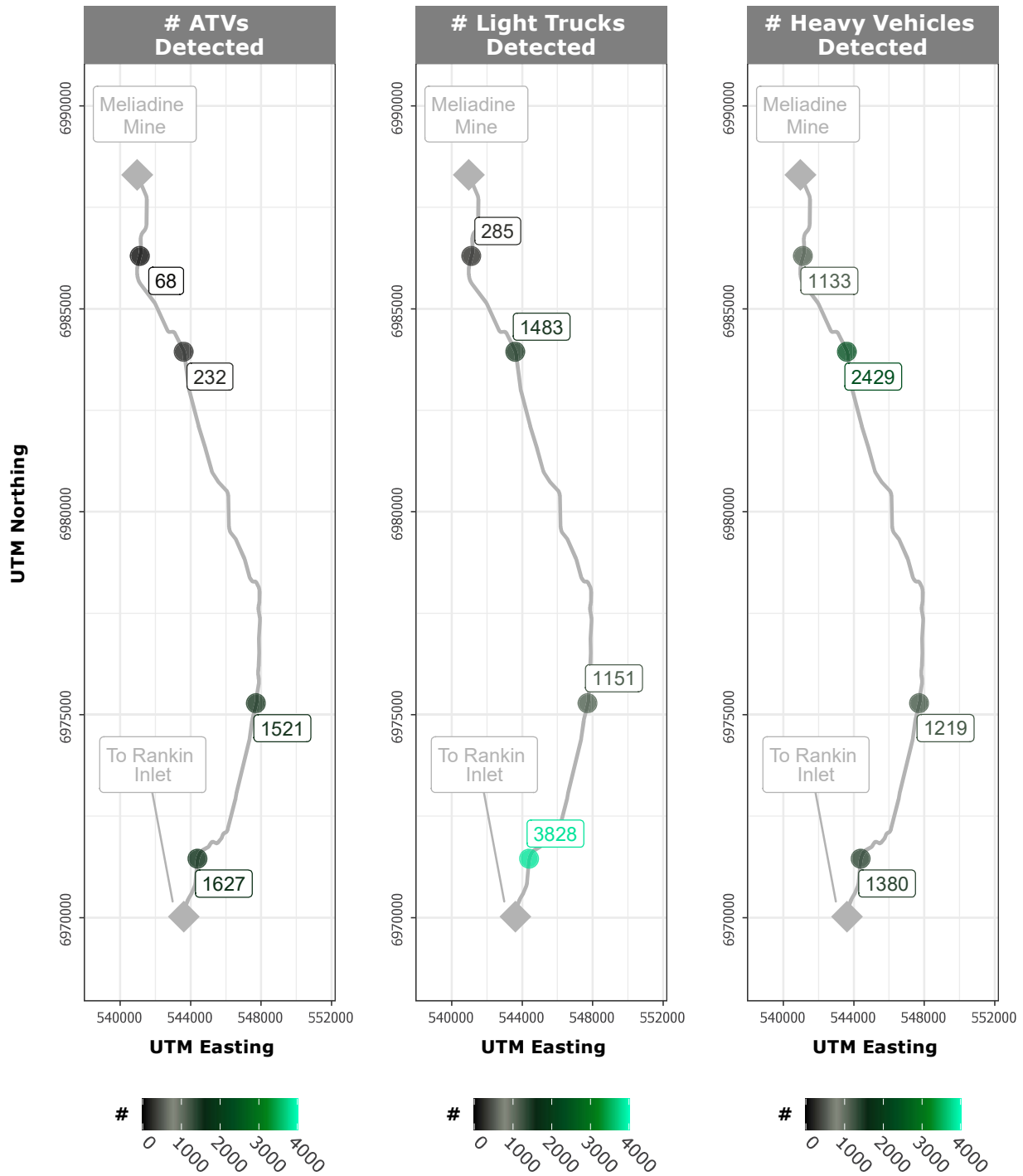
## 6.5 VEHICLE DETECTIONS AND CARIBOU

The average gap between vehicles detected on the AWAR when the road was open was 15.8 minutes, while the average gap between vehicles detected while the AWAR was open with restriction was 40.0 minutes, and the average gap when the AWAR was closed was 129.6 minutes. These values were calculated using all vehicle traffic detected at all cameras. Median time lag from a vehicle passing to a caribou crossing when the AWAR was open was 1.7 hours, when the AWAR was open with restriction was 3.7 hours, and when the AWAR was closed was 4.3 hours. The increasing time lag between vehicle detection and caribou crossing does not necessarily suggest avoidance of traffic on the AWAR, but may instead reflect the largely reduced volume of traffic due to pre-emptive restriction on the AWAR when caribou are in the area (Table 6.4-1).

**TABLE 6.4-1 VEHICLE DETECTIONS ACROSS THE FOUR AWAR CAMERAS PROCESSED, JUNE – JULY 2023**

Vehicle Type	Vehicle	AWAR Open (July 17 onward)		AWAR Restricted		AWAR Closed (convoys permitted with authorization)	
		Average Number of Detections across Cameras	Proportion of Total Detections (%)	Average Number of Detections across Cameras	Proportion of Total Detections (%)	Average Number of Detections across Cameras	Proportion of Total Detections (%)
Heavy Vehicle	Ambulance	-	0.08	3	0.09	3	0.31
	Box Truck	14	0.61	22	0.74	-	-
	Fuel Tanker	174	7.41	84	2.78	2	0.21
	Grader	14	0.60	22	0.72	5	0.52
	Haul Truck	338	14.38	476	15.70	5	0.52
Light Truck	Bus	136	5.81	162	5.33	25	2.58
	Tractor Trailer	580	24.72	218	7.20	3	0.31
	Water Truck	11	0.48	19	0.62	1	0.10
	Pickup Truck	811	34.54	1285	42.34	532	55.66
ATV	Service Truck	16	0.68	10	0.31	-	-
	Side by Side and Quad	227	9.68	730	24.07	380	39.67
Other	Unidentifiable	1	0.04	3	0.11	1	0.10
	<b>Total</b>	<b>2,347</b>	<b>-</b>	<b>3,034</b>	<b>-</b>	<b>957</b>	<b>-</b>

FIGURE 6.4-1 NUMBER OF VEHICLE DETECTIONS ON THE AWAR



## 7. SUMMARY

The results of this combined four-year study suggest the potential for multiple interacting factors explaining where and when caribou cross the AWAR. The choice of where to cross the road may be mitigated by several factors to varying degrees, including habitat, road traffic, substrate type, and inter-annual route fidelity (i.e., same route chosen every year).

Overall, this camera study was successful at capturing many caribou in numerous locations, including crossing the AWAR, in proximity to the Mine site, and along the proposed Discovery Road.

The **first objective** of this study was to evaluate how the AWAR and Mine site may affect caribou movement during migration. Key findings related to this objective are:

- The second highest rate of caribou detection events recorded during the four years of this study was recorded in 2023 (24.85 caribou per 100 camera days), suggesting no pattern of learned avoidance of the AWAR year to year.
- Detection rates at the Mine site (10.34 caribou per 100 camera days) were lower than along the AWAR in 2023, and higher (42.58 caribou per 100 camera days) in the Discovery area. Timing of caribou detections in these areas were aligned with those along the AWAR.
- Caribou were observed crossing the AWAR in different group sizes, ranging from single individuals to thousands, suggesting no strong avoidance by small or large caribou groups.

The **second objective** of this study was to evaluate if there were specific locations with high numbers of caribou observations along the AWAR in 2023, and compare these locations with those identified in 2020, 2021, 2022, and by collar data and IQ. Key findings related to this objective are:

- Peak caribou passage occurred earlier than the previous four years, with the most caribou detection events occurring on or around June 26. This timing was considerably earlier than previous study years, with a peak in detections approximately three weeks earlier than in 2022.
- The study found that caribou crossing timing and locations on the AWAR in 2023 were consistent with locations identified in 2020, 2021, 2022, and with locations identified by IQ from Elders and community members. The hotspots identified by the camera data in 2020, 2021, 2022, and 2023 aligned closely with the IQ identified hotspots.

The **third objective** of this study was to use the information on road crossings to determine whether caribou prefer to cross the road at locations with a particular set of road features, specifically: material of road construction (esker vs. quarry); side slope; road height; and surrounding vegetation type. Key findings related to this objective are:

- Road height and road-side slope did not have an impact on caribou crossing locations.
- Alternatively, since the structure of the road is relatively uniform along its length, there may not be enough difference in the shape, profile, or materials used to build the road to influence which sections of the road caribou prefer to cross, or crossing locations may be driven by surrounding features, such as habitat, trails, etc. Early-stage earthworks in preparation for the waterline were completed prior to caribou arrival in 2023, minorly altering the structure next to the AWAR.

- When data are pooled across all four years, caribou appeared to cross the AWAR more readily in the northern portion of the road where esker rock is more common as a substrate, though this may be an artifact of a sampling bias in the data (increased sampling closer to the Mine), or the result of inter-annual route fidelity.

The **fourth objective** of the study was to evaluate what relationship (if any) there is between vehicles recorded on the road and location/timing of caribou observations. Key findings related to this objective are:

- The average gap between vehicles detected on the AWAR when the road was open, restricted, and closed was 15.8, 40.0 minutes, and 129.6 minutes respectively.
- Vehicle traffic was observed to be greatly reduced during AWAR closure, with nearly all traffic coming from pickups (including caribou survey vehicles) or local ATVs.

The **final objective** of the 2023 study was to provide data on caribou occurrence in the Discovery area and in proximity to the Mine site. Key findings related to this objective are:

- Caribou were observed in both the Discovery and Mine areas, with the highest rate of detection on the Discovery cameras (42.58 caribou per 100 camera days).
- Detections of caribou from these areas in 2023 contribute to the overall understanding of caribou use of the Meliadine area during important parts of their lifecycle. These data may provide a comparison against data collected in the future to assist in understanding caribou response to the Mine and other factors.

Data discussed in this study provide multiple insights into caribou occurrence and movement in the Meliadine area, including differences across four years of available data. The findings from this study may be incorporated with other data sources, including concurrent behaviour surveys and collar data to inform potential cumulative effects on caribou from the Meliadine Mine and associated infrastructure or development. This study highlights the power of using motion-trigger cameras to draw connections between the many possible variables explaining caribou movement. The results suggest that multiple factors including interannual variation, vehicle traffic, and road substrate may contribute to when and where caribou occur in the Meliadine area, including crossing the AWAR.

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# APPENDIX A DATA FROM WILDLIFE CAMERAS



APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM10	2023-06-02 18:20:13	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM01	2023-06-03 08:18:40	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A10	2023-06-03 21:18:21	Arctic Fox	1	0		FALSE	Mixed	
CAM08	2023-06-03 22:26:23	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM05	2023-06-04 09:46:35	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-04 19:26:43	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM10	2023-06-04 19:47:39	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A09	2023-06-04 20:44:41	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-06-04 22:15:42	Arctic Hare	1	0		FALSE	Mixed	
CAM19	2023-06-04 22:20:11	Arctic Fox	1	0		FALSE	Mixed	
A06	2023-06-04 23:32:25	Arctic Hare	1	0		FALSE	Mixed	
CAM15	2023-06-05 09:02:48	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM34	2023-06-05 19:35:20	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A07	2023-06-05 23:13:27	Arctic Hare	1	0		FALSE	Mixed	
CAM17	2023-06-05 23:15:23	Arctic Hare	1	0		FALSE	Mixed	
CAM21	2023-06-05 23:15:54	Arctic Fox	1	0		FALSE	Mixed	
CAM14	2023-06-06 07:14:23	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM34	2023-06-06 11:27:49	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM34	2023-06-06 11:47:57	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM34	2023-06-06 14:09:06	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM20	2023-06-06 23:44:48	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM05	2023-06-07 07:25:11	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM20	2023-06-07 16:38:26	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM10	2023-06-07 21:33:11	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM27	2023-06-08 01:46:57	Arctic Fox	1	0		FALSE	Mixed	NA
CAM07	2023-06-08 05:56:44	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
A15	2023-06-08 08:45:12	Arctic Fox	1	0		FALSE	Mixed	
CAM07	2023-06-08 09:29:59	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM25	2023-06-08 10:59:59	Uncategorized Bird	1	0	Standing	FALSE	Mixed	NA
A04	2023-06-09 08:59:02	Uncategorized Bird	1	0		FALSE	Mixed	
CAM20	2023-06-09 12:18:30	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM27	2023-06-09 16:55:14	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM27	2023-06-09 17:14:00	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM09	2023-06-09 21:36:33	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A06	2023-06-09 21:55:28	Arctic Fox	1	0		FALSE	Mixed	
CAM38	2023-06-10 10:26:38	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM27	2023-06-10 12:30:00	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM06	2023-06-10 14:19:07	Uncategorized Bird	1	0		FALSE	Mixed	
A02	2023-06-10 14:55:08	Uncategorized Bird	1	0		FALSE	Mixed	
CAM34	2023-06-10 16:30:39	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A12	2023-06-11 05:55:57	Arctic Fox	1	0		FALSE	Mixed	
CAM04	2023-06-11 07:59:59	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-11 10:30:39	Uncategorized Bird	1	0		FALSE	Mixed	NA
CAM38	2023-06-11 12:56:54	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM38	2023-06-11 13:12:13	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM17	2023-06-11 13:59:59	Uncategorized Bird	1	0		FALSE	Mixed	
CAM38	2023-06-11 15:08:12	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM38	2023-06-11 17:47:14	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM27	2023-06-11 18:44:34	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM18	2023-06-11 21:11:21	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM38	2023-06-11 22:43:59	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM27	2023-06-12 00:32:15	Caribou	1	0	Walking	FALSE	Mixed	NA
A15	2023-06-12 00:34:37	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-06-12 03:45:35	Arctic Hare	1	0		FALSE	Mixed	
CAM38	2023-06-12 04:48:53	Uncategorized Bird	8	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 05:29:59	Uncategorized Bird	8	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 05:59:59	Uncategorized Bird	7	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 06:29:59	Uncategorized Bird	8	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 06:59:59	Uncategorized Bird	6	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 07:16:25	Uncategorized Bird	8	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 08:59:59	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-12 09:27:42	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM38	2023-06-12 14:19:35	Uncategorized Bird	4	0	Walking	FALSE	Mixed	NA
CAM38	2023-06-12 14:59:59	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-12 17:58:14	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM18	2023-06-12 19:36:38	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM38	2023-06-12 19:55:25	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM10	2023-06-12 20:17:02	Uncategorized Bird	3	0	Feeding	FALSE	Mixed	NA
CAM11	2023-06-12 23:58:27	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-06-13 02:27:19	Arctic Fox	1	0		FALSE	Mixed	
A11	2023-06-13 09:21:05	Uncategorized Bird	3	0		FALSE	Mixed	
CAM38	2023-06-13 09:59:30	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM21	2023-06-13 10:00:00	Arctic Fox	1	0		FALSE	Mixed	

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A03	2023-06-13 10:18:38	Arctic Fox	1	0		FALSE	Mixed	
CAM03	2023-06-13 10:24:06	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM28	2023-06-13 10:59:59	Arctic Ground Squirrel	1	0		FALSE	Mixed	
CAM28	2023-06-13 11:11:27	Uncategorized Bird	2	0		FALSE	Mixed	
CAM38	2023-06-13 17:18:27	Uncategorized Bird	13	0	Flying	FALSE	Mixed	NA
CAM27	2023-06-13 19:47:03	Uncategorized Bird	3	0	Flying	FALSE	Mixed	NA
CAM14	2023-06-13 20:13:37	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM38	2023-06-13 20:32:49	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-06-14 09:36:48	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-14 12:17:07	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM13	2023-06-14 12:18:12	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM06	2023-06-14 12:23:29	Uncategorized Bird	1	0		FALSE	Mixed	
A05	2023-06-14 12:26:29	Uncategorized Bird	4	0		FALSE	Mixed	
CAM08	2023-06-14 12:59:37	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
A05	2023-06-14 13:39:38	Uncategorized Bird	7	0		FALSE	Mixed	
CAM20	2023-06-14 14:27:57	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
A15	2023-06-14 17:43:52	Arctic Fox	1	0		FALSE	Mixed	
CAM04	2023-06-14 17:58:17	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM05	2023-06-14 21:50:14	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM04	2023-06-14 21:55:11	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-15 08:02:58	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM25	2023-06-16 03:53:06	Caribou	10	1	Feeding	FALSE	Mixed	NA
CAM25	2023-06-16 04:49:51	Caribou	10	0	Feeding	FALSE	Mixed	NA
CAM15	2023-06-16 05:12:02	Caribou	4	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-16 10:05:37	Caribou	80	20	Feeding	FALSE	Mixed	NA
CAM12	2023-06-16 11:29:59	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-16 13:07:50	Caribou	0	1	Walking	FALSE	Mixed	NA
CAM15	2023-06-16 13:22:45	Caribou	10	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-16 13:59:34	Uncategorized Bird	3	0	Walking	FALSE	Mixed	NA
CAM16	2023-06-16 17:49:28	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM16	2023-06-16 18:54:26	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM15	2023-06-16 19:08:13	Caribou	1	1	Feeding	FALSE	Mixed	NA
CAM20	2023-06-16 19:35:22	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM18	2023-06-16 20:00:00	Caribou	6	0	Feeding	FALSE	Mixed	NA
CAM15	2023-06-16 20:55:41	Caribou	3	0	Feeding	FALSE	Mixed	NA
A15	2023-06-16 21:26:57	Arctic Hare	1	0		FALSE	Mixed	

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM25	2023-06-16 21:28:52	Caribou	9	4	Running	FALSE	Mixed	NA
CAM15	2023-06-16 21:39:27	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM20	2023-06-16 23:07:19	Caribou	1	0	Inspecting camera	FALSE	Mixed	NA
A02	2023-06-17 00:57:57	Caribou	1	0	Feeding	FALSE	Female	left
CAM15	2023-06-17 02:24:57	Caribou	8	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-17 02:50:45	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 02:56:02	Caribou	8	0	Feeding	FALSE	Mixed	NA
CAM18	2023-06-17 03:15:53	Caribou	5	3	Feeding	FALSE	Mixed	NA
CAM25	2023-06-17 03:22:39	Caribou	8	4	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 03:39:01	Caribou	4	0	Feeding	FALSE	Mixed	NA
CAM15	2023-06-17 03:43:39	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-06-17 04:17:37	Caribou	1	1	Standing	FALSE	Mixed	NA
A02	2023-06-17 04:43:40	Caribou	2	0	Walking	FALSE	Female	left
CAM20	2023-06-17 05:39:50	Caribou	3	0	Inspecting camera	FALSE	Mixed	NA
CAM25	2023-06-17 06:00:42	Caribou	2	1	Running	FALSE	Mixed	NA
CAM16	2023-06-17 06:29:59	Caribou	2	2	Running	FALSE	Mixed	NA
CAM01	2023-06-17 07:10:26	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A02	2023-06-17 07:44:32	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A05	2023-06-17 08:41:45	Caribou	15	0	Feeding	TRUE	Female	left
CAM25	2023-06-17 08:54:10	Caribou	2	2	Walking	FALSE	Mixed	NA
CAM25	2023-06-17 09:53:25	Caribou	6	1	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 09:59:59	Caribou	5	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-17 10:14:42	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM15	2023-06-17 10:18:42	Caribou	2	0	Walking	FALSE	Mixed	NA
A04	2023-06-17 10:24:28	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM16	2023-06-17 10:54:58	Caribou	10	3	Feeding	FALSE	Mixed	NA
CAM25	2023-06-17 11:10:13	Caribou	80	20	Feeding	FALSE	Mixed	NA
CAM38	2023-06-17 11:24:26	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM15	2023-06-17 11:29:59	Caribou	13	0	Feeding	FALSE	Mixed	NA
A05	2023-06-17 11:37:28	Caribou	7	0	Feeding	FALSE	Female	left
CAM18	2023-06-17 11:43:51	Caribou	20	10	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 12:19:20	Caribou	20	10	Feeding	FALSE	Mixed	NA
A05	2023-06-17 12:29:04	Caribou	12	3	Feeding	TRUE	Mixed	left
CAM15	2023-06-17 12:33:42	Caribou	15	5	Feeding	FALSE	Mixed	NA
CAM18	2023-06-17 12:58:51	Caribou	50	20	Feeding	FALSE	Mixed	NA
A02	2023-06-17 13:25:28	Caribou	6	0	Feeding	FALSE	Mixed	left

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM15	2023-06-17 13:59:59	Caribou	20	10	Feeding	FALSE	Mixed	NA
CAM18	2023-06-17 14:00:00	Caribou	60	20	Feeding	FALSE	Mixed	NA
A04	2023-06-17 14:40:52	Caribou	5	0	Feeding	TRUE	Female	left
CAM25	2023-06-17 15:22:31	Caribou	20	20	Walking	FALSE	Mixed	NA
CAM14	2023-06-17 15:29:59	Caribou	2	0	Feeding	FALSE	Mixed	NA
CAM20	2023-06-17 16:07:25	Caribou	1	0	Inspecting camera	FALSE	Mixed	NA
CAM18	2023-06-17 16:30:00	Caribou	200	100	Feeding	FALSE	Mixed	NA
CAM15	2023-06-17 16:36:49	Caribou	80	20	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 16:47:50	Caribou	80	20	Feeding	FALSE	Mixed	NA
CAM14	2023-06-17 16:51:06	Caribou	40	20	Feeding	FALSE	Mixed	NA
A15	2023-06-17 16:59:55	Caribou	1	1	Walking	FALSE	Mixed	left
CAM13	2023-06-17 17:01:54	Caribou	2	0	Walking	FALSE	Mixed	NA
CAM18	2023-06-17 17:06:11	Caribou	200	100	Feeding	FALSE	Mixed	NA
CAM13	2023-06-17 17:45:56	Caribou	40	10	Walking	FALSE	Mixed	NA
CAM16	2023-06-17 18:02:06	Caribou	39	11	Walking	FALSE	Mixed	NA
A04	2023-06-17 18:09:41	Caribou	2	0	Walking	TRUE	Female	left
A06	2023-06-17 18:13:14	Caribou	5	3	Walking	TRUE	Mixed	left
CAM14	2023-06-17 19:27:05	Caribou	2	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-17 19:56:46	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM10	2023-06-17 20:00:00	Caribou	11	2	Feeding	FALSE	Mixed	NA
CAM11	2023-06-17 20:18:06	Arctic Fox	1	0		FALSE	Mixed	
CAM14	2023-06-17 20:22:37	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-06-17 20:59:59	Caribou	20	10	Feeding	FALSE	Mixed	NA
CAM20	2023-06-17 21:00:43	Caribou	2	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-17 21:10:33	Caribou	48	9	Feeding	FALSE	Mixed	NA
A04	2023-06-17 21:22:23	Caribou	15	2	Walking	TRUE	Mixed	left
A02	2023-06-17 21:26:09	Caribou	35	6	Feeding	TRUE	Female	left
CAM20	2023-06-17 21:29:59	Caribou	4	0	Feeding	FALSE	Female	NA
CAM09	2023-06-17 21:39:25	Caribou	10	0	Feeding	FALSE	Mixed	NA
CAM17	2023-06-17 22:06:01	Arctic Fox	1	0		FALSE	Mixed	
CAM14	2023-06-17 22:10:00	Caribou	4	1	Running	FALSE	Mixed	NA
A06	2023-06-17 22:20:39	Caribou	8	2	Walking	TRUE	Mixed	left
CAM09	2023-06-17 22:22:31	Caribou	10	0	Inspecting camera	FALSE	Mixed	NA
CAM18	2023-06-17 22:23:37	Caribou	30	10	Walking	FALSE	Mixed	NA
CAM10	2023-06-17 22:26:09	Caribou	5	4	Walking	FALSE	Mixed	NA
A07	2023-06-17 22:35:37	Uncategorized Bird	1	0		FALSE	Mixed	

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM17	2023-06-17 22:36:55	Uncategorized Bird	1	0		FALSE	Mixed	
A15	2023-06-17 22:39:35	Caribou	4	5	Walking	TRUE	Mixed	left
CAM15	2023-06-17 22:43:00	Caribou	40	20	Feeding	FALSE	Mixed	NA
CAM06	2023-06-17 22:58:16	Arctic Fox	1	0		FALSE	Mixed	
CAM10	2023-06-17 23:09:44	Caribou	20	5	Feeding	FALSE	Mixed	NA
CAM16	2023-06-17 23:11:08	Caribou	60	20	Feeding	FALSE	Mixed	NA
CAM14	2023-06-17 23:19:38	Caribou	1	0	Inspecting camera	FALSE	Mixed	NA
CAM13	2023-06-17 23:38:40	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM15	2023-06-17 23:41:33	Caribou	35	15	Feeding	FALSE	Mixed	NA
A02	2023-06-18 00:22:28	Caribou	1	1	Feeding	FALSE	Mixed	left
CAM09	2023-06-18 00:32:00	Caribou	5	2	Feeding	FALSE	Mixed	NA
A02	2023-06-18 00:58:40	Caribou	12	2	Feeding	TRUE	Mixed	left
A04	2023-06-18 01:29:00	Caribou	0	1	Inspecting camera	FALSE	Mixed	left
A15	2023-06-18 01:37:11	Caribou	1	1	Walking	TRUE	Mixed	left
CAM11	2023-06-18 01:46:00	Caribou	1	1	Walking	TRUE	Female	left
CAM15	2023-06-18 02:10:04	Caribou	20	10	Feeding	FALSE	Mixed	NA
CAM10	2023-06-18 02:21:57	Caribou	35	10	Feeding	FALSE	Mixed	NA
CAM01	2023-06-18 02:23:43	Caribou	10	10	Feeding	FALSE	Mixed	NA
A02	2023-06-18 02:42:10	Caribou	6	3	Feeding	FALSE	Female	left
A15	2023-06-18 02:42:17	Caribou	1	0	Walking	TRUE	Mixed	left
CAM16	2023-06-18 02:46:33	Caribou	2	1	Feeding	FALSE	Mixed	NA
CAM13	2023-06-18 02:57:19	Caribou	30	0	Feeding	FALSE	Mixed	NA
CAM15	2023-06-18 03:13:08	Caribou	40	10	Feeding	FALSE	Mixed	NA
CAM03	2023-06-18 03:19:34	Caribou	29	8	Walking	FALSE	Mixed	NA
CAM09	2023-06-18 03:29:59	Caribou	6	0	Feeding	FALSE	Mixed	NA
CAM04	2023-06-18 03:41:21	Caribou	3	0	Feeding	FALSE	Mixed	NA
CAM16	2023-06-18 03:43:45	Caribou	6	5	Feeding	FALSE	Mixed	NA
CAM19	2023-06-18 03:47:58	Caribou	1	0	Walking	TRUE	Male	right
CAM12	2023-06-18 04:15:44	Caribou	35	10	Feeding	FALSE	Mixed	NA
CAM01	2023-06-18 04:23:03	Caribou	1	0	Feeding	FALSE	Female	NA
CAM15	2023-06-18 04:27:38	Caribou	80	30	Feeding	FALSE	Mixed	NA
CAM16	2023-06-18 04:35:23	Caribou	2	0	Running	FALSE	Mixed	NA
CAM11	2023-06-18 04:36:09	Arctic Fox	1	0		FALSE	Mixed	NA
CAM14	2023-06-18 04:51:48	Caribou	45	15	Feeding	FALSE	Mixed	NA
CAM18	2023-06-18 05:00:00	Caribou	10	5	Feeding	FALSE	Mixed	NA
CAM05	2023-06-18 05:02:47	Caribou	2	0	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A02	2023-06-18 05:15:04	Caribou	8	4	Feeding	TRUE	Mixed	left
CAM04	2023-06-18 05:40:04	Caribou	5	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-18 05:49:34	Caribou	40	20	Feeding	FALSE	Mixed	NA
CAM12	2023-06-18 06:00:53	Caribou	1	0	Inspecting camera	FALSE	Mixed	NA
CAM20	2023-06-18 06:01:33	Caribou	1	0	Feeding	FALSE	Female	NA
CAM04	2023-06-18 06:22:38	Caribou	15	0	Feeding	FALSE	Mixed	NA
CAM04	2023-06-18 07:04:51	Caribou	19	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-18 07:12:43	Caribou	100	15	Feeding	FALSE	Mixed	NA
CAM05	2023-06-18 07:20:26	Caribou	5	0	Feeding	FALSE	Mixed	NA
CAM14	2023-06-18 07:29:59	Caribou	4	2	Feeding	FALSE	Mixed	NA
CAM10	2023-06-18 07:32:48	Caribou	2	1	Walking	FALSE	Mixed	NA
CAM04	2023-06-18 07:37:29	Caribou	180	15	Feeding	FALSE	Mixed	NA
CAM01	2023-06-18 07:38:13	Caribou	1	0	Walking	FALSE	Mixed	NA
A02	2023-06-18 07:39:39	Arctic Fox	1	0		FALSE	Mixed	
CAM03	2023-06-18 07:41:23	Caribou	60	25	Feeding	FALSE	Mixed	NA
CAM18	2023-06-18 08:15:14	Caribou	100	50	Feeding	FALSE	Mixed	NA
CAM05	2023-06-18 08:16:56	Caribou	100	0	Feeding	FALSE	Mixed	NA
CAM20	2023-06-18 08:29:59	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM09	2023-06-18 08:40:25	Caribou	13	0	Feeding	FALSE	Mixed	NA
CAM07	2023-06-18 08:45:22	Caribou	250	80	Walking	FALSE	Mixed	NA
CAM10	2023-06-18 08:47:28	Caribou	21	12	Running	FALSE	Mixed	NA
CAM12	2023-06-18 08:50:22	Caribou	24	12	Walking	FALSE	Mixed	NA
CAM04	2023-06-18 08:51:22	Caribou	100	10	Feeding	FALSE	Mixed	NA
CAM14	2023-06-18 08:58:10	Caribou	3	2	Walking	FALSE	Mixed	NA
CAM15	2023-06-18 09:28:31	Caribou	150	50	Feeding	FALSE	Mixed	NA
CAM08	2023-06-18 09:34:38	Caribou	50	0	Feeding	FALSE	Mixed	NA
CAM14	2023-06-18 09:37:32	Caribou	25	10	Feeding	FALSE	Mixed	NA
CAM16	2023-06-18 09:37:40	Caribou	33	4	Feeding	FALSE	Mixed	NA
CAM05	2023-06-18 10:09:31	Caribou	60	20	Resting	FALSE	Mixed	NA
CAM05	2023-06-18 11:24:46	Caribou	200	50	Feeding	FALSE	Mixed	NA
CAM13	2023-06-18 11:25:31	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM08	2023-06-18 11:30:00	Caribou	300	NA	Feeding	FALSE	Mixed	NA
CAM14	2023-06-18 11:47:46	Caribou	5	4	Feeding	FALSE	Mixed	NA
CAM11	2023-06-18 11:49:12	Caribou	4	0	Walking	TRUE	Mixed	left
A13	2023-06-18 11:52:09	Caribou	6	0	Walking	TRUE	Mixed	left
CAM15	2023-06-18 11:59:59	Caribou	40	20	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM09	2023-06-18 12:26:44	Caribou	30	10	Feeding	FALSE	Mixed	NA
CAM14	2023-06-18 12:58:28	Caribou	40	10	Feeding	FALSE	Mixed	NA
CAM04	2023-06-18 13:00:00	Caribou	62	0	Feeding	FALSE	Mixed	NA
CAM07	2023-06-18 13:00:54	Caribou	20	5	Feeding	FALSE	Mixed	NA
A02	2023-06-18 13:21:31	Caribou	200	50	Feeding	TRUE	Mixed	left
A04	2023-06-18 13:42:42	Caribou	1	0	Inspecting camera	FALSE	Mixed	left
CAM16	2023-06-18 13:42:48	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM01	2023-06-18 13:56:14	Caribou	1	0	Walking	FALSE	Female	NA
CAM20	2023-06-18 13:57:37	Caribou	1	0	Feeding	FALSE	Female	NA
A12	2023-06-18 14:24:21	Caribou	2	2	Walking	TRUE	Mixed	left
CAM20	2023-06-18 14:30:00	Caribou	8	0	Feeding	FALSE	Mixed	NA
CAM10	2023-06-18 14:42:14	Caribou	23	8	Walking	FALSE	Mixed	NA
A06	2023-06-18 14:47:22	Caribou	6	3	Walking	TRUE	Mixed	right
CAM13	2023-06-18 14:57:56	Caribou	30	0	Walking	FALSE	Mixed	NA
CAM18	2023-06-18 15:00:00	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM15	2023-06-18 15:44:32	Caribou	3	2	Feeding	FALSE	Mixed	NA
CAM11	2023-06-18 15:59:47	Caribou	1	0	Walking	FALSE	Female	left
A13	2023-06-18 16:00:10	Caribou	1	0	Walking	FALSE	Male	left
A02	2023-06-18 16:14:07	Caribou	6	2	Feeding	FALSE	Mixed	left
CAM09	2023-06-18 16:29:59	Caribou	12	6	Walking	FALSE	Mixed	NA
A05	2023-06-18 16:36:58	Caribou	30	4	Feeding	TRUE	Mixed	left
A12	2023-06-18 16:38:31	Caribou	1	0	Walking	TRUE	Female	right
CAM10	2023-06-18 16:43:28	Caribou	30	5	Feeding	FALSE	Mixed	NA
CAM16	2023-06-18 16:54:36	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
A04	2023-06-18 16:58:24	Caribou	1	1	Walking	FALSE	Mixed	left
CAM11	2023-06-18 17:06:50	Caribou	1	0	Walking	TRUE	Female	left
A13	2023-06-18 17:07:13	Caribou	1	0	Walking	TRUE	Female	left
CAM14	2023-06-18 17:33:26	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM20	2023-06-18 18:00:00	Caribou	20	0	Feeding	FALSE	Mixed	NA
CAM12	2023-06-18 18:14:10	Caribou	11	1	Walking	FALSE	Mixed	NA
CAM09	2023-06-18 18:16:29	Caribou	8	5	Walking	FALSE	Mixed	NA
CAM11	2023-06-18 18:21:11	Caribou	2	1	Walking	TRUE	Female	left
A07	2023-06-18 18:32:19	Caribou	2	0	Walking	TRUE	Mixed	right
CAM17	2023-06-18 18:33:34	Caribou	2	0	Walking	TRUE	Female	right
A15	2023-06-18 18:55:52	Caribou	5	3	Feeding	TRUE	Mixed	left
CAM09	2023-06-18 19:09:04	Caribou	4	2	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM11	2023-06-18 19:22:12	Caribou	10	6	Walking	TRUE	Mixed	left
A13	2023-06-18 19:24:56	Caribou	5	3	Walking	TRUE	Mixed	right
CAM19	2023-06-18 19:25:20	Caribou	2	0	Walking	TRUE	Female	right
A12	2023-06-18 19:26:15	Caribou	3	2	Walking	TRUE	Mixed	left
CAM17	2023-06-18 19:53:32	Caribou	3	0	Walking	TRUE	Female	left
A05	2023-06-18 19:54:18	Caribou	30	7	Feeding	TRUE	Mixed	left
CAM13	2023-06-18 19:59:59	Caribou	9	1	Walking	FALSE	Mixed	NA
CAM14	2023-06-18 20:15:01	Caribou	70	40	Feeding	FALSE	Mixed	NA
CAM11	2023-06-18 20:33:44	Caribou	2	2	Walking	TRUE	Mixed	left
A13	2023-06-18 20:36:50	Caribou	3	1	Walking	TRUE	Mixed	left
CAM15	2023-06-18 20:42:40	Caribou	3	2	Running	FALSE	Mixed	NA
CAM25	2023-06-18 20:48:58	Caribou	2	0		FALSE	Mixed	NA
CAM18	2023-06-18 20:55:00	Caribou	40	10	Feeding	FALSE	Mixed	NA
A15	2023-06-18 21:00:36	Caribou	2	0	Walking	FALSE	Female	left
CAM11	2023-06-18 21:07:36	Caribou	25	10	Feeding	TRUE	Mixed	left
A13	2023-06-18 21:08:05	Caribou	1	0	Walking	FALSE	Mixed	left
CAM16	2023-06-18 21:13:51	Caribou	2	2	Walking	FALSE	Mixed	NA
CAM11	2023-06-18 21:18:11	Arctic Fox	1	0		FALSE	Mixed	
A13	2023-06-18 21:43:47	Caribou	8	2	Walking	TRUE	Mixed	right
A04	2023-06-18 21:45:22	Caribou	500	100	Walking	TRUE	Mixed	left
A03	2023-06-18 22:18:06	Caribou	3	1	Walking	TRUE	Mixed	right
CAM25	2023-06-18 22:22:17	Caribou	20	10	Resting	FALSE	Mixed	NA
CAM04	2023-06-18 22:22:37	Caribou	55	5	Feeding	FALSE	Mixed	NA
CAM11	2023-06-18 22:45:15	Caribou	6	7	Running	TRUE	Mixed	right
A13	2023-06-18 22:45:58	Caribou	3	6	Walking	TRUE	Mixed	right
CAM03	2023-06-18 22:53:42	Caribou	20	2	Feeding	FALSE	Mixed	NA
A03	2023-06-18 23:28:22	Caribou	1	0	Feeding	FALSE	Female	left
CAM11	2023-06-18 23:38:54	Caribou	11	9	Walking	TRUE	Mixed	left
A13	2023-06-18 23:39:05	Caribou	7	3	Running	TRUE	Mixed	left
A12	2023-06-19 00:04:24	Caribou	1	0	Feeding	FALSE	Mixed	left
CAM25	2023-06-19 00:40:07	Caribou	1	3	Running	FALSE	Mixed	NA
CAM03	2023-06-19 01:00:00	Caribou	30	2	Feeding	FALSE	Mixed	NA
CAM04	2023-06-19 01:24:15	Caribou	4	1	Walking	FALSE	Mixed	NA
A03	2023-06-19 02:08:51	Caribou	1	0	Walking	FALSE	Female	left
A04	2023-06-19 03:03:53	Caribou	40	20	Resting	TRUE	Mixed	right
CAM11	2023-06-19 03:17:09	Arctic Hare	1	0		FALSE	Mixed	

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A04	2023-06-19 03:49:00	Caribou	200	50	Walking	TRUE	Mixed	left
A03	2023-06-19 04:00:26	Caribou	1	0	Walking	TRUE	Female	right
A06	2023-06-19 04:04:09	Caribou	12	7	Walking	TRUE	Mixed	left
A04	2023-06-19 04:42:07	Caribou	200	50	Walking	TRUE	Mixed	left
CAM08	2023-06-19 05:45:04	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A04	2023-06-19 05:51:10	Caribou	500	100	Feeding	TRUE	Mixed	left
A06	2023-06-19 05:59:23	Caribou	1	2	Standing	FALSE	Female	left
CAM21	2023-06-19 06:02:11	Caribou	1	0	Walking	TRUE	Mixed	left
A06	2023-06-19 06:45:17	Caribou	0	1	Running	FALSE	Female	left
CAM09	2023-06-19 06:53:53	Caribou	30	10	Walking	FALSE	Mixed	NA
A04	2023-06-19 07:48:35	Caribou	20	5	Walking	TRUE	Mixed	left
A03	2023-06-19 08:16:37	Caribou	1	0	Feeding	TRUE	Female	right
A15	2023-06-19 08:23:03	Caribou	10	6	Walking	TRUE	Mixed	left
A04	2023-06-19 08:29:04	Caribou	1	0	Walking	TRUE	Female	left
CAM01	2023-06-19 08:40:03	Caribou	3	0	Feeding	FALSE	Female	NA
CAM01	2023-06-19 09:17:07	Caribou	42	26	Feeding	FALSE	Mixed	NA
CAM03	2023-06-19 09:57:52	Caribou	24	4	Feeding	FALSE	Mixed	NA
A04	2023-06-19 10:14:09	Caribou	5	4	Running	TRUE	Mixed	left
A03	2023-06-19 10:16:25	Caribou	1	0	Walking	FALSE	Female	left
CAM03	2023-06-19 10:41:15	Caribou	40	20	Feeding	FALSE	Mixed	NA
CAM03	2023-06-19 10:41:58	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
A05	2023-06-19 10:44:50	Caribou	1	0	Walking	FALSE	Female	left
A15	2023-06-19 10:54:58	Caribou	1	0	Walking	FALSE	Female	left
CAM21	2023-06-19 11:28:13	Caribou	5	0	Feeding	TRUE	Female	left
CAM04	2023-06-19 11:29:59	Caribou	500	100	Walking	FALSE	Mixed	NA
A03	2023-06-19 11:47:07	Caribou	5	0	Feeding	TRUE	Female	left
CAM20	2023-06-19 11:59:59	Caribou	10	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-19 12:00:00	Caribou	8	7	Feeding	FALSE	Mixed	NA
CAM19	2023-06-19 12:00:00	Caribou	50	0	Feeding	FALSE	Mixed	right
CAM20	2023-06-19 12:30:00	Caribou	15	0	Feeding	FALSE	Mixed	NA
CAM11	2023-06-19 12:42:47	Caribou	5	1	Feeding	TRUE	Female	left
A13	2023-06-19 12:43:00	Caribou	5	1	Walking	TRUE	Female	left
CAM01	2023-06-19 13:10:07	Caribou	2	0	Feeding	FALSE	Female	NA
CAM20	2023-06-19 13:19:07	Caribou	9	0	Feeding	FALSE	Mixed	NA
CAM17	2023-06-19 13:21:01	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM38	2023-06-19 13:40:03	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A15	2023-06-19 13:47:38	Caribou	1	0	Walking	FALSE	Female	left
CAM19	2023-06-19 14:00:00	Caribou	200	0	Feeding	FALSE	Mixed	right
CAM20	2023-06-19 14:13:02	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM05	2023-06-19 14:19:24	Caribou	25	8	Feeding	FALSE	Mixed	NA
CAM01	2023-06-19 14:27:13	Caribou	12	12	Feeding	FALSE	Mixed	NA
A07	2023-06-19 14:39:33	Caribou	2	1	Walking	TRUE	Mixed	left
CAM17	2023-06-19 14:40:46	Caribou	3	2	Feeding	TRUE	Female	right
A02	2023-06-19 14:46:41	Uncategorized Bird	1	0		FALSE	Mixed	
A03	2023-06-19 14:47:49	Caribou	1	0	Feeding	FALSE	Female	left
CAM20	2023-06-19 14:53:29	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM03	2023-06-19 15:30:00	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-19 15:51:42	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM19	2023-06-19 15:58:17	Caribou	6	0	Walking	TRUE	Mixed	right
CAM07	2023-06-19 16:08:28	Caribou	30	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-19 16:48:58	Caribou	14	10	Feeding	FALSE	Mixed	NA
A02	2023-06-19 16:55:30	Uncategorized Bird	1	0		FALSE	Mixed	
CAM21	2023-06-19 17:19:02	Arctic Fox	1	0		FALSE	Mixed	
A06	2023-06-19 17:46:44	Caribou	3	3	Walking	TRUE	Mixed	left
A09	2023-06-19 17:52:07	Arctic Fox	1	0		FALSE	Mixed	
A03	2023-06-19 17:58:11	Caribou	1	0	Walking	FALSE	Female	left
CAM03	2023-06-19 18:00:22	Caribou	35	15	Feeding	FALSE	Mixed	NA
CAM07	2023-06-19 18:00:26	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM01	2023-06-19 18:31:39	Caribou	34	12	Walking	FALSE	Mixed	NA
CAM07	2023-06-19 18:46:10	Caribou	20	5	Feeding	FALSE	Mixed	NA
CAM04	2023-06-19 18:49:53	Caribou	10	3	Walking	FALSE	Mixed	NA
A04	2023-06-19 19:09:08	Arctic Fox	1	0		FALSE	Mixed	
CAM04	2023-06-19 19:59:59	Caribou	200	50	Feeding	FALSE	Mixed	NA
CAM20	2023-06-19 19:59:59	Caribou	31	4	Feeding	FALSE	Mixed	NA
CAM17	2023-06-19 20:34:09	Caribou	3	1	Walking	TRUE	Female	right
A07	2023-06-19 20:36:19	Caribou	1	1	Walking	TRUE	Mixed	left
A06	2023-06-19 21:31:22	Arctic Fox	1	0		FALSE	Mixed	
A07	2023-06-19 21:48:21	Caribou	1	0	Inspecting camera	FALSE	Female	left
CAM17	2023-06-19 21:49:33	Caribou	1	0	Feeding	FALSE	Female	left
CAM20	2023-06-19 21:59:59	Caribou	17	0	Feeding	FALSE	Mixed	NA
CAM18	2023-06-19 22:01:36	Caribou	3	1	Walking	FALSE	Mixed	NA
CAM20	2023-06-19 22:30:00	Caribou	8	2	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM04	2023-06-19 22:59:59	Caribou	1	0	Feeding	FALSE	Mixed	NA
A15	2023-06-19 23:00:29	Arctic Hare	1	0		FALSE	Mixed	
A04	2023-06-19 23:19:24	Caribou	200	30	Walking	TRUE	Mixed	left
CAM20	2023-06-19 23:24:58	Caribou	16	2	Feeding	FALSE	Mixed	NA
A02	2023-06-19 23:46:59	Caribou	300	50	Feeding	TRUE	Mixed	right
CAM04	2023-06-20 00:06:52	Caribou	1	0	Walking	FALSE	Mixed	NA
A03	2023-06-20 00:16:40	Caribou	1	0	Walking	TRUE	Female	left
CAM20	2023-06-20 00:59:59	Caribou	2	0	Walking	FALSE	Mixed	NA
A04	2023-06-20 01:02:42	Caribou	400	120	Walking	TRUE	Mixed	left
A02	2023-06-20 01:20:13	Caribou	20	5	Walking	FALSE	Mixed	left
CAM05	2023-06-20 02:00:00	Caribou	60	10	Feeding	FALSE	Mixed	NA
A02	2023-06-20 02:49:35	Caribou	200	25	Feeding	TRUE	Mixed	left
CAM08	2023-06-20 02:54:54	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A05	2023-06-20 03:37:37	Caribou	1	0	Feeding	FALSE	Female	left
CAM11	2023-06-20 03:39:28	Caribou	1	0	Walking	TRUE	Female	left
A13	2023-06-20 03:39:39	Caribou	1	0	Walking	TRUE	Female	left
CAM07	2023-06-20 03:59:59	Caribou	60	0	Feeding	FALSE	Mixed	NA
CAM04	2023-06-20 04:29:59	Caribou	100	0	Feeding	FALSE	Mixed	NA
A05	2023-06-20 04:47:19	Caribou	200	40	Running	TRUE	Mixed	left
A03	2023-06-20 05:00:04	Caribou	5	0	Feeding	TRUE	Female	right
CAM07	2023-06-20 05:36:27	Caribou	25	8	Feeding	FALSE	Mixed	NA
A02	2023-06-20 05:41:42	Caribou	6	2	Feeding	TRUE	Mixed	left
A04	2023-06-20 05:59:29	Caribou	0	1	Inspecting camera	FALSE	Mixed	left
A06	2023-06-20 06:04:00	Caribou	6	7	Walking	TRUE	Mixed	right
CAM20	2023-06-20 06:08:41	Caribou	1	0	Walking	FALSE	Mixed	NA
A12	2023-06-20 06:11:34	Caribou	20	4	Walking	TRUE	Mixed	left
CAM08	2023-06-20 06:26:27	Caribou	250	50	Feeding	FALSE	Mixed	NA
A03	2023-06-20 06:29:07	Caribou	1	0	Walking	TRUE	Female	left
CAM04	2023-06-20 06:38:28	Caribou	300	50	Feeding	FALSE	Mixed	NA
CAM25	2023-06-20 06:44:36	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-20 07:11:45	Caribou	33	18	Walking	FALSE	Mixed	NA
CAM09	2023-06-20 07:26:19	Caribou	250	50	Walking	FALSE	Mixed	NA
CAM03	2023-06-20 07:47:29	Caribou	260	100	Walking	FALSE	Mixed	NA
A06	2023-06-20 08:32:05	Caribou	1	0	Running	FALSE	Female	left
A05	2023-06-20 08:43:25	Caribou	1	0	Running	FALSE	Female	left
CAM10	2023-06-20 08:47:49	Caribou	30	7	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM07	2023-06-20 08:54:08	Caribou	35	0	Walking	FALSE	Mixed	NA
CAM05	2023-06-20 09:02:50	Caribou	20	10	Walking	FALSE	Mixed	NA
A07	2023-06-20 09:07:42	Caribou	2	0	Walking	TRUE	Female	left
CAM17	2023-06-20 09:08:51	Caribou	3	0	Feeding	TRUE	Male	left
CAM13	2023-06-20 09:18:56	Caribou	100	0	Walking	FALSE	Mixed	NA
CAM01	2023-06-20 09:19:35	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM21	2023-06-20 09:22:29	Caribou	3	1	Feeding	TRUE	Female	left
CAM14	2023-06-20 09:43:22	Caribou	180	50	Walking	FALSE	Mixed	NA
CAM17	2023-06-20 09:50:35	Caribou	1	0	Walking	TRUE	Male	left
CAM12	2023-06-20 09:51:27	Caribou	60	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-20 09:59:59	Caribou	200	0	Feeding	FALSE	Mixed	NA
CAM05	2023-06-20 10:10:30	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM03	2023-06-20 10:14:09	Caribou	50	30	Walking	FALSE	Mixed	NA
CAM04	2023-06-20 10:17:58	Caribou	200	0	Feeding	FALSE	Mixed	NA
CAM08	2023-06-20 10:24:32	Caribou	2	0	Walking	FALSE	Mixed	NA
CAM15	2023-06-20 10:29:20	Caribou	200	50	Feeding	FALSE	Mixed	NA
A07	2023-06-20 10:29:24	Caribou	0	1	Running	FALSE	Mixed	left
CAM17	2023-06-20 10:29:59	Caribou	0	1	Running	FALSE	Mixed	left
CAM18	2023-06-20 10:30:00	Caribou	200	100	Feeding	FALSE	Mixed	NA
CAM21	2023-06-20 10:36:25	Caribou	35	14	Walking	TRUE	Female	left
CAM09	2023-06-20 10:38:01	Caribou	20	5	Walking	FALSE	Mixed	NA
CAM16	2023-06-20 10:42:30	Caribou	150	50	Feeding	FALSE	Mixed	NA
A06	2023-06-20 10:45:54	Caribou	18	3	Walking	TRUE	Mixed	left
CAM05	2023-06-20 10:53:31	Caribou	90	30	Walking	FALSE	Mixed	NA
CAM08	2023-06-20 10:58:12	Caribou	400	100	Walking	FALSE	Mixed	NA
CAM07	2023-06-20 11:12:52	Caribou	130	20	Walking	FALSE	Mixed	NA
CAM13	2023-06-20 11:22:52	Caribou	200	0	Feeding	FALSE	Mixed	NA
CAM09	2023-06-20 11:28:21	Caribou	150	50	Walking	FALSE	Mixed	NA
CAM01	2023-06-20 11:40:20	Caribou	22	14	Walking	FALSE	Mixed	NA
CAM14	2023-06-20 11:50:20	Caribou	150	150	Walking	FALSE	Mixed	NA
CAM21	2023-06-20 11:50:20	Caribou	10	6	Walking	TRUE	Female	left
CAM10	2023-06-20 12:05:40	Caribou	13	8	Walking	FALSE	Mixed	NA
A03	2023-06-20 12:40:23	Arctic Fox	1	0		FALSE	Mixed	
CAM15	2023-06-20 12:40:31	Caribou	200	50	Feeding	FALSE	Mixed	NA
CAM18	2023-06-20 12:41:34	Caribou	200	100	Feeding	FALSE	Mixed	NA
CAM25	2023-06-20 12:56:25	Caribou	10	5	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM06	2023-06-20 13:00:00	Caribou	1	0	Feeding	FALSE	Female	right
A07	2023-06-20 13:01:21	Caribou	6	1	Walking	TRUE	Mixed	left
CAM17	2023-06-20 13:02:30	Caribou	9	2	Walking	TRUE	Mixed	right
CAM09	2023-06-20 13:13:03	Caribou	6	2	Walking	FALSE	Mixed	NA
CAM13	2023-06-20 13:58:08	Caribou	300	0	Walking	FALSE	Mixed	NA
CAM18	2023-06-20 13:59:30	Caribou	250	100	Feeding	FALSE	Mixed	NA
CAM12	2023-06-20 13:59:59	Caribou	28	8	Resting	FALSE	Mixed	NA
CAM11	2023-06-20 14:01:15	Arctic Hare	1	0		FALSE	Mixed	
A02	2023-06-20 14:04:29	Caribou	2	2	Walking	FALSE	Female	left
CAM08	2023-06-20 14:08:20	Caribou	15	5	Walking	FALSE	Mixed	NA
CAM25	2023-06-20 14:16:48	Caribou	70	20	Walking	FALSE	Mixed	NA
CAM07	2023-06-20 14:26:35	Caribou	30	0	Walking	FALSE	Mixed	NA
CAM06	2023-06-20 14:36:08	Caribou	1	0	Feeding	FALSE	Female	left
CAM09	2023-06-20 14:42:28	Caribou	20	10	Walking	FALSE	Mixed	NA
CAM15	2023-06-20 14:48:39	Caribou	200	50	Feeding	FALSE	Mixed	NA
CAM04	2023-06-20 15:07:39	Caribou	11	7	Walking	FALSE	Mixed	NA
CAM07	2023-06-20 15:22:05	Caribou	2	0	Walking	FALSE	Mixed	NA
CAM14	2023-06-20 16:17:14	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM13	2023-06-20 16:53:09	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM10	2023-06-20 17:00:00	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-20 17:19:42	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM13	2023-06-20 17:24:50	Caribou	0	1	Walking	FALSE	Mixed	NA
CAM08	2023-06-20 17:26:54	Caribou	2	0	Walking	FALSE	Mixed	NA
A02	2023-06-20 17:29:35	Caribou	1	0	Inspecting camera	FALSE	Female	left
CAM09	2023-06-20 17:36:11	Caribou	9	3	Walking	FALSE	Mixed	NA
CAM14	2023-06-20 17:53:40	Caribou	7	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-20 18:03:48	Caribou	35	15	Walking	FALSE	Mixed	NA
CAM11	2023-06-20 18:10:33	Uncategorized Bird	4	0		FALSE	Mixed	
CAM09	2023-06-20 19:00:00	Caribou	1	0	Resting	FALSE	Mixed	NA
CAM13	2023-06-20 20:04:35	Caribou	12	4	Walking	FALSE	Mixed	NA
CAM14	2023-06-20 20:20:05	Caribou	3	1	Walking	FALSE	Mixed	NA
CAM14	2023-06-20 20:55:55	Caribou	6	5	Walking	FALSE	Mixed	NA
CAM19	2023-06-20 21:14:14	Caribou	20	12	Running	TRUE	Mixed	left
CAM14	2023-06-20 21:29:59	Caribou	2	0	Feeding	FALSE	Mixed	NA
CAM03	2023-06-20 22:42:35	Caribou	35	6	Feeding	FALSE	Mixed	NA
CAM19	2023-06-20 23:54:26	Caribou	20	7	Walking	TRUE	Mixed	left

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM15	2023-06-21 04:20:15	Caribou	1	0	Walking	FALSE	Mixed	NA
A02	2023-06-21 04:33:03	Caribou	15	6	Feeding	FALSE	Mixed	left
CAM03	2023-06-21 05:30:00	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-21 07:10:15	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM01	2023-06-21 07:10:56	Uncategorized Bird	6	0	Flying	FALSE	Mixed	NA
A02	2023-06-21 08:13:19	Caribou	50	5	Feeding	TRUE	Mixed	left
CAM09	2023-06-21 09:51:25	Caribou	30	10	Walking	FALSE	Mixed	NA
A12	2023-06-21 09:52:27	Caribou	4	0	Running	FALSE	Mixed	left
A06	2023-06-21 10:36:54	Caribou	35	10	Walking	TRUE	Mixed	left
CAM09	2023-06-21 10:51:07	Caribou	40	15	Walking	FALSE	Mixed	NA
CAM03	2023-06-21 11:06:56	Caribou	100	70	Walking	FALSE	Mixed	NA
CAM03	2023-06-21 11:07:01	Uncategorized Bird	1	0	Running	FALSE	Mixed	NA
CAM04	2023-06-21 11:10:51	Caribou	30	0	Walking	FALSE	Mixed	NA
CAM07	2023-06-21 11:13:31	Uncategorized Bird	1	0	Resting	FALSE	Mixed	NA
CAM04	2023-06-21 12:04:07	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM11	2023-06-21 12:12:57	Caribou	2	0	Walking	TRUE	Female	left
A13	2023-06-21 12:13:06	Caribou	2	0	Walking	TRUE	Male	left
CAM18	2023-06-21 12:18:43	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM07	2023-06-21 12:22:49	Caribou	7	1	Walking	FALSE	Mixed	NA
CAM18	2023-06-21 12:23:56	Caribou	30	10	Walking	FALSE	Mixed	NA
CAM08	2023-06-21 12:30:00	Caribou	15	5	Feeding	FALSE	Mixed	NA
A02	2023-06-21 12:39:40	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM13	2023-06-21 12:54:26	Caribou	13	2	Walking	FALSE	Mixed	NA
CAM09	2023-06-21 13:05:22	Caribou	27	9	Walking	FALSE	Mixed	NA
CAM14	2023-06-21 13:07:41	Caribou	10	5	Walking	FALSE	Mixed	NA
A06	2023-06-21 13:34:56	Caribou	5	3	Walking	TRUE	Mixed	left
CAM08	2023-06-21 14:20:51	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-21 15:54:46	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-06-21 16:19:07	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM04	2023-06-21 17:00:00	Caribou	150	0	Feeding	FALSE	Mixed	NA
A04	2023-06-21 19:27:54	Caribou	40	0	Walking	FALSE	Mixed	right
CAM13	2023-06-21 20:27:56	Caribou	105	45	Feeding	FALSE	Mixed	NA
CAM21	2023-06-21 20:51:03	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
A02	2023-06-21 21:32:38	Uncategorized Bird	1	0		FALSE	Mixed	
CAM13	2023-06-21 21:59:59	Caribou	150	80	Feeding	FALSE	Mixed	NA
CAM14	2023-06-21 22:35:34	Caribou	90	40	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM38	2023-06-22 04:59:59	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM10	2023-06-22 07:29:31	Caribou	1	1	Walking	FALSE	Mixed	NA
A03	2023-06-22 09:27:40	Arctic Ground Squirrel	1	0		FALSE	Mixed	
CAM05	2023-06-22 09:29:36	Caribou	40	20	Walking	FALSE	Mixed	NA
CAM08	2023-06-22 09:30:00	Caribou	150	50	Feeding	FALSE	Mixed	NA
CAM09	2023-06-22 09:41:25	Caribou	85	15	Walking	FALSE	Mixed	NA
CAM09	2023-06-22 10:27:40	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-22 10:51:05	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM18	2023-06-22 11:16:53	Uncategorized Bird	1	0		FALSE	Mixed	NA
CAM05	2023-06-22 12:18:46	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM05	2023-06-22 12:52:51	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM38	2023-06-22 16:59:59	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-22 18:00:00	Caribou	30	10	Feeding	FALSE	Mixed	NA
CAM07	2023-06-22 21:34:04	Caribou	15	10	Feeding	FALSE	Mixed	NA
CAM05	2023-06-22 21:55:40	Caribou	23	5	Feeding	FALSE	Mixed	NA
A07	2023-06-23 00:00:30	Arctic Fox	1	0		FALSE	Mixed	
CAM17	2023-06-23 00:01:33	Arctic Fox	1	0		FALSE	Mixed	
CAM05	2023-06-23 04:23:13	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
A13	2023-06-23 13:19:36	Uncategorized Bird	1	0		FALSE	Mixed	
CAM20	2023-06-23 16:30:00	Uncategorized Bird	1	0		FALSE	Mixed	NA
CAM03	2023-06-23 21:00:00	Uncategorized Bird	1	0	Standing	FALSE	Mixed	NA
CAM38	2023-06-23 21:36:34	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
A05	2023-06-23 22:18:11	Uncategorized Bird	11	0		FALSE	Mixed	
A15	2023-06-24 01:44:09	Arctic Hare	1	0		FALSE	Mixed	
CAM38	2023-06-24 16:59:59	Uncategorized Bird	4	0	Feeding	FALSE	Mixed	NA
CAM25	2023-06-25 01:29:59	Uncategorized Bird	1	0	Standing	FALSE	Mixed	NA
A15	2023-06-25 02:42:14	Arctic Hare	1	0		FALSE	Mixed	
CAM25	2023-06-25 03:49:23	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A12	2023-06-25 04:47:12	Caribou	0	1	Walking	FALSE	Mixed	left
A15	2023-06-25 06:45:09	Arctic Fox	1	0		FALSE	Mixed	
CAM19	2023-06-25 07:14:55	Caribou	1000	200	Feeding	TRUE	Mixed	left
A09	2023-06-25 07:16:21	Caribou	2000	200	Feeding	TRUE	Mixed	right
A11	2023-06-25 08:31:21	Caribou	1	0	Walking	FALSE	Female	left
CAM19	2023-06-25 10:00:00	Caribou	3000	400	Feeding	TRUE	Mixed	left
A09	2023-06-25 10:07:49	Caribou	1500	200	Feeding	TRUE	Mixed	right
A11	2023-06-25 10:12:00	Caribou	13	2	Walking	FALSE	Mixed	left

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM28	2023-06-25 10:30:00	Caribou	11	0	Feeding	FALSE	Mixed	right
CAM21	2023-06-25 10:38:39	Caribou	12	3	Feeding	TRUE	Mixed	left
CAM15	2023-06-25 10:41:55	Uncategorized Bird	5	0	Resting	FALSE	Mixed	NA
A03	2023-06-25 11:11:16	Caribou	7	0	Walking	TRUE	Female	right
CAM19	2023-06-25 11:30:00	Caribou	1000	200	Feeding	FALSE	Mixed	right
A11	2023-06-25 12:53:17	Caribou	300	0	Feeding	FALSE	Mixed	right
CAM19	2023-06-25 13:17:29	Caribou	10000	2000	Feeding	TRUE	Mixed	right
CAM21	2023-06-25 14:00:54	Caribou	17	8	Walking	TRUE	Mixed	left
A05	2023-06-25 14:33:34	Caribou	3	0	Feeding	FALSE	Mixed	left
A03	2023-06-25 14:46:30	Caribou	8	0	Walking	TRUE	Mixed	left
CAM21	2023-06-25 15:13:07	Caribou	6	2	Feeding	TRUE	Mixed	right
CAM28	2023-06-25 15:22:15	Caribou	15	4	Feeding	TRUE	Mixed	right
CAM19	2023-06-25 16:30:00	Caribou	15000	4000	Walking	TRUE	Mixed	left
A03	2023-06-25 17:03:25	Caribou	15	6	Feeding	TRUE	Mixed	right
CAM21	2023-06-25 17:29:15	Caribou	1	0	Walking	FALSE	Female	left
CAM19	2023-06-25 17:30:00	Caribou	500	100	Feeding	FALSE	Mixed	right
A05	2023-06-25 17:47:06	Caribou	15	4	Feeding	FALSE	Mixed	left
CAM19	2023-06-25 18:30:00	Caribou	10000	3000	Feeding	FALSE	Mixed	right
A05	2023-06-25 19:22:02	Caribou	5	1	Feeding	TRUE	Mixed	left
CAM28	2023-06-25 19:55:29	Caribou	6	0	Walking	TRUE	Mixed	right
A05	2023-06-25 20:58:42	Caribou	4	1	Feeding	TRUE	Mixed	left
CAM19	2023-06-25 21:47:31	Caribou	25000	6000	Feeding	TRUE	Mixed	left
CAM21	2023-06-25 22:02:28	Caribou	8	2	Feeding	TRUE	Mixed	left
A02	2023-06-25 22:13:45	Caribou	80	35	Walking	TRUE	Mixed	left
A05	2023-06-25 22:39:51	Caribou	3	2	Feeding	TRUE	Mixed	left
CAM21	2023-06-25 22:46:20	Caribou	30	8	Walking	TRUE	Mixed	right
A05	2023-06-25 23:31:06	Caribou	12	4	Walking	TRUE	Mixed	left
CAM21	2023-06-26 00:30:29	Caribou	4	0	Walking	FALSE	Female	left
CAM13	2023-06-26 01:19:21	Caribou	5	0	Walking	FALSE	Mixed	NA
CAM21	2023-06-26 01:30:00	Caribou	2	0	Walking	TRUE	Mixed	right
A03	2023-06-26 01:42:14	Caribou	200	40	Walking	TRUE	Mixed	left
CAM21	2023-06-26 02:37:31	Caribou	300	60	Feeding	TRUE	Mixed	left
A15	2023-06-26 03:06:07	Caribou	2	0	Walking	FALSE	Male	left
CAM13	2023-06-26 03:12:47	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM19	2023-06-26 03:45:06	Caribou	6000	1000	Walking	TRUE	Mixed	right
CAM25	2023-06-26 03:59:38	Arctic Fox	1	0	Running	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM09	2023-06-26 04:15:10	Caribou	2	0	Walking	FALSE	Mixed	NA
CAM13	2023-06-26 04:18:10	Caribou	44	11	Feeding	FALSE	Mixed	NA
CAM38	2023-06-26 04:35:32	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
A11	2023-06-26 04:55:29	Caribou	6	0	Feeding	TRUE	Mixed	left
CAM14	2023-06-26 04:57:31	Caribou	20	15	Walking	FALSE	Mixed	NA
A05	2023-06-26 05:44:37	Caribou	30	8	Feeding	TRUE	Mixed	left
A03	2023-06-26 05:45:23	Caribou	4	2	Walking	TRUE	Female	left
CAM19	2023-06-26 05:50:06	Caribou	30	5	Walking	TRUE	Mixed	right
CAM28	2023-06-26 06:35:47	Caribou	8	0	Feeding	TRUE	Mixed	left
CAM13	2023-06-26 06:56:55	Caribou	7	4	Walking	FALSE	Mixed	NA
CAM14	2023-06-26 06:58:31	Caribou	15	5	Walking	FALSE	Mixed	NA
A11	2023-06-26 07:08:45	Caribou	6	0	Feeding	TRUE	Mixed	left
CAM19	2023-06-26 07:20:01	Caribou	1	0	Walking	FALSE	Female	left
A05	2023-06-26 07:30:49	Caribou	50	5	Walking	TRUE	Mixed	left
A02	2023-06-26 07:43:44	Caribou	55	20	Feeding	TRUE	Mixed	left
CAM19	2023-06-26 07:53:09	Caribou	2	0	Feeding	FALSE	Mixed	left
CAM21	2023-06-26 08:04:25	Caribou	5	3	Feeding	TRUE	Female	left
A11	2023-06-26 08:14:57	Caribou	1	1	Walking	FALSE	Female	left
CAM15	2023-06-26 08:28:16	Caribou	20	10	Feeding	FALSE	Mixed	NA
CAM28	2023-06-26 08:32:19	Caribou	120	30	Walking	TRUE	Mixed	right
CAM16	2023-06-26 08:36:07	Caribou	70	30	Feeding	FALSE	Mixed	NA
CAM08	2023-06-26 08:40:40	Caribou	1	0	Walking	FALSE	Mixed	NA
A02	2023-06-26 09:06:51	Caribou	0	1	Running	FALSE	Mixed	left
A05	2023-06-26 09:19:04	Caribou	1	1	Running	FALSE	Female	left
A09	2023-06-26 09:22:42	Caribou	600	100	Feeding	TRUE	Mixed	right
CAM25	2023-06-26 09:43:22	Caribou	15	5	Feeding	FALSE	Mixed	NA
CAM19	2023-06-26 09:56:44	Caribou	1	1	Walking	TRUE	Mixed	right
A05	2023-06-26 10:06:06	Caribou	10	6	Walking	TRUE	Mixed	left
A09	2023-06-26 10:19:30	Caribou	300	0	Feeding	TRUE	Mixed	left
CAM08	2023-06-26 10:39:53	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM21	2023-06-26 10:48:31	Caribou	1	0	Feeding	FALSE	Female	left
CAM14	2023-06-26 11:17:06	Caribou	0	1	Walking	FALSE	Mixed	NA
A09	2023-06-26 11:31:36	Caribou	1000	120	Feeding	TRUE	Mixed	right
CAM03	2023-06-26 11:53:48	Caribou	2	0	Feeding	FALSE	Mixed	NA
A05	2023-06-26 12:25:46	Caribou	25	6	Walking	TRUE	Mixed	left
CAM19	2023-06-26 12:39:49	Caribou	20000	6000	Feeding	TRUE	Mixed	right

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM21	2023-06-26 12:40:59	Caribou	1	1	Walking	TRUE	Female	left
CAM07	2023-06-26 12:41:32	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM04	2023-06-26 13:10:55	Caribou	40	10	Walking	FALSE	Mixed	NA
CAM25	2023-06-26 13:20:03	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM03	2023-06-26 13:23:21	Caribou	4	0	Feeding	FALSE	Mixed	NA
CAM21	2023-06-26 13:27:27	Caribou	32	9	Walking	TRUE	Mixed	right
CAM03	2023-06-26 14:07:11	Caribou	19	3	Feeding	FALSE	Mixed	NA
A03	2023-06-26 14:18:20	Caribou	15	6	Walking	TRUE	Mixed	left
CAM08	2023-06-26 14:42:01	Caribou	20	0	Feeding	FALSE	Mixed	NA
CAM19	2023-06-26 15:00:00	Caribou	400	1500	Feeding	TRUE	Mixed	right
A03	2023-06-26 15:05:18	Caribou	1	1	Running	TRUE	Mixed	right
CAM03	2023-06-26 15:30:00	Caribou	3	3	Feeding	FALSE	Mixed	NA
CAM21	2023-06-26 16:03:17	Caribou	4	1	Walking	FALSE	Female	left
A03	2023-06-26 16:05:58	Caribou	7	2	Walking	TRUE	Mixed	right
CAM09	2023-06-26 16:07:37	Caribou	15	5	Feeding	FALSE	Mixed	NA
CAM08	2023-06-26 16:16:53	Caribou	10	0	Feeding	FALSE	Mixed	NA
CAM12	2023-06-26 16:29:52	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-26 16:31:45	Caribou	9	8	Feeding	FALSE	Mixed	NA
CAM21	2023-06-26 16:38:09	Caribou	65	10	Walking	TRUE	Mixed	right
CAM12	2023-06-26 17:19:12	Caribou	12	0	Feeding	FALSE	Mixed	NA
CAM19	2023-06-26 17:45:28	Caribou	20	7	Feeding	TRUE	Mixed	right
A05	2023-06-26 17:59:39	Caribou	7	4	Feeding	TRUE	Mixed	left
CAM04	2023-06-26 18:06:17	Caribou	7	4	Walking	FALSE	Mixed	NA
CAM21	2023-06-26 18:24:38	Caribou	6	1	Walking	TRUE	Female	right
CAM19	2023-06-26 18:41:52	Caribou	200	35	Walking	TRUE	Mixed	right
A05	2023-06-26 18:58:00	Caribou	400	150	Walking	TRUE	Mixed	left
CAM19	2023-06-26 21:26:39	Caribou	1	0	Walking	TRUE	Female	right
CAM21	2023-06-26 21:53:10	Caribou	300	80	Walking	TRUE	Mixed	left
A15	2023-06-26 21:59:04	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-06-27 00:48:01	Arctic Hare	1	0		FALSE	Mixed	
CAM07	2023-06-27 01:56:40	Caribou	2	1	Walking	FALSE	Mixed	NA
CAM03	2023-06-27 02:55:34	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A09	2023-06-27 08:42:48	Caribou	100	200	Walking	TRUE	Mixed	left
CAM19	2023-06-27 09:14:53	Caribou	1	0	Walking	TRUE	Female	right
A11	2023-06-27 09:35:55	Uncategorized Bird	1	0		FALSE	Mixed	
CAM20	2023-06-27 13:51:00	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A11	2023-06-27 15:30:00	Uncategorized Bird	2	0		FALSE	Mixed	
CAM13	2023-06-27 19:00:00	Caribou	200	100	Feeding	FALSE	Mixed	NA
CAM14	2023-06-27 19:18:59	Caribou	60	40	Feeding	FALSE	Mixed	NA
A09	2023-06-27 22:15:28	Caribou	600	100	Walking	TRUE	Mixed	left
CAM15	2023-06-27 22:38:48	Caribou	1	1	Walking	FALSE	Mixed	NA
CAM14	2023-06-27 22:39:10	Caribou	1	0	Walking	FALSE	Mixed	NA
A15	2023-06-27 23:48:01	Arctic Hare	1	0		FALSE	Mixed	
CAM19	2023-06-28 00:08:59	Caribou	1	0	Walking	TRUE	Female	right
A06	2023-06-28 01:09:44	Arctic Hare	1	0		FALSE	Mixed	
A09	2023-06-28 01:32:12	Arctic Fox	1	0		FALSE	Mixed	
CAM19	2023-06-28 01:33:17	Arctic Hare	1	0		FALSE	Mixed	
CAM19	2023-06-28 03:59:14	Arctic Fox	1	0		FALSE	Mixed	
A11	2023-06-28 04:12:52	Caribou	1	0	Standing	FALSE	Female	left
CAM03	2023-06-28 04:13:05	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM25	2023-06-28 04:20:20	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
A15	2023-06-28 05:56:17	Arctic Hare	1	0		FALSE	Mixed	
A11	2023-06-28 07:51:06	Caribou	140	25	Walking	TRUE	Mixed	left
A15	2023-06-28 08:17:57	Arctic Hare	1	0		FALSE	Mixed	
CAM13	2023-06-28 08:57:37	Caribou	12	8	Resting	FALSE	Mixed	NA
A15	2023-06-28 09:36:09	Arctic Hare	1	0		FALSE	Mixed	
CAM19	2023-06-28 09:50:46	Caribou	1	0	Walking	TRUE	Female	right
CAM13	2023-06-28 10:15:13	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-28 15:47:34	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM25	2023-06-28 19:02:20	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
A09	2023-06-29 03:10:43	Arctic Fox	1	0		FALSE	Mixed	
CAM03	2023-06-29 04:32:10	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A11	2023-06-29 05:55:53	Arctic Fox	1	0		FALSE	Mixed	
CAM19	2023-06-29 09:14:09	Caribou	4	0	Walking	TRUE	Male	left
CAM03	2023-06-29 19:39:37	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A15	2023-06-30 05:28:09	Arctic Hare	1	0		FALSE	Mixed	
CAM38	2023-06-30 08:59:24	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM14	2023-06-30 10:22:31	Caribou	20	0	Walking	FALSE	Mixed	NA
CAM03	2023-06-30 17:44:15	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A07	2023-07-01 00:03:32	Arctic Fox	1	0		FALSE	Mixed	
CAM17	2023-07-01 00:04:13	Arctic Fox	1	0		FALSE	Mixed	
CAM14	2023-07-01 01:48:41	Uncategorized Bird	1	0	Standing	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
A09	2023-07-01 04:16:06	Arctic Fox	1	0		FALSE	Mixed	
CAM19	2023-07-01 08:20:22	Arctic Fox	1	0		FALSE	Mixed	
CAM38	2023-07-01 20:23:11	Uncategorized Bird	1	0	Resting	FALSE	Mixed	NA
CAM38	2023-07-01 20:39:54	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM14	2023-07-01 21:44:41	Caribou	1	0	Walking	FALSE	Male	NA
A06	2023-07-02 00:14:16	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-07-02 00:59:36	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-07-02 02:36:45	Arctic Hare	2	0		FALSE	Mixed	
A15	2023-07-02 03:41:48	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-07-02 04:44:52	Arctic Hare	1	0		FALSE	Mixed	
CAM15	2023-07-02 07:50:07	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM38	2023-07-02 20:08:39	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM25	2023-07-03 00:08:07	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM13	2023-07-03 01:43:27	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-07-03 12:07:51	Caribou	1	0	Walking	FALSE	Male	NA
A07	2023-07-03 20:17:30	Arctic Fox	1	0		FALSE	Mixed	
CAM17	2023-07-03 20:18:01	Arctic Fox	1	0		FALSE	Mixed	
CAM13	2023-07-03 23:17:13	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM19	2023-07-04 01:47:17	Arctic Fox	1	0		FALSE	Mixed	
A13	2023-07-04 04:52:37	Arctic Fox	1	0		FALSE	Mixed	
CAM03	2023-07-04 10:04:07	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM07	2023-07-05 00:24:14	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A15	2023-07-05 04:09:48	Arctic Fox	1	0		FALSE	Mixed	
CAM19	2023-07-05 04:59:59	Uncategorized Bird	1	0		FALSE	Mixed	
CAM10	2023-07-05 08:29:46	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM38	2023-07-05 14:01:26	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM38	2023-07-05 16:22:55	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
A06	2023-07-06 01:09:03	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-07-06 07:10:45	Arctic Hare	1	0		FALSE	Mixed	
A11	2023-07-06 07:26:18	Caribou	3000	500	Walking	TRUE	Mixed	right
CAM21	2023-07-06 07:35:43	Uncategorized Bird	3	0		FALSE	Mixed	
CAM28	2023-07-06 07:45:07	Caribou	700	200	Walking	TRUE	Mixed	right
CAM28	2023-07-06 18:29:19	Caribou	12	4	Running	TRUE	Female	right
CAM05	2023-07-06 19:05:44	Uncategorized Bird	2	1	Feeding	FALSE	Mixed	NA
A04	2023-07-06 20:01:12	Arctic Fox	1	0		FALSE	Mixed	
A07	2023-07-07 01:37:06	Arctic Fox	1	0		FALSE	Mixed	

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM17	2023-07-07 01:37:31	Arctic Fox	1	0		FALSE	Mixed	
CAM28	2023-07-07 05:59:59	Caribou	1	0	Walking	FALSE	Female	right
A09	2023-07-07 09:11:53	Caribou	1	0	Walking	TRUE	Female	left
A06	2023-07-07 11:39:37	Arctic Fox	1	0		FALSE	Mixed	
A15	2023-07-07 20:42:10	Arctic Hare	1	0		FALSE	Mixed	
A07	2023-07-08 02:14:16	Arctic Hare	1	0		FALSE	Mixed	
CAM17	2023-07-08 02:14:36	Arctic Hare	1	0		FALSE	Mixed	
A15	2023-07-08 05:03:56	Arctic Hare	1	0		FALSE	Mixed	
A11	2023-07-08 11:30:19	Arctic Ground Squirrel	1	0		FALSE	Mixed	
A11	2023-07-09 07:01:12	Caribou	400	50	Walking	TRUE	Mixed	right
CAM38	2023-07-09 08:17:29	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM03	2023-07-09 10:49:20	Caribou	30	20	Feeding	FALSE	Mixed	NA
CAM01	2023-07-09 11:08:42	Caribou	5	1	Walking	FALSE	Mixed	NA
A15	2023-07-09 11:38:20	Caribou	1	1	Walking	FALSE	Female	left
CAM01	2023-07-09 12:03:05	Caribou	2	1	Feeding	FALSE	Mixed	NA
A15	2023-07-09 12:29:25	Caribou	2	1	Walking	FALSE	Mixed	left
CAM01	2023-07-09 12:44:09	Caribou	67	43	Running	FALSE	Mixed	NA
CAM04	2023-07-09 13:00:26	Caribou	5	0	Feeding	FALSE	Mixed	NA
CAM19	2023-07-09 13:29:59	Caribou	1	1	Feeding	FALSE	Female	left
CAM04	2023-07-09 13:38:30	Caribou	30	0	Feeding	FALSE	Mixed	NA
A15	2023-07-09 13:40:28	Caribou	0	1	Feeding	FALSE	Mixed	left
A06	2023-07-09 13:46:38	Caribou	6	3	Walking	TRUE	Mixed	right
CAM03	2023-07-09 14:22:11	Caribou	2	2	Feeding	FALSE	Mixed	NA
CAM14	2023-07-09 14:35:13	Caribou	1	0	Walking	FALSE	Female	NA
CAM04	2023-07-09 14:49:00	Caribou	40	0	Feeding	FALSE	Mixed	NA
CAM05	2023-07-09 15:29:59	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM05	2023-07-09 16:20:00	Caribou	15	5	Feeding	FALSE	Mixed	NA
CAM05	2023-07-09 17:59:59	Caribou	8	2	Feeding	FALSE	Mixed	NA
CAM11	2023-07-09 19:13:13	Caribou	1	0	Walking	FALSE	Female	right
CAM01	2023-07-09 21:26:18	Caribou	18	10	Running	FALSE	Mixed	NA
CAM17	2023-07-09 23:00:00	Uncategorized Bird	1	0		FALSE	Mixed	
CAM17	2023-07-10 01:21:44	Arctic Fox	1	0		FALSE	Mixed	
A06	2023-07-10 03:53:02	Caribou	1	1	Walking	TRUE	Female	right
A05	2023-07-10 04:31:15	Caribou	7	0	Feeding	FALSE	Female	left
A11	2023-07-10 06:24:45	Arctic Ground Squirrel	1	0		FALSE	Mixed	
A04	2023-07-10 07:47:52	Caribou	1	1	Feeding	TRUE	Mixed	left

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM20	2023-07-10 11:42:55	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A07	2023-07-10 14:14:37	Uncategorized Bird	1	0		FALSE	Mixed	
CAM17	2023-07-10 14:14:48	Uncategorized Bird	1	0		FALSE	Mixed	
CAM21	2023-07-10 18:34:42	Caribou	34	14	Walking	TRUE	Mixed	left
CAM01	2023-07-10 19:40:41	Caribou	50	24	Walking	FALSE	Mixed	NA
CAM19	2023-07-10 19:47:34	Caribou	40	15	Walking	TRUE	Mixed	left
CAM21	2023-07-10 21:01:51	Caribou	1	0	Walking	TRUE	Female	left
CAM10	2023-07-10 23:03:30	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM28	2023-07-11 05:35:47	Caribou	7	3	Running	TRUE	Female	right
CAM11	2023-07-11 06:58:25	Arctic Fox	1	0		FALSE	Mixed	
CAM13	2023-07-11 20:38:33	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A11	2023-07-12 01:20:04	Caribou	0	1	Walking	FALSE	Mixed	left
CAM19	2023-07-12 10:15:41	Caribou	1	0	Walking	FALSE	Mixed	right
CAM09	2023-07-12 16:26:49	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-07-12 23:12:11	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM20	2023-07-14 19:01:58	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-07-14 21:15:20	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-07-15 02:46:52	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-07-15 04:10:27	Caribou	0	1	Feeding	FALSE	Mixed	NA
CAM14	2023-07-15 08:03:59	Caribou	1	0	Walking	FALSE	Female	NA
CAM10	2023-07-15 11:43:12	Uncategorized Bird	4	0	Feeding	FALSE	Mixed	NA
CAM10	2023-07-15 23:18:37	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM01	2023-07-15 23:43:55	Uncategorized Bird	3	1	Flying	FALSE	Mixed	NA
CAM13	2023-07-16 00:41:01	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
CAM11	2023-07-16 05:39:47	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-07-16 09:31:16	Arctic Ground Squirrel	1	0		FALSE	Mixed	
A10	2023-07-16 10:08:35	Arctic Fox	1	0		FALSE	Mixed	
CAM20	2023-07-16 13:00:00	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM06	2023-07-16 22:53:05	Arctic Hare	1	0		FALSE	Mixed	
A08	2023-07-16 22:57:34	Arctic Hare	1	0		FALSE	Mixed	
A07	2023-07-17 00:52:34	Arctic Hare	1	0		FALSE	Mixed	
A06	2023-07-17 01:07:23	Arctic Hare	1	0		FALSE	Mixed	
CAM19	2023-07-17 06:18:20	Caribou	1	0	Running	TRUE	Female	left
A11	2023-07-17 13:16:14	Arctic Ground Squirrel	1	0		FALSE	Mixed	
CAM11	2023-07-17 20:44:42	Caribou	0	1	Walking	FALSE	Mixed	left
CAM05	2023-07-17 21:03:10	Arctic Fox	1	0	Running	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM19	2023-07-17 21:06:45	Caribou	1	0	Walking	TRUE	Male	right
A13	2023-07-17 22:31:15	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-07-17 22:32:11	Arctic Fox	1	0		FALSE	Mixed	
CAM40	2023-07-18 00:05:16	Arctic Hare	1	0	Feeding	FALSE	Mixed	NA
A13	2023-07-18 01:06:52	Arctic Hare	1	0		FALSE	Mixed	
CAM11	2023-07-18 01:07:38	Arctic Hare	1	0		FALSE	Mixed	
CAM31	2023-07-18 05:23:34	Uncategorized Bird	3	0	Feeding	FALSE	Mixed	NA
CAM20	2023-07-18 11:23:12	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM28	2023-07-18 14:27:30	Uncategorized Bird	1	0		FALSE	Mixed	
CAM31	2023-07-18 18:00:53	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM29	2023-07-19 04:58:40	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM19	2023-07-19 08:32:57	Uncategorized Bird	1	0		FALSE	Mixed	
CAM21	2023-07-19 08:50:40	Caribou	0	1	Walking	TRUE	Mixed	left
CAM29	2023-07-19 10:39:18	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM03	2023-07-19 11:47:24	Caribou	0	1	Running	FALSE	Mixed	NA
CAM19	2023-07-19 12:04:38	Uncategorized Bird	1	0		FALSE	Mixed	
CAM28	2023-07-19 18:08:34	Uncategorized Bird	1	0		FALSE	Mixed	
CAM30	2023-07-19 19:55:02	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-07-19 19:59:07	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM30	2023-07-20 02:33:30	Arctic Hare	1	0	Running	FALSE	Mixed	NA
A02	2023-07-20 08:17:34	Uncategorized Bird	1	0		FALSE	Mixed	
CAM39	2023-07-20 08:30:00	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM19	2023-07-20 08:56:14	Uncategorized Bird	1	0		FALSE	Mixed	
CAM28	2023-07-20 12:13:22	Uncategorized Bird	1	0		FALSE	Mixed	
CAM19	2023-07-20 12:49:24	Uncategorized Bird	1	0		FALSE	Mixed	
CAM03	2023-07-20 14:17:01	Caribou	0	1	Running	FALSE	Mixed	NA
CAM19	2023-07-20 18:09:12	Uncategorized Bird	1	0		FALSE	Mixed	
CAM40	2023-07-21 00:31:15	Arctic Hare	1	0	Feeding	FALSE	Mixed	NA
CAM40	2023-07-21 01:59:04	Arctic Hare	1	0	Feeding	FALSE	Mixed	NA
CAM30	2023-07-21 05:46:59	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM17	2023-07-21 05:54:13	Uncategorized Bird	2	0		FALSE	Mixed	
CAM30	2023-07-21 06:12:09	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM39	2023-07-21 11:00:00	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM03	2023-07-21 12:37:01	Caribou	0	1	Walking	FALSE	Mixed	NA
CAM31	2023-07-21 13:29:59	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM39	2023-07-21 18:56:39	Uncategorized Bird	3	0	Flying	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM29	2023-07-21 20:52:19	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-07-22 02:30:10	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM28	2023-07-22 14:25:00	Uncategorized Bird	1	0		FALSE	Mixed	
CAM28	2023-07-22 17:08:17	Uncategorized Bird	1	0		FALSE	Mixed	
CAM07	2023-07-22 17:43:11	Arctic Ground Squirrel	1	0	Walking	FALSE	Mixed	NA
CAM11	2023-07-22 20:35:50	Arctic Fox	1	0		FALSE	Mixed	
A06	2023-07-23 00:23:02	Arctic Hare	1	0		FALSE	Mixed	
CAM28	2023-07-23 03:54:26	Uncategorized Bird	1	0		FALSE	Mixed	
CAM15	2023-07-23 07:04:47	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM15	2023-07-23 09:51:23	Uncategorized Bird	3	0	Walking	FALSE	Mixed	NA
CAM15	2023-07-23 12:02:55	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM28	2023-07-23 15:46:08	Uncategorized Bird	1	0		FALSE	Mixed	
CAM40	2023-07-23 16:38:53	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM17	2023-07-23 21:41:27	Arctic Fox	1	0		FALSE	Mixed	
CAM20	2023-07-24 09:16:17	Uncategorized Bird	7	5	Running	FALSE	Mixed	NA
CAM01	2023-07-24 11:00:00	Uncategorized Bird	2	0	Standing	FALSE	Mixed	NA
CAM38	2023-07-24 11:51:42	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM30	2023-07-24 17:08:33	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM30	2023-07-24 21:36:48	Uncategorized Bird	1	0	Running	FALSE	Mixed	NA
CAM10	2023-07-24 22:59:59	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
A13	2023-07-25 04:20:17	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-07-25 04:21:13	Arctic Fox	1	0		FALSE	Mixed	
A03	2023-07-25 08:58:43	Uncategorized Bird	1	0		FALSE	Mixed	
A13	2023-07-25 09:29:07	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-07-25 09:30:04	Arctic Fox	1	0		FALSE	Mixed	
CAM28	2023-07-25 18:55:58	Uncategorized Bird	1	0		FALSE	Mixed	
A04	2023-07-25 19:36:22	Arctic Fox	1	0		FALSE	Mixed	
CAM31	2023-07-25 19:55:22	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM21	2023-07-25 21:13:50	Arctic Fox	1	0		FALSE	Mixed	
CAM17	2023-07-25 21:14:31	Arctic Fox	1	0		FALSE	Mixed	
A07	2023-07-25 21:14:58	Arctic Fox	1	0		FALSE	Mixed	
CAM01	2023-07-25 22:46:34	Arctic Fox	1	0	Running	FALSE	Mixed	NA
A01	2023-07-25 22:53:41	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-07-26 00:24:34	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
A02	2023-07-26 04:08:10	Caribou	0	1	Walking	FALSE	Mixed	left
CAM03	2023-07-26 06:21:44	Uncategorized Bird	2	1	Feeding	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM20	2023-07-26 07:51:25	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM30	2023-07-26 10:30:03	Uncategorized Bird	34	0	Feeding	FALSE	Mixed	NA
CAM28	2023-07-26 17:13:47	Uncategorized Bird	1	0		FALSE	Mixed	
CAM39	2023-07-26 18:20:25	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM20	2023-07-26 18:58:18	Caribou	1	0	Feeding	FALSE	Mixed	NA
CAM39	2023-07-26 19:15:54	Uncategorized Bird	3	0	Flying	FALSE	Mixed	NA
CAM20	2023-07-26 21:29:30	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM13	2023-07-27 00:11:16	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
CAM17	2023-07-27 02:42:29	Arctic Hare	1	0		FALSE	Mixed	
A07	2023-07-27 02:43:00	Arctic Hare	1	0		FALSE	Mixed	
CAM05	2023-07-27 06:39:21	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-07-27 09:29:59	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
A13	2023-07-27 10:13:40	Uncategorized Bird	1	0		FALSE	Mixed	
CAM11	2023-07-27 10:14:38	Uncategorized Bird	1	0		FALSE	Mixed	
CAM20	2023-07-27 12:11:21	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-07-27 13:00:00	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM28	2023-07-27 13:21:32	Uncategorized Bird	1	0		FALSE	Mixed	
CAM19	2023-07-27 16:48:41	Uncategorized Bird	1	0		FALSE	Mixed	
CAM17	2023-07-27 20:41:23	Arctic Fox	1	0		FALSE	Mixed	
A07	2023-07-27 20:41:54	Arctic Fox	1	0		FALSE	Mixed	
CAM11	2023-07-27 23:17:37	Arctic Hare	1	0		FALSE	Mixed	
A04	2023-07-28 03:55:59	Arctic Hare	1	0		FALSE	Mixed	
CAM30	2023-07-28 06:01:19	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
CAM28	2023-07-28 06:29:28	Uncategorized Bird	1	0		FALSE	Mixed	
CAM30	2023-07-28 08:58:07	Uncategorized Bird	3	0	Feeding	FALSE	Mixed	NA
CAM30	2023-07-28 09:00:34	Uncategorized Bird	22	0	Feeding	FALSE	Mixed	NA
CAM07	2023-07-28 12:13:48	Arctic Ground Squirrel	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-07-28 12:30:00	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM39	2023-07-28 13:25:36	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM30	2023-07-28 15:50:30	Uncategorized Bird	28	0	Feeding	FALSE	Mixed	NA
CAM31	2023-07-28 18:29:59	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM30	2023-07-28 23:23:07	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
CAM30	2023-07-29 08:47:04	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM10	2023-07-29 18:30:00	Uncategorized Bird	3	0	Standing	FALSE	Mixed	NA
CAM07	2023-07-29 19:40:13	Arctic Fox	0	1	Walking	FALSE	Mixed	NA
CAM31	2023-07-30 15:14:44	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM39	2023-07-30 16:29:59	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM01	2023-07-30 17:50:26	Caribou	1	0	Running	FALSE	Female	NA
CAM31	2023-07-31 02:28:51	Arctic Hare	1	0	Walking	FALSE	Mixed	NA
CAM20	2023-07-31 07:38:11	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM05	2023-07-31 13:05:08	Uncategorized Bird	3	0	Walking	FALSE	Mixed	NA
CAM03	2023-07-31 13:19:14	Uncategorized Bird	3	0	Feeding	FALSE	Mixed	NA
CAM13	2023-07-31 14:09:37	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM05	2023-07-31 16:58:22	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-08-01 12:03:37	Uncategorized Bird	1	0	Feeding	FALSE	Mixed	NA
CAM31	2023-08-01 17:30:14	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-01 19:37:43	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM29	2023-08-01 21:28:04	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM40	2023-08-01 21:55:42	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM20	2023-08-02 15:07:54	Uncategorized Bird	1	0	Walking	FALSE	Mixed	NA
CAM16	2023-08-03 07:16:32	Uncategorized Bird	1	0	Resting	FALSE	Mixed	NA
CAM39	2023-08-03 07:45:43	Uncategorized Bird	2	0	Feeding	FALSE	Mixed	NA
CAM03	2023-08-03 15:01:47	Arctic Ground Squirrel	1	0	Walking	FALSE	Mixed	NA
CAM39	2023-08-03 17:32:10	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM29	2023-08-04 00:15:05	Arctic Hare	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-04 00:24:19	Arctic Hare	1	0	Walking	FALSE	Mixed	NA
CAM07	2023-08-04 13:47:16	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-04 21:00:00	Uncategorized Bird	1	1	Walking	FALSE	Mixed	NA
CAM20	2023-08-04 21:29:59	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-05 10:20:57	Arctic Fox	1	0	Walking	FALSE	Mixed	NA
CAM14	2023-08-05 12:58:35	Uncategorized Bird	9	0	Feeding	FALSE	Mixed	NA
CAM14	2023-08-05 14:17:29	Uncategorized Bird	3	0	Feeding	FALSE	Mixed	NA
CAM31	2023-08-06 00:24:39	Arctic Hare	1	0	Running	FALSE	Mixed	NA
CAM20	2023-08-06 14:16:03	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
CAM40	2023-08-07 14:24:43	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM39	2023-08-08 08:26:59	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM31	2023-08-09 21:06:01	Uncategorized Bird	2	1	Feeding	FALSE	Mixed	NA
CAM15	2023-08-10 11:26:02	Uncategorized Bird	2	0	Flying	FALSE	Mixed	NA
CAM39	2023-08-10 13:53:27	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM38	2023-08-10 18:01:55	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM31	2023-08-11 09:30:25	Arctic Fox	1	0	Feeding	FALSE	Mixed	NA
CAM40	2023-08-11 18:47:40	Caribou	1	0	Walking	FALSE	Mixed	NA

APPENDIX A: DATA FROM WILDLIFE CAMERAS

Camera Site	Date/Time Captured	Species	Number Adults	Number Juvenile	Behaviour	Crossed	Sex	Side-of-Road
CAM29	2023-08-12 16:43:48	Uncategorized Bird	2	0	Walking	FALSE	Mixed	NA
A01	2023-08-13 07:43:14	Caribou	2	0	Feeding	FALSE	Mixed	NA
CAM31	2023-08-13 08:15:32	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM38	2023-08-13 08:32:18	Uncategorized Bird	1	0	Flying	FALSE	Mixed	NA
CAM29	2023-08-14 15:50:36	Uncategorized Bird	3	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-15 01:25:24	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM40	2023-08-15 03:19:13	Arctic Hare	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-15 18:55:06	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM40	2023-08-15 21:30:00	Uncategorized Bird	12	0		FALSE	Mixed	NA
CAM31	2023-08-16 03:33:45	Arctic Hare	1	0	Running	FALSE	Mixed	NA
CAM40	2023-08-16 09:00:00	Uncategorized Bird	1	0		FALSE	Mixed	NA
CAM40	2023-08-17 10:59:46	Caribou	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-17 20:45:38	Arctic Fox	1	0	Running	FALSE	Mixed	NA
CAM40	2023-08-17 22:56:46	Arctic Hare	1	0	Walking	FALSE	Mixed	NA
CAM31	2023-08-18 03:12:38	Arctic Fox	1	0	Running	FALSE	Mixed	NA



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**APPENDIX H**

**Caribou Observations and Advisory, 2023**

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-01-16	16:00	N	100	Caribou Migration Alert - 2023-01-16 16:00 - Level 1	9500	North	Portal 1
2023-01-17	10:00	N	7	Caribou Migration Alert - 2023-01-17 10:00 - Level 2	2000	West	TSF
2023-01-17	16:00	N	7	Caribou Migration Alert - 2023-01-17 16:00 - Level 2	3000	West	TSF
2023-01-18	10:00	N	7	Caribou Migration Alert - 2023-01-18 10:00 - Level 2	3000	West	TSF
2023-01-18	17:00	N	7	Caribou Migration Alert - 2023-01-18 17:00 - Level 2	2700	West	TSF
2023-01-19	10:00	N	7	Caribou Migration Alert - 2023-01-19 10:00 - Level 2	3200	West	TSF
2023-01-19	16:00	N	7	Caribou Migration Alert - 2023-01-19 16:00 - Level 2	2900	Southwest	TSF
2023-01-20	10:00	N	7	Caribou Migration Alert - 2023-01-20 10:00 - Level 2	3200	West	TSF
2023-01-20	16:00	Y	10	Caribou Migration Alert - 2023-01-20 16:00 - Level 3	3200	West	TSF
2023-01-20	16:00	Y	20	Caribou Migration Alert - 2023-01-20 16:00 - Level 3	3900	West	Portal 1
2023-01-20	16:00	Y	10	Caribou Migration Alert - 2023-01-20 16:00 - Level 3	3400	West	Portal 1
2023-01-20	16:00	Y	30	Caribou Migration Alert - 2023-01-20 16:00 - Level 3	1000	West	KM26
2023-01-21	10:00	Y	10	Caribou Migration Alert - 2023-01-21 10:00 - Level 3	2800	West	TSF
2023-01-21	10:00	Y	20	Caribou Migration Alert - 2023-01-21 10:00 - Level 3	3800	West	Portal 1
2023-01-21	10:00	Y	10	Caribou Migration Alert - 2023-01-21 10:00 - Level 3	3300	West	Portal 1
2023-01-21	10:00	Y	30	Caribou Migration Alert - 2023-01-21 10:00 - Level 3	1200	West	KM27
2023-01-21	11:30	N	0	Caribou Migration Alert - 2023-01-21 11:30 - Level 2	-	-	-
2023-01-21	16:00	N	14	Caribou Migration Alert - 2023-01-21 16:30 - Level 2	3000	North	TSF
2023-01-22	10:00	N	14	Caribou Migration Alert - 2023-01-22 10:00 - Level 2	3000	North	TSF
2023-01-22	16:00	N	14	Caribou Migration Alert - 2023-01-22 16:00 - Level 2	3200	North	TSF
2023-01-23	10:00	N	0	Caribou Migration Alert - 2023-01-23 10:00 - Level 2	-	-	-
2023-01-23	16:00	N	0	Caribou Migration Alert - 2023-01-23 16:00 - Level 2	-	-	-
2023-05-30	14:30	N	500	Caribou Migration Alert - 2023-05-30 14:30 - Level 1	5200	North	TSF
2023-05-31	6:00	N	500	Caribou Migration Alert - 2023-05-31 06:00 - Level 1	5100	North	TSF
2023-05-31	12:00	N	500	Caribou Migration Alert - 2023-05-31 12:00 - Level 1	5400	North	TSF
2023-05-31	18:00	N	500	Caribou Migration Alert - 2023-05-31 18:00 - Level 1	5200	North	TSF
2023-06-01	6:00	N	0	Caribou Migration Alert - 2023-06-01 06:00 - Level 1	-	-	-
2023-06-01	12:00	N	3	Caribou Migration Alert - 2023-06-01 12:00 - Level 2	2500	South	Exploration Camp
2023-06-01	18:00	N	0	Caribou Migration Alert - 2023-06-01 18:00 - Level 2	-	-	-
2023-06-02	6:00	N	0	Caribou Migration Alert - 2023-06-02 06:00 - Level 2	-	-	-
2023-06-02	12:00	N	0	Caribou Migration Alert - 2023-06-02 12:00 - Level 2	-	-	-
2023-06-02	18:00	N	0	Caribou Migration Alert - 2023-06-02 18:00 - Level 2	-	-	-
2023-06-03	6:00	N	0	Caribou Migration Alert - 2023-06-03 06:00 - Level 2	-	-	-
2023-06-03	12:00	N	0	Caribou Migration Alert - 2023-06-03 12:00 - Level 2	-	-	-
2023-06-03	18:00	N	0	Caribou Migration Alert - 2023-06-03 18:00 - Level 2	-	-	-
2023-06-04	6:00	N	0	Caribou Migration Alert - 2023-06-04 06:00 - Level 2	-	-	-
2023-06-04	12:00	N	3	Caribou Migration Alert - 2023-06-04 12:00 - Level 2	1200	East	KM19
2023-06-04	18:00	N	0	Caribou Migration Alert - 2023-06-04 18:00 - Level 2	-	-	-
2023-06-05	6:00	N	0	Caribou Migration Alert - 2023-06-05 06:00 - Level 2	-	-	-
2023-06-05	12:00	N	0	Caribou Migration Alert - 2023-06-05 12:00 - Level 2	-	-	-
2023-06-05	18:00	N	0	Caribou Migration Alert - 2023-06-05 18:00 - Level 2	-	-	-
2023-06-06	6:00	N	0	Caribou Migration Alert - 2023-06-06 06:00 - Level 2	-	-	-
2023-06-06	12:00	N	0	Caribou Migration Alert - 2023-06-06 12:00 - Level 2	-	-	-
2023-06-06	18:00	N	0	Caribou Migration Alert - 2023-06-06 18:00 - Level 2	-	-	-
2023-06-07	6:00	N	0	Caribou Migration Alert - 2023-06-07 06:00 - Level 2	-	-	-
2023-06-07	11:00	N	0	Caribou Migration Alert - 2023-06-07 12:00 - Level 2	-	-	-
2023-06-07	18:00	N	0	Caribou Migration Alert - 2023-06-07 18:00 - Level 2	-	-	-
2023-06-08	6:00	N	0	Caribou Migration Alert - 2023-06-08 06:00 - Level 2	-	-	-
2023-06-08	18:15	N	0	Caribou Migration Alert - 2023-06-08 18:15 - Level 2	-	-	-
2023-06-09	6:00	N	0	Caribou Migration Alert - 2023-06-09 06:00 - Level 2	-	-	-
2023-06-09	18:00	N	0	Caribou Migration Alert - 2023-06-09 18:00 - Level 2	-	-	-
2023-06-10	6:00	N	500	Caribou Migration Alert - 2023-06-10 6:00 - Level 2	8000	West	TSF
2023-06-10	12:00	N	8000	Caribou Migration Alert - 2023-06-10 12:00 - Level 2	13000	West	TSF
2023-06-10	17:00	N	8000	Caribou Migration Alert - 2023-06-10 17:00 - Level 2	8000	West	TSF

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-06-11	6:00	N	0	Caribou Migration Alert - 2023-06-11 06:00 - Level 2	-	-	-
2023-06-11	13:00	N	10000	Caribou Migration Alert - 2023-06-11 13:00 - Level 3	5000	North	TSF
2023-06-11	13:00	N	2000	Caribou Migration Alert - 2023-06-11 13:00 - Level 3	3300	North	Exploration Camp
2023-06-11	18:00	N	8000	Caribou Migration Alert - 2023-06-11 18:00 - Level 3	4000	North	Portal 1
2023-06-11	18:00	N	2000	Caribou Migration Alert - 2023-06-11 18:00 - Level 3	3000	North	Exploration Camp
2023-06-12	6:00	N	10000	Caribou Migration Alert - 2023-06-12 06:00 - Level 3	4000	North	TSF
2023-06-12	6:00	N	12000	Caribou Migration Alert - 2023-06-12 06:00 - Level 3	9000	West	TSF
2023-06-12	12:00	N	30000	Caribou Migration Alert - 2023-06-12 12:00 - Level 3	8700	West	Portal 1
2023-06-12	12:00	N	1500	Caribou Migration Alert - 2023-06-12 12:00 - Level 3	5000	North	TSF
2023-06-12	12:00	N	1500	Caribou Migration Alert - 2023-06-12 12:00 - Level 3	5000	North	Portal 1
2023-06-12	18:00	N	1200	Caribou Migration Alert - 2023-06-12 18:00 - Level 3	3700	North	TSF
2023-06-12	18:00	N	800	Caribou Migration Alert - 2023-06-12 18:00 - Level 3	4700	North	TSF
2023-06-12	18:00	N	30000	Caribou Migration Alert - 2023-06-12 18:00 - Level 3	7400	West	TSF
2023-06-13	6:00	N	77755	Caribou Migration Alert - 2023-06-13 06:00 - Level 3	8500	West	TSF
2023-06-13	6:00	N	3500	Caribou Migration Alert - 2023-06-13 06:00 - Level 3	4900	North	TSF
2023-06-13	6:00	N	3500	Caribou Migration Alert - 2023-06-13 06:00 - Level 3	3400	North	TSF
2023-06-13	18:00	N	50000	Caribou Migration Alert - 2023-06-13 18:00 - Level 3	4200	West	TSF
2023-06-13	18:00	N	1200	Caribou Migration Alert - 2023-06-13 18:00 - Level 3	3700	North	TSF
2023-06-13	18:00	N	800	Caribou Migration Alert - 2023-06-13 18:00 - Level 3	4500	North	TSF
2023-06-14	6:00	N	800	Caribou Migration Alert - 2023-06-14 06:00 - Level 3	3000	Northeast	Exploration Camp
2023-06-14	6:00	N	2000	Caribou Migration Alert - 2023-06-14 06:00 - Level 3	6000	West	TSF
2023-06-14	6:00	N	8000	Caribou Migration Alert - 2023-06-14 06:00 - Level 3	5500	West	KM27
2023-06-14	6:00	N	10000	Caribou Migration Alert - 2023-06-14 06:00 - Level 3	8000	West	KM20
2023-06-14	6:00	N	10000	Caribou Migration Alert - 2023-06-14 06:00 - Level 3	10000	West	KM15
2023-06-14	12:00	N	800	Caribou Migration Alert - 2023-06-14 12:00 - Level 3	3700	North	TSF
2023-06-14	12:00	N	200	Caribou Migration Alert - 2023-06-14 12:00 - Level 3	2500	North	Exploration Camp
2023-06-14	12:00	N	300	Caribou Migration Alert - 2023-06-14 12:00 - Level 3	2200	North	Exploration Camp
2023-06-14	12:00	N	2000	Caribou Migration Alert - 2023-06-14 12:00 - Level 3	5900	West	TSF
2023-06-14	12:00	N	8000	Caribou Migration Alert - 2023-06-14 12:00 - Level 3	4400	West	KM27
2023-06-14	18:00	Y	1500	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	4000	North	TSF
2023-06-14	18:00	Y	300	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	4000	North	Exploration Camp
2023-06-14	18:00	Y	10000	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	5300	East	Exploration Camp
2023-06-14	18:00	Y	2000	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	7700	Southwest	TSF
2023-06-14	18:00	Y	15000	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	4000	West	KM27
2023-06-14	18:00	Y	15000	Caribou Migration Alert - 2023-06-14 18:00 - Level 3	4600	West	KM12
2023-06-15	6:00	N	1500	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	4000	North	TSF
2023-06-15	6:00	N	800	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	2300	North	TSF
2023-06-15	6:00	N	2000	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	4800	West	TSF
2023-06-15	6:00	N	15000	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	5300	West	KM27
2023-06-15	6:00	N	10000	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	6100	East	KM28
2023-06-15	6:00	N	15000	Caribou Migration Alert - 2023-06-15 06:00 - Level 3	8800	West	KM21
2023-06-15	12:00	N	800	Caribou Migration Alert - 2023-06-15 12:00 - Level 3	3000	North	Exploration Camp
2023-06-15	12:00	N	1000	Caribou Migration Alert - 2023-06-15 12:00 - Level 3	6400	East	KM28
2023-06-15	12:00	N	15000	Caribou Migration Alert - 2023-06-15 12:00 - Level 3	3400	West	KM27
2023-06-15	12:00	N	1000	Caribou Migration Alert - 2023-06-15 12:00 - Level 3	3000	West	KM8
2023-06-15	18:00	Y	800	Caribou Migration Alert - 2023-06-15 18:00 - Level 3	3100	North	Exploration Camp
2023-06-15	18:00	Y	80000	Caribou Migration Alert - 2023-06-15 18:00 - Level 3	6800	West	TSF
2023-06-15	18:00	Y	1000	Caribou Migration Alert - 2023-06-15 18:00 - Level 3	6200	East	KM26
2023-06-15	18:00	Y	2000	Caribou Migration Alert - 2023-06-15 18:00 - Level 3	3300	West	KM20
2023-06-16	6:00	N	800	Caribou Migration Alert - 2023-06-16 06:00 - Level 3	2400	North	Exploration Camp
2023-06-16	6:00	N	30000	Caribou Migration Alert - 2023-06-16 06:00 - Level 3	6400	West	KM27
2023-06-16	6:00	N	30000	Caribou Migration Alert - 2023-06-16 06:00 - Level 3	3300	West	KM20
2023-06-16	12:00	N	800	Caribou Migration Alert - 2023-06-16 12:00 - Level 3	3100	North	Exploration Camp
2023-06-16	12:00	N	20000	Caribou Migration Alert - 2023-06-16 12:00 - Level 3	2300	West	KM25
2023-06-16	12:00	N	1200	Caribou Migration Alert - 2023-06-16 12:00 - Level 3	2100	West	KM13

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-06-16	18:00	N	25	Caribou Migration Alert - 2023-06-16 18:00 - Level 3	4900	East	Exploration Camp
2023-06-16	18:00	N	20000	Caribou Migration Alert - 2023-06-16 18:00 - Level 3	1300	West	KM18
2023-06-16	18:00	N	1200	Caribou Migration Alert - 2023-06-16 18:00 - Level 3	2100	West	KM13
2023-06-17	6:00	Y	17	Caribou Migration Alert - 2023-06-17 06:00 - Level 2	2700	North	Exploration Camp
2023-06-17	6:00	Y	50000	Caribou Migration Alert - 2023-06-17 06:00 - Level 2	2700	West	KM20
2023-06-17	6:00	Y	2000	Caribou Migration Alert - 2023-06-17 06:00 - Level 2	700	West	KM16
2023-06-17	6:00	Y	1500	Caribou Migration Alert - 2023-06-17 06:00 - Level 2	1000	West	KM14
2023-06-17	12:00	Y	150	Caribou Migration Alert - 2023-06-17 12:00 - Level 2	8800	West	TSF
2023-06-17	12:00	Y	400	Caribou Migration Alert - 2023-06-17 12:00 - Level 2	7700	West	Portal 1
2023-06-17	12:00	Y	20000	Caribou Migration Alert - 2023-06-17 12:00 - Level 2	2200	West	KM21
2023-06-17	12:00	Y	2000	Caribou Migration Alert - 2023-06-17 12:00 - Level 2	1000	West	KM18
2023-06-17	12:00	Y	1500	Caribou Migration Alert - 2023-06-17 12:00 - Level 2	300	West	KM16
2023-06-17	18:00	Y	35000	Caribou Migration Alert - 2023-06-17 18:00 - Level 3	1800	West	KM27
2023-06-17	18:00	Y	2000	Caribou Migration Alert - 2023-06-17 18:00 - Level 3	600	West	KM18
2023-06-17	18:00	Y	1500	Caribou Migration Alert - 2023-06-17 18:00 - Level 3	0	West	KM16
2023-06-18	6:00	Y	300	Caribou Migration Alert - 2023-06-18 06:00 - Level 3	1500	West	KM27
2023-06-18	6:00	Y	1000	Caribou Migration Alert - 2023-06-18 06:00 - Level 3	2300	East	KM24
2023-06-18	6:00	Y	1000	Caribou Migration Alert - 2023-06-18 06:00 - Level 3	0	West	KM22
2023-06-18	6:00	Y	800	Caribou Migration Alert - 2023-06-18 06:00 - Level 3	4100	East	KM21
2023-06-18	6:00	Y	10000	Caribou Migration Alert - 2023-06-18 06:00 - Level 3	0	West and East	KM18
2023-06-18	12:00	Y	300	Caribou Migration Alert - 2023-06-18 12:00 - Level 3	1000	West	KM27
2023-06-18	12:00	Y	18000	Caribou Migration Alert - 2023-06-18 12:00 - Level 3	0	West	KM21
2023-06-18	12:00	Y	10000	Caribou Migration Alert - 2023-06-18 12:00 - Level 3	0	West	KM16
2023-06-18	18:00	Y	41	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	1100	West	KM28
2023-06-18	18:00	Y	15	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	500	West	KM28
2023-06-18	18:00	Y	10	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	500	West	KM28
2023-06-18	18:00	Y	10	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	0	West	KM27
2023-06-18	18:00	Y	200	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	1700	East	KM25
2023-06-18	18:00	Y	5000	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	0	West and East	KM25
2023-06-18	18:00	Y	18000	Caribou Migration Alert - 2023-06-18 18:00 - Level 3	0	West	KM21
2023-06-18	21:00	Y	300	Caribou Migration Alert - 2023-06-18 21:00 - Level 3	1400	East	KM25
2023-06-18	21:00	Y	1500	Caribou Migration Alert - 2023-06-18 21:00 - Level 3	0	East	KM25
2023-06-18	21:00	Y	1000	Caribou Migration Alert - 2023-06-18 21:00 - Level 3	5300	West	KM20
2023-06-18	21:00	Y	15000	Caribou Migration Alert - 2023-06-18 21:00 - Level 3	500	East	KM20
2023-06-19	6:00	Y	21	Caribou Migration Alert - 2023-06-19 06:00 - Level 2	1500	West	KM28
2023-06-19	6:00	Y	10000	Caribou Migration Alert - 2023-06-19 06:00 - Level 2	0	East	KM23
2023-06-19	6:00	Y	50000	Caribou Migration Alert - 2023-06-19 06:00 - Level 2	2700	West	KM22
2023-06-19	12:00	Y	50	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	700	West	KM27
2023-06-19	12:00	Y	200	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	500	West	KM27

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-06-19	12:00	Y	450	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	1700	West	KM27
2023-06-19	12:00	Y	500	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	300	West	KM25
2023-06-19	12:00	Y	400	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	2900	West	KM25
2023-06-19	12:00	Y	600	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	0	East	KM24
2023-06-19	12:00	Y	15000	Caribou Migration Alert - 2023-06-19 12:00 - Level 3	1100	East	KM23
2023-06-19	18:00	Y	8000	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	7500	West	TSF
2023-06-19	18:00	Y	150	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	1400	West	KM27
2023-06-19	18:00	Y	100	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	1600	West	KM26
2023-06-19	18:00	Y	20	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	400	West	KM26
2023-06-19	18:00	Y	300	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	800	West	KM24
2023-06-19	18:00	Y	10000	Caribou Migration Alert - 2023-06-19 18:00 - Level 3	2500	East	KM24
2023-06-20	6:00	Y	10000	Caribou Migration Alert - 2023-06-20 06:00 - Level 3	700	West	KM27
2023-06-20	6:00	Y	50000	Caribou Migration Alert - 2023-06-20 06:00 - Level 3	2300	West	KM23
2023-06-20	12:00	Y	200	Caribou Migration Alert - 2023-06-20 12:00 - Level 3	50	East	KM28
2023-06-20	12:00	Y	50	Caribou Migration Alert - 2023-06-20 12:00 - Level 3	50	East	KM26
2023-06-20	18:00	Y	12	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	50	East	KM28
2023-06-20	18:00	Y	5000	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	5500	East	KM24
2023-06-20	18:00	Y	200	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	1000	East	KM21
2023-06-20	18:00	Y	250	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	1100	East	KM21
2023-06-20	18:00	Y	150	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	2800	East	KM20
2023-06-20	18:00	Y	300	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	3900	West	KM17
2023-06-20	18:00	Y	3500	Caribou Migration Alert - 2023-06-20 18:00 - Level 2	4200	West	KM15
2023-06-21	6:00	Y	300	Caribou Migration Alert - 2023-06-21 06:00 - Level 2	600	East	KM18
2023-06-21	6:00	Y	200	Caribou Migration Alert - 2023-06-21 06:00 - Level 2	100	West	KM18
2023-06-21	6:00	Y	2000	Caribou Migration Alert - 2023-06-21 06:00 - Level 2	1000	West	KM18
2023-06-21	12:00	Y	250	Caribou Migration Alert - 2023-06-21 12:00 - Level 3	1400	West	KM25
2023-06-21	12:00	Y	2000	Caribou Migration Alert - 2023-06-21 12:00 - Level 3	0	West and East	KM17
2023-06-21	18:00	Y	250	Caribou Migration Alert - 2023-06-21 18:00 - Level 2	500	West	KM23
2023-06-21	18:00	Y	25	Caribou Migration Alert - 2023-06-21 18:00 - Level 2	1200	East	KM20
2023-06-22	6:00	Y	250	Caribou Migration Alert - 2023-06-22 06:00 - Level 2	100	West	KM23
2023-06-22	6:00	Y	25	Caribou Migration Alert - 2023-06-22 06:00 - Level 2	1000	East	KM20
2023-06-22	9:30	N	1000	Caribou Migration Alert - 2023-06-22 9:30 - Level 2	1300	East	KM23
2023-06-22	9:30	N	200	Caribou Migration Alert - 2023-06-22 9:30 - Level 2	1300	West	KM22
2023-06-22	9:30	N	500	Caribou Migration Alert - 2023-06-22 9:30 - Level 2	1500	East	KM21
2023-06-22	18:00	Y	1000	Caribou Migration Alert - 2023-06-22 18:00 - Level 3	2200	East	KM24
2023-06-23	6:00	Y	1000	Caribou Migration Alert - 2023-06-23 06:00 - Level 3	700	East	KM29
2023-06-23	6:00	Y	500	Caribou Migration Alert - 2023-06-23 06:00 - Level 3	1600	West	KM26
2023-06-23	6:00	Y	200	Caribou Migration Alert - 2023-06-23 06:00 - Level 3	2400	West	KM21
2023-06-23	9:00	N	1000	Caribou Migration Alert - 2023-06-23 09:00 - Level 3	1400	East	KM29
2023-06-23	9:00	N	500	Caribou Migration Alert - 2023-06-23 09:00 - Level 3	2400	West	KM25
2023-06-23	9:00	N	200	Caribou Migration Alert - 2023-06-23 09:00 - Level 3	3800	West	KM20
2023-06-23	12:00	N	50	Caribou Migration Alert - 2023-06-23 12:00 - Level 3	5000	North	Exploration Camp
2023-06-23	12:00	N	100	Caribou Migration Alert - 2023-06-23 12:00 - Level 3	4500	West	Portal 1
2023-06-23	12:00	N	500	Caribou Migration Alert - 2023-06-23 12:00 - Level 3	1300	East	KM29
2023-06-23	12:00	N	150	Caribou Migration Alert - 2023-06-23 12:00 - Level 3	1400	West	KM28

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-06-24	6:00	N	500	Caribou Migration Alert - 2023-06-24 06:00 - Level 3	800	East	KM29
2023-06-24	6:00	N	1000	Caribou Migration Alert - 2023-06-24 06:00 - Level 3	4900	West	KM28
2023-06-24	6:00	N	30	Caribou Migration Alert - 2023-06-24 06:00 - Level 3	1200	East	KM26
2023-06-24	12:00	N	50	Caribou Migration Alert - 2023-06-24 12:00 - Level 3	5300	North	TSF
2023-06-24	12:00	N	100	Caribou Migration Alert - 2023-06-24 12:00 - Level 3	3600	West	KM30
2023-06-24	12:00	N	500	Caribou Migration Alert - 2023-06-24 12:00 - Level 3	3300	West	KM27
2023-06-24	12:00	N	100	Caribou Migration Alert - 2023-06-24 12:00 - Level 3	1500	East	KM16
2023-06-24	17:00	N	100	Caribou Migration Alert - 2023-06-24 17:00 - Level 2	1500	East	KM16
2023-06-25	6:00	Y	100	Caribou Migration Alert - 2023-06-25 06:00 - Level 2	3600	West	KM22
2023-06-25	6:00	Y	10000	Caribou Migration Alert - 2023-06-25 06:00 - Level 2	100	East	KM12
2023-06-25	12:00	Y	4	Caribou Migration Alert - 2023-06-25 06:00 - Level 2	2400	West	KM28
2023-06-25	12:00	Y	10000	Caribou Migration Alert - 2023-06-25 12:00 - Level 2	0	East	KM12
2023-06-25	18:00	Y	80000	Caribou Migration Alert - 2023-06-25 18:00 - Level 2	0	East	KM13
2023-06-26	6:00	Y	150	Caribou Migration Alert - 2023-06-26 06:00 - Level 2	900	West	KM20
2023-06-26	6:00	Y	50	Caribou Migration Alert - 2023-06-26 06:00 - Level 2	50	East	KM18
2023-06-26	6:00	Y	30000	Caribou Migration Alert - 2023-06-26 06:00 - Level 2	0	West and East	KM16
2023-06-26	6:00	Y	100	Caribou Migration Alert - 2023-06-26 06:00 - Level 2	0	East	KM11.5
2023-06-26	12:00	Y	500	Caribou Migration Alert - 2023-06-26 12:00 - Level 2	2500	East	KM18
2023-06-26	12:00	Y	2000	Caribou Migration Alert - 2023-06-26 12:00 - Level 2	0	West and East	KM16
2023-06-26	12:00	Y	3000	Caribou Migration Alert - 2023-06-26 12:00 - Level 2	3500	West	KM12
2023-06-26	12:00	Y	30000	Caribou Migration Alert - 2023-06-26 12:00 - Level 2	0	West and East	KM8
2023-06-26	12:00	Y	2000	Caribou Migration Alert - 2023-06-26 12:00 - Level 2	2500	East	KM8
2023-06-26	18:00	Y	10000	Caribou Migration Alert - 2023-06-26 18:00 - Level 2	0	West and East	KM15
2023-06-26	18:00	Y	30000	Caribou Migration Alert - 2023-06-26 18:00 - Level 2	0	West and East	KM8
2023-06-26	18:00	Y	2000	Caribou Migration Alert - 2023-06-26 18:00 - Level 2	0	West and East	KM6
2023-06-27	6:00	Y	250	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	3600	West	KM14
2023-06-27	6:00	Y	100	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	700	West	KM13
2023-06-27	6:00	Y	250	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	300	East	KM13
2023-06-27	6:00	Y	20000	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	1700	East	KM14
2023-06-27	6:00	Y	30000	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	3800	East	KM14
2023-06-27	6:00	Y	20000	Caribou Migration Alert - 2023-06-27 06:00 - Level 2	1300	East	KM9
2023-06-27	12:00	Y	300	Caribou Migration Alert - 2023-06-27 12:00 - Level 2	0	East	KM20
2023-06-27	12:00	Y	20000	Caribou Migration Alert - 2023-06-27 12:00 - Level 2	4000	East	KM15
2023-06-27	18:00	Y	10000	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	2400	East	KM16
2023-06-27	18:00	Y	200	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	0	West	KM16
2023-06-27	18:00	Y	100	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	0	West	KM15
2023-06-28	6:00	N	20	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	2200	West	KM23
2023-06-28	6:00	N	2500	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	6900	West	KM15
2023-06-28	6:00	N	10000	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	5700	East	KM15
2023-06-28	6:00	N	50	Caribou Migration Alert - 2023-06-27 18:00 - Level 2	3900	East	KM11
2023-06-28	12:00	N	1000	Caribou Migration Alert - 2023-06-28 12:00 - Level 2	3500	East	KM12
2023-06-28	18:00	N	0	Caribou Migration Alert - 2023-06-28 18:00 - Level 2	-	-	-
2023-06-29	6:00	N	5	Caribou Migration Alert - 2023-06-29 06:00 - Level 2	2100	East	KM25
2023-06-29	6:00	N	2	Caribou Migration Alert - 2023-06-29 06:00 - Level 2	500	East	KM8
2023-06-29	6:00	N	1	Caribou Migration Alert - 2023-06-29 06:00 - Level 2	500	East	KM10
2023-06-29	12:00	N	100	Caribou Migration Alert - 2023-06-29 12:00 - Level 2	3000	East	KM20
2023-06-29	17:45	Y	300	Caribou Migration Alert - 2023-06-29 17:45 - Level 3	600	West	Exploration Camp
2023-06-30	6:00	Y	50	Caribou Migration Alert - 2023-06-30 06:00 - Level 3	1300	East	TSF
2023-06-30	6:00	Y	300	Caribou Migration Alert - 2023-06-30 06:00 - Level 3	1100	North	Portal 1
2023-06-30	12:00	N	0	Caribou Migration Alert - 2023-06-30 12:00 - Level 2	-	-	-
2023-06-30	18:00	Y	4	Caribou Migration Alert - 2023-06-30 18:00 - Level 2	500	North	Exploration Camp
2023-06-30	18:00	Y	10000	Caribou Migration Alert - 2023-06-30 18:00 - Level 2	1600	East	KM7
2023-07-01	6:00	N	0	Caribou Migration Alert - 2023-07-01 06:00 - Level 2	-	-	-
2023-07-01	12:00	N	0	Caribou Migration Alert - 2023-07-01 12:00 - Level 2	-	-	-
2023-07-01	18:00	N	70	Caribou Migration Alert - 2023-07-01 18:00 - Level 2	200	West	KM21

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-07-02	6:00	N	0	Caribou Migration Alert - 2023-07-02 06:00 - Level 2	-	-	-
2023-07-02	12:00	N	0	Caribou Migration Alert - 2023-07-02 12:00 - Level 2	-	-	-
2023-07-02	18:00	N	0	Caribou Migration Alert - 2023-07-02 1800 - Level 2	-	-	-
2023-07-03	6:00	N	0	Caribou Migration Alert - 2023-07-03 0600 - Level 2	-	-	-
2023-07-03	12:00	N	0	Caribou Migration Alert - 2023-07-03 12:00 - Level 2	-	-	-
2023-07-03	18:00	N	0	Caribou Migration Alert - 2023-07-03 18:00 - Level 2	-	-	-
2023-07-04	6:00	N	0	Caribou Migration Alert - 2023-07-04 06:00 - Level 2	-	-	-
2023-07-04	12:00	N	0	Caribou Migration Alert - 2023-07-04 12:00 - Level 2	-	-	-
2023-07-04	18:00	N	0	Caribou Migration Alert - 2023-07-04 18:00 - Level 2	-	-	-
2023-07-05	6:00	N	0	Caribou Migration Alert - 2023-07-05 06:00 - Level 2	-	-	-
2023-07-05	12:00	N	0	Caribou Migration Alert - 2023-07-05 12:00 - Level 2	-	-	-
2023-07-05	18:00	N	1	Caribou Migration Alert - 2023-07-05 18:00 - Level 2	1600	West	Portal 1
2023-07-06	6:00	N	10000	Caribou Migration Alert - 2023-07-06 06:00 - Level 2	5000	East	KM7
2023-07-06	10:50	Y	150000	Caribou Migration Alert - 2023-07-06 10:50	150	West and East	KM10
2023-07-06	12:00	Y	150000	Caribou Migration Alert - 2023-07-06 12:00 - Level 2	150	West and East	KM10
2023-07-06	18:00	Y	10000	Caribou Migration Alert - 2023-07-06 18:00 - Level 2	600	West	KM5
2023-07-06	18:00	Y	5000	Caribou Migration Alert - 2023-07-06 18:00 - Level 2	4600	East	KM9
2023-07-07	6:00	N	3000	Caribou Migration Alert - 2023-07-07 06:00 - Level 2	1600	East	KM9
2023-07-07	9:30	Y	3000	Caribou Migration Alert - 2023-07-07 09:30 - Level 2	0	East	KM10
2023-07-07	9:30	Y	30000	Caribou Migration Alert - 2023-07-07 09:30 - Level 2	0	East	KM6
2023-07-07	12:00	Y	3000	Caribou Migration Alert - 2023-07-07 12:00 - Level 2	800	West	KM11
2023-07-07	12:00	Y	30000	Caribou Migration Alert - 2023-07-07 12:00 - Level 2	0	West and East	KM5
2023-07-07	18:00	Y	1	Caribou Migration Alert - 2023-07-07 18:00 - Level 2	1000	South	Portal 1
2023-07-07	18:00	Y	3000	Caribou Migration Alert - 2023-07-07 18:00 - Level 2	1500	West	KM8
2023-07-07	18:00	Y	15	Caribou Migration Alert - 2023-07-07 18:00 - Level 2	1200	East	KM7
2023-07-07	18:00	Y	275	Caribou Migration Alert - 2023-07-07 18:00 - Level 2	3600	East	KM7
2023-07-08	6:00	N	1	Caribou Migration Alert - 2023-07-08 06:00 - Level 2	400	West	KM28
2023-07-08	12:00	N	0	Caribou Migration Alert - 2023-07-08 12:00 - Level 2	-	-	-
2023-07-08	18:00	N	1	Caribou Migration Alert - 2023-07-08 18:00 - Level 2	500	West	KM5
2023-07-09	6:00	Y	3000	Caribou Migration Alert - 2023-07-09 06:00 - Level 2	3300	East	KM12
2023-07-09	6:00	Y	500	Caribou Migration Alert - 2023-07-09 06:00 - Level 2	800	East	KM9
2023-07-09	6:00	Y	1000	Caribou Migration Alert - 2023-07-09 06:00 - Level 2	1800	East	KM9
2023-07-09	12:00	Y	3000	Caribou Migration Alert - 2023-07-09 12:00 - Level 2	0	East and West	KM20
2023-07-09	12:00	Y	3000	Caribou Migration Alert - 2023-07-09 12:00 - Level 2	1500	East	KM12
2023-07-09	12:00	Y	800	Caribou Migration Alert - 2023-07-09 12:00 - Level 2	800	West	KM11
2023-07-09	18:00	Y	15000	Caribou Migration Alert - 2023-07-09 18:00 - Level 2	0	East and West	KM23
2023-07-10	6:00	N	1500	Caribou Migration Alert - 2023-07-10 06:00 - Level 3	800	East	KM26
2023-07-10	6:00	N	1000	Caribou Migration Alert - 2023-07-10 06:00 - Level 3	4300	West	KM20
2023-07-10	6:00	N	60	Caribou Migration Alert - 2023-07-10 06:00 - Level 3	500	West	KM16
2023-07-10	12:00	N	1500	Caribou Migration Alert - 2023-07-10 12:00 - Level 3	1900	East	KM24
2023-07-10	12:00	N	100	Caribou Migration Alert - 2023-07-10 12:00 - Level 3	800	East	KM24
2023-07-10	12:00	N	100	Caribou Migration Alert - 2023-07-10 12:00 - Level 3	1700	West	KM18
2023-07-10	18:00	Y	2000	Caribou Migration Alert - 2023-07-10 18:00 - Level 3	1200	East	KM29
2023-07-11	6:00	N	1	Caribou Migration Alert - 2023-07-11 06:00 - Level 2	900	East	KM112
2023-07-11	12:00	N	0	Caribou Migration Alert - 2023-07-11 12:00 - Level 2	-	-	-
2023-07-11	18:00	N	0	Caribou Migration Alert - 2023-07-11 18:00 - Level 2	-	-	-
2023-07-12	6:00	N	2	Caribou Migration Alert - 2023-07-12 06:00 - Level 2	500	North	Portal 1
2023-07-12	6:00	N	10	Caribou Migration Alert - 2023-07-12 06:00 - Level 2	400	West	KM7
2023-07-12	12:00	N	0	Caribou Migration Alert - 2023-07-12 12:00 - Level 2	-	-	-
2023-07-12	18:00	N	0	Caribou Migration Alert - 2023-07-12 18:00 - Level 2	-	-	-
2023-07-13	6:00	N	0	Caribou Migration Alert - 2023-07-13 06:00 - Level 2	-	-	-
2023-07-13	12:00	N	0	Caribou Migration Alert - 2023-07-13 06:00 - Level 2	-	-	-
2023-07-13	18:00	N	0	Caribou Migration Alert - 2023-07-13 06:00 - Level 2	-	-	-
2023-07-14	6:00	N	0	Caribou Migration Alert - 2023-07-14 06:00 - Level 2	-	-	-
2023-07-14	12:00	N	1	Caribou Migration Alert - 2023-07-14 12:00 - Level 2	500	East	KM14

Date	Time	Road Closure in Effect (Y/N)	Estimated Number of Caribou per Herd	Alert Level	Closest Estimated Distance from Site/AWAR (m)	Direction from Location	Location
2023-07-14	18:00	N	0	Caribou Migration Alert - 2023-07-14 18:00 - Level 2	-	-	-
2023-07-15	6:00	N	0	Caribou Migration Alert - 2023-07-15 06:00 - Level 2	-	-	-
2023-07-15	12:00	N	0	Caribou Migration Alert - 2023-07-15 12:00 - Level 2	-	-	-
2023-07-15	18:00	N	0	Caribou Migration Alert - 2023-07-15 18:00 - Level 2	-	-	-
2023-07-16	6:00	N	1	Caribou Migration Alert - 2023-07-16 06:00 - Level 2	2600	East	KM19
2023-07-16	12:00	N	0	Caribou Migration Alert - 2023-07-16 12:00 - Level 2	-	-	-
2023-07-16	18:00	N	0	Caribou Migration Alert - 2023-07-16 18:00 - Level 2	-	-	-
2023-07-17	6:00	N	0	Caribou Migration Alert - 2023-07-17 06:00 - Level 2	-	-	-
2023-07-17	12:00	N	0	Caribou Migration Alert - 2023-07-17 12:00 - Level 2	-	-	-
2023-07-17	18:00	N	0	Caribou Migration Alert - 2023-07-17 18:00 - Level 2	-	-	-
2023-07-18	6:00	N	0	Caribou Migration Alert - 2023-07-18 06:00 - Level 2	-	-	-
2023-07-18	12:00	N	0	Caribou Migration Alert - 2023-07-18 12:00 - Level 2	-	-	-
2023-07-18	18:00	N	0	Caribou Migration Alert - 2023-07-18 18:00 - Level 2	-	-	-
2023-07-19	6:00	N	0	Caribou Migration Alert - 2023-07-19 06:00 - Level 2	-	-	-
2023-07-19	12:00	N	0	Caribou Migration Alert - 2023-07-19 12:00 - Level 2	-	-	-
2023-07-19	18:00	N	0	Caribou Migration Alert - 2023-07-19 18:00 - Level 2	-	-	-
2023-07-20	6:00	N	0	Caribou Migration Alert - 2023-07-20 06:00 - Level 2	-	-	-
2023-07-20	12:00	N	0	Caribou Migration Alert - 2023-07-20 12:00 - Level 2	-	-	-
2023-07-20	18:00	N	0	Caribou Migration Alert - 2023-07-20 18:00 - Level 2	-	-	-
2023-07-21	6:00	N	0	Caribou Migration Alert - 2023-07-21 06:00 - Level 1	-	-	-
2023-07-21	18:00	N	0	Caribou Migration Alert - 2023-07-21 18:00 - Level 1	-	-	-
2023-07-22	6:00	N	0	Caribou Migration Alert - 2023-07-22 06:00 - Level 1	-	-	-
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2023-07-23	6:00	N	0	Caribou Migration Alert - 2023-07-23 06:00 - Level 1	-	-	-
2023-07-24	6:00	N	0	Caribou Migration Alert - 2023-07-24 06:00 - Level 1	-	-	-
2023-07-24	18:00	N	0	Caribou Migration Alert - 2023-07-24 18:00 - Level 1	-	-	-
2023-07-25	6:00	N	0	Caribou Migration Alert - 2023-07-25 06:00 - Level 1	-	-	-
2023-07-25	18:00	N	0	Caribou Migration Alert - 2023-07-25 18:00 - Level 1	-	-	-
2023-07-26	-	N	-	Caribou Migration Alert - 2023-07-26	-	-	-

**APPENDIX I**

**Hunter Harvest Study, 2023**



# MELIADINE MINE

## 2023 HUNTER HARVEST STUDY AND CREEL SURVEY SUMMARY REPORT

MARCH 2024

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## List of Acronyms

AWAR	All-Weather Access Road
GN DoE	Government of Nunavut, Department of Environment
HHS	Hunter Harvest Study
IQ	Inuit Qaujimajatuqangit
KHTO	Kangiqliniq Hunters and Trappers Organization
LSA	Local Study Area
NWMB	Nunavut Wildlife Management Board
NIRB	Nunavut Impact Review Board
RSA	Regional Study Area
TEMMP	Terrestrial Environment Management and Monitoring Program
TK	Traditional Knowledge

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## SECTION 1 • EXECUTIVE SUMMARY

---

A Rankin Inlet Hunter Harvest Study (HHS) was initiated in 2020 and continued through 2023. The 2023 study included 56 participants of which 37 reported harvesting Caribou (*Rangifer tarandus*). Several guide outfitters were added as participants in 2023 and are now reporting harvest data. The number of participants in 2023 was a marked increase compared to 2022 (44 participants) and 2021 (40). Given an estimated 300 to 350 active hunters in the Hamlet of Rankin Inlet, the HHS represents from 11 to 12% of hunters in the community. With a total reported Caribou harvest of 483 in 2023, the total estimated number of Caribou harvested was between 4,025 to 4,390 animals, which is considerably lower than estimates in 2022 (i.e., 5,470 to 6,077 animals) and 2021 (i.e., 6,700 to 7,444). This estimate may be conservative (i.e., high) since participants likely represent a higher proportion of successful hunters in the community.

The 2023 HHS Caribou harvest data indicated that 5.0% of reported harvest occurred within 5 km of the AWAR (4.8% in 2022), and 26.9% occurred within the Meliadine Regional Study Area (RSA) (29.4% in 2022). During the Nunavut Wildlife Management Board (NWMB 2005) study from 1996 to 2001, 24.8% of reported harvest was within the Meliadine RSA. As per the Meliadine Terrestrial Environment Management and Monitoring Plan (TEMMP), due to a lack of existing baseline data, no thresholds related to Caribou harvesting in the Mine area can be identified; however, these very preliminary results suggest that the presence of the AWAR and the Meliadine Mine has not greatly increased hunting in the area. Provided the data and collaboration with local harvesters is suitable, after three years of data collection through implementation of the HHS, Agnico Eagle, in collaboration with the GN DoE and the Terrestrial Advisory Group (TAG), will discuss the next steps to reduce potential increased harvest associated with improved access due to the road (i.e., after the 2023 HHS). Based on available data, decisions on thresholds and mitigation related to Caribou movements may be premature.

A comprehensive comparison of Caribou harvest in the current study (2021 to 2023) and the NWMB (2005) study (1996 to 2001) determined that the average number of Caribou harvested per participant between 2021 and 2023 was higher within the HHS study area than between 1996 to 2001 for each month except November. This outcome is less pronounced when comparing harvest rates within the Meliadine RSA. Comparisons in the total number of Caribou harvested between the two studies is difficult to determine because of changing Caribou distribution, differences in hunter numbers, varied hunter success, and differences in study design.

Fourteen (14) Muskox (*Ovibos moschatus*), three (3) Wolverine (*Gulo gulo*), and four (4) Arctic Wolf (*Canis lupus*) were harvested in 2023. The only other terrestrial mammals harvested in 2023 was Arctic Hare (*Lepus arcticus*; 1 individual) and Polar Bear (*Ursus maritimus*; 4). In the marine environment, Beluga (*Delphinapterus leucas*; 45 individuals) was the most common species reported as harvested, followed by Ringed Seal (*Pusa hispida*; 29 individuals), Bearded Seal (*Erignathus barbatus*; 5), Narwhal (*Monodon monoceros*; 2), and Walrus (*Odobenus rosmarus*; 2).

Moderate numbers of bird species were harvested by Rankin Inlet participants in 2023 with Canada Goose (*Branta canadensis*; 78 individuals) and Common Eider (*Somateria mollissima*; 65) harvested at the highest levels. Ptarmigan (*Lagopus* sp.; 33), Snow Goose (*Anser caerulescens*; 44), goose sp. (8), Northern Pintail (*Anas acuta*; 12), Sandhill Crane (*Grus canadensis*; 6), Northern Pintail (*Anas acuta*; 6), gull sp. (*Larus* sp.; 1), and Tundra Swan (*Cygnus columbianus*) were also harvested.

The most common fish species captured, Arctic Char (*Salvelinus alpinus*), represented 93% of the total catch in 2023 (compared to 77% in 2022 and 72% in 2021). Lake Trout (*Salvelinus namaycush*; 4.5%) were captured at moderate numbers. The other two species that were the focus of the HHS, Arctic Grayling (*Thymallus arcticus*) and Lake Whitefish (*Coregonus clupeaformis*), were caught at low numbers.

## SECTION 2 • OVERVIEW

---

As outlined in the Terrestrial Environment Management and Monitoring Program (TEMMP; Agnico Eagle 2022) and as a requirement of the Nunavut Impact Review Board (NIRB) Project Certificate No. 006 Terms and Conditions 46 and 48, the Rankin Inlet Hunter Harvest Study (HHS) was initiated in 2020 by Agnico Eagle. The HHS is being conducted in conjunction with the Kangiqliniq Hunters and Trappers Organization (KHTO) to monitor and document the spatial distribution, seasonal patterns, and harvest rates of hunter kills and angler catches within the Meliadine Regional Study Area (RSA).

Nunavut Environmental Consulting was contracted to work alongside the KHTO in conducting the study in 2023 and increase hunter participation. The 2023 HHS, through regular visits, contributed to developing relationships with local harvesters, outfitting and guiding businesses, and the Government of Nunavut, Department of Environment (GN DoE).

Preliminary detailed analyses of the differences in Caribou harvest rates between the current study (2021 to 2023) and the NWMB study (1996 to 2001) are included in this report. Detailed analyses will be conducted in subsequent reports as the HHS database becomes more robust.

## SECTION 3 • OBJECTIVES

---

The primary objective of the HHS is to monitor potential project-related effects on harvesting of wildlife by residents of the Hamlet of Rankin Inlet. This objective is achieved by estimating the following key metrics:

1. Determining the distribution of Caribou (*Rangifer tarandus*), Muskox (*Ovibos moschatus*), Grizzly Bear (*Ursus arctos*), Polar Bear (*Ursus maritimus*), Arctic Wolf (*Canis lupus*), Wolverine (*Gulo gulo*), Arctic Fox (*Vulpes lagopus*), goose, ptarmigan, and seal harvest by residents of Rankin Inlet; and
2. Estimating the total level (or an index) of harvest by residents of Rankin Inlet.

Other objectives of the HHS include:

1. Supporting creel surveys by gathering information on Arctic Char (*Salvelinus alpinus*), Lake Trout (*Salvelinus namaycush*), Lake Whitefish (*Coregonus clupeaformis*), and Arctic Grayling (*Thymallus arcticus*) catch rates and Inuit-use patterns in the Rankin Inlet area;
2. Understanding regional distribution of hunting and fishing activity;
3. Investigating seasonal timing of hunting and fishing activity; and
4. Determining whether increased harvest and catch rates are associated with the Meliadine All-Weather Access Road (AWAR). For Caribou, determining how current harvest rates compare to historical levels (i.e., NWMB 2005 – 1996 to 2001).

As discussed during consultation with stakeholders, including the KHTO, the HHS will further seek to:

- increase and maintain the hunter and fisherman participant rate in the future of the program;
- Increase efforts to include guide outfitters as participants in the HHS;
- improve resource protection;
- improve hunter and fisherman awareness and education;
- increase the integration of Inuit Qaujimajatuqangit (IQ) and Traditional Knowledge (TK);
- increase availability of data to support a collective approach to understanding harvest; and
- assist Agnico Eagle in mitigative actions and the GN in management decisions.

## SECTION 4 • METHODOLOGY

---

The wildlife species that are the focus of the HHS are Caribou, Muskox, Grizzly Bear, Polar Bear, Wolf, Wolverine, Arctic Fox, goose, ptarmigan, and seal; however, harvest data on other species, such as Beluga (*Delphinapterus leucas*), Common Eider (*Somateria mollissima*), and Sandhill Crane (*Grus canadensis*) are also collected. The species in the study were deliberately chosen to make data entry and collection as simple as possible. To support creel surveys, data on fish harvest (Priority species = Arctic Char, Lake Trout, Lake Whitefish, and Arctic Grayling) were also collected.

Inuit and non-Inuit residents, at least 16 years of age, are eligible to participate in the harvest survey. Harvest calendars are provided to participants on a household basis, rather than an individual basis, to simplify data entry and collection, and reflect household hunting patterns. The harvest calendar is attractive and consists of local photographs of wildlife and Nunavut residents (see Appendix A for the 2023 Rankin Inlet calendar). Space is provided in the calendar for each day where harvest details can be documented.

A map is provided at the end of the calendar that delineates a 5 km<sup>2</sup> UTM grid around the Rankin Inlet and Meliadine mine areas, and regions indicated as important for hunting during discussions with KHTO members. Each grid has a unique code to facilitate recording of information. When calendars are issued, participants or participating households are encouraged to write harvest details (e.g., number of animals, sex, age, and location (i.e., grid code) for the appropriate date on the calendar.

Participants were interviewed in person three times during the year (i.e., June 2023, October 2023, and January 2024) by the harvest study coordinator. During the January 2024 interviews, remaining data from 2023 were collected, a new 2024 HHS calendar was provided, and prizes were distributed. The purpose of the interviews is to ensure all harvest data are recorded on the calendars and to collect incidental information to compliment calendar data, including notable Caribou movements, aggregations, and unique observations. Between interview periods, participants were often contacted by phone or social media to encourage recording of harvest data.

Features of the 2023 HHS included:

- 1) adding new participants;
- 2) building long-term relationships between participants and researchers;
- 3) increasing engagement with participants on social media platforms such as Facebook and Instagram; and
- 4) increasing incentives for participating in the study (e.g., gas vouchers and prizes).

## SECTION 5 • HISTORICAL RESULTS

---

The number of hunters interviewed during the comprehensive 5-year Nunavut Wildlife Harvest Study (NWMB 2005) was 327, which apparently represented 97% of all hunters in Rankin Inlet (NWMB 2005). For the purposes of this annual report, and in the absence of more specific details on hunter numbers, the total number of active hunters in Rankin Inlet was estimated to be 300 to 350. Future discussions with KHTO members and other community groups in 2024 will focus on obtaining a better estimate of current numbers of active hunters in the Hamlet of Rankin Inlet.

Between 1996 and 2001, 4.5% of Caribou reported harvests were within 5 km of the Meliadine AWAR (prior to construction) and 24.8% of harvests occurred within the RSA (NWMB 2005). According to the NWMB harvest study, an average of 535 Caribou were harvested per year over the five-years between June 1996 and May 2001 (NWMB 2005).

Based on the NWMB (2005) results, highest Caribou harvests occurred from March to May and from September to November.

A detailed analysis of the average number of Caribou harvested per participant during the NWMB (2005) study is provided in Section 6.1.3 of this report.

## SECTION 6 • 2023 HUNTER HARVEST STUDY RESULTS

---

### 6.1 BARREN-LAND CARIBOU

#### 6.1.1 Number of Hunters

The HHS included 56 participants by the end of 2023, which was a marked increase compared to 2022 (44 participants) and 2021 (40). Recruitment efforts in the Hamlet of Rankin Inlet during community visits and on social media platforms resulted in the many new participants in 2023. Of the 2023 participants, Caribou harvest data were collected from 37 participants, which was higher than the 31 participants reporting Caribou harvest in 2022.

Based on the previous discussion of total numbers of hunters in the Hamlet of Rankin Inlet (Section 5 Historical Results), an estimated 300 to 350 active hunters live within the Rankin Inlet community. Discussions with Rankin Inlet HTO members in 2019 through 2023 suggest the total number of hunters is well over 300 but future HHS studies and discussions with the HTO will aim to refine hunter numbers. Based on these numbers, the 37 hunters reporting Caribou harvest in 2023 conservatively represent from 11 to 12% of total hunters in the community.

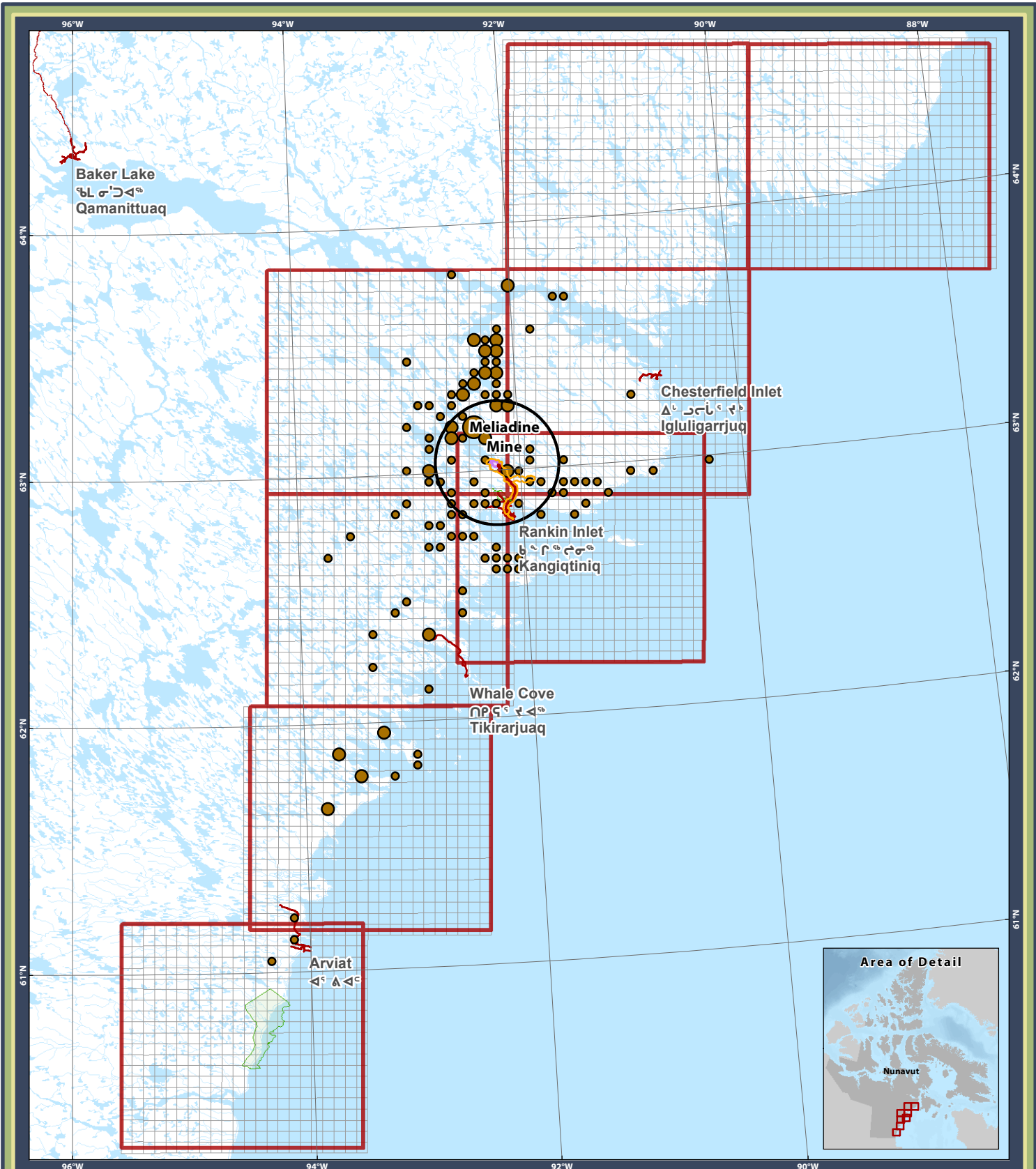
Participants noted that there is a growing demand for their skills as professional hunters, especially for taking sport hunters out for Caribou and Muskox, and that the prominence of guide outfitters has increased since the start of the HHS. Some participants consider this increased demand as a positive thing for their livelihood and for Rankin Inlet, while others are concerned that the demand for sport hunting is at odds with local and subsistence harvesting.

#### 6.1.2 Distribution of Hunting

Figure 6.1 illustrates the distribution of 2023 Caribou harvest within the HHS data collection area. Hunting was concentrated in the vicinity of the Hamlet of Rankin Inlet and particularly between the Meliadine Mine and the southern shore of Chesterfield Inlet. A small number of harvests were recorded near the hamlets of Whale Cove, Arviat, and Chesterfield Inlet.

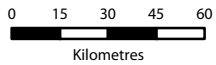
Hunting did not appear to be associated with the Meliadine AWAR, although several harvests were recorded within the Meliadine RSA. Variation in harvest location and intensity is attributable to numerous factors. For instance, hunters may have a 'favorite' hunting area that they frequent each year while others prefer hunting in 'convenient' locations. Some hunters prefer remote locations well away from frequented areas. The primary factor determining location of successful harvests each year is the availability and distribution of Caribou herds in the area.

Figure 6.2 shows hunting distribution by community from the five-year NWMB study for the HHS study area. Most Caribou hunting occurred around the four hamlets in the study area. Figures 6.3 to 6.5 show the Caribou harvest distribution (i.e., average number of Caribou per participant) for the Rankin Inlet component of the NWMB (2005) study (1996 to 2001; 6 years), the current study (2021 to 2023; 3 years), and both studies combined, respectively. Distribution of harvest is similar in the two studies.



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- | Total Caribou Harvest |         |
|-----------------------|---------|
|                       | 1 - 5   |
|                       | 6 - 10  |
|                       | 11 - 20 |
|                       | > 20    |



**Projection:**  
Canada Lambert Conformal Conic

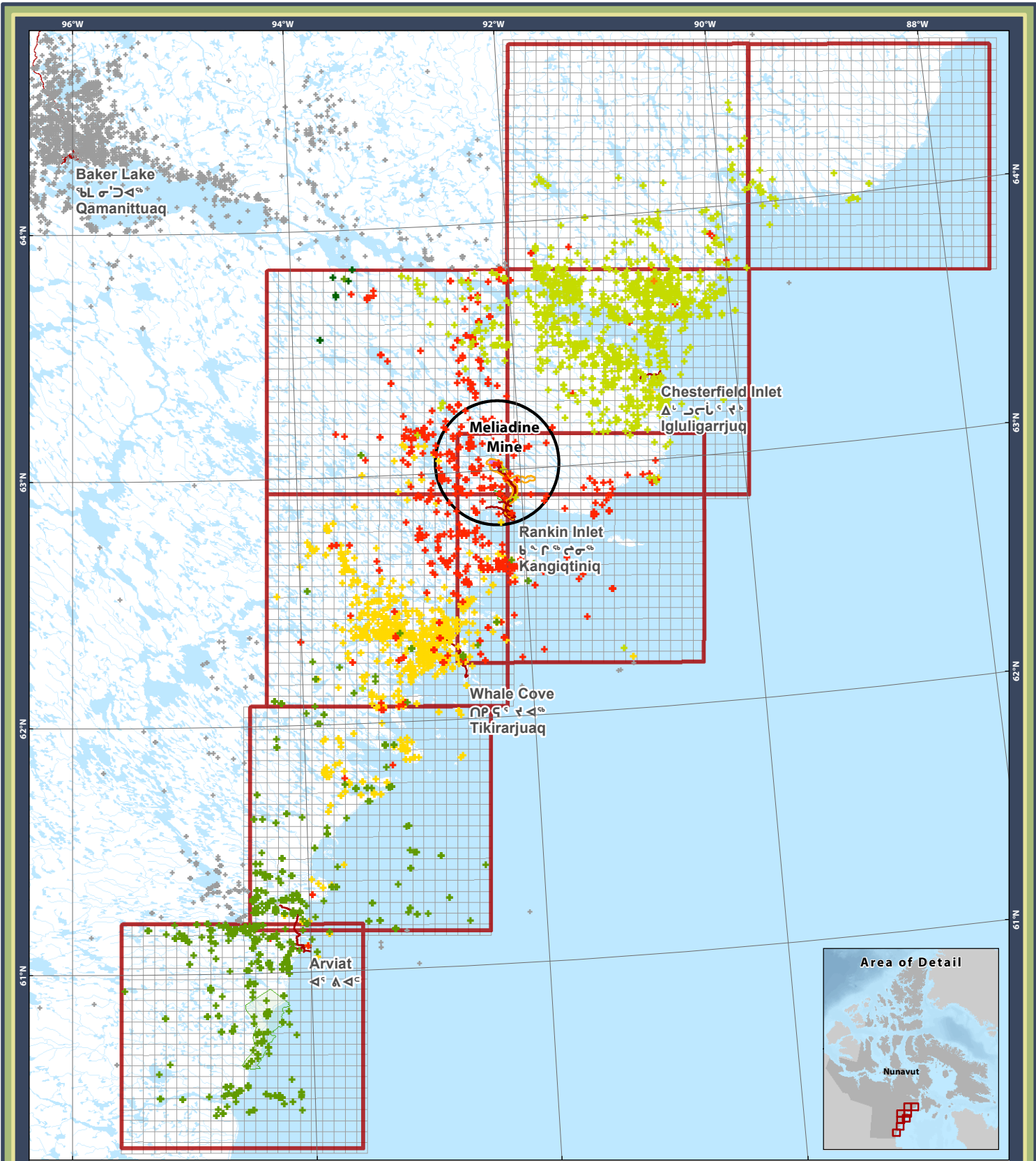
**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.1**  
**Total Number of Caribou Harvested in 2023**

**Rankin Inlet Hunter Harvest Study**

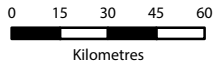
Prepared for: By: **CASLYS CONSULTING**

**ENVIRONMENTAL CONSULTING LTD**



**Legend**

- Roads
- HHS Extents
- Local Study Area
- Regional Study Area
- Production Lease
- Parks & Protected Areas
- NWMB Caribou Harvest Outside RIHHS
- Baker Lake
- Arviat
- Chesterfield Inlet
- Whale Cove
- Coral Harbour
- Rankin Inlet



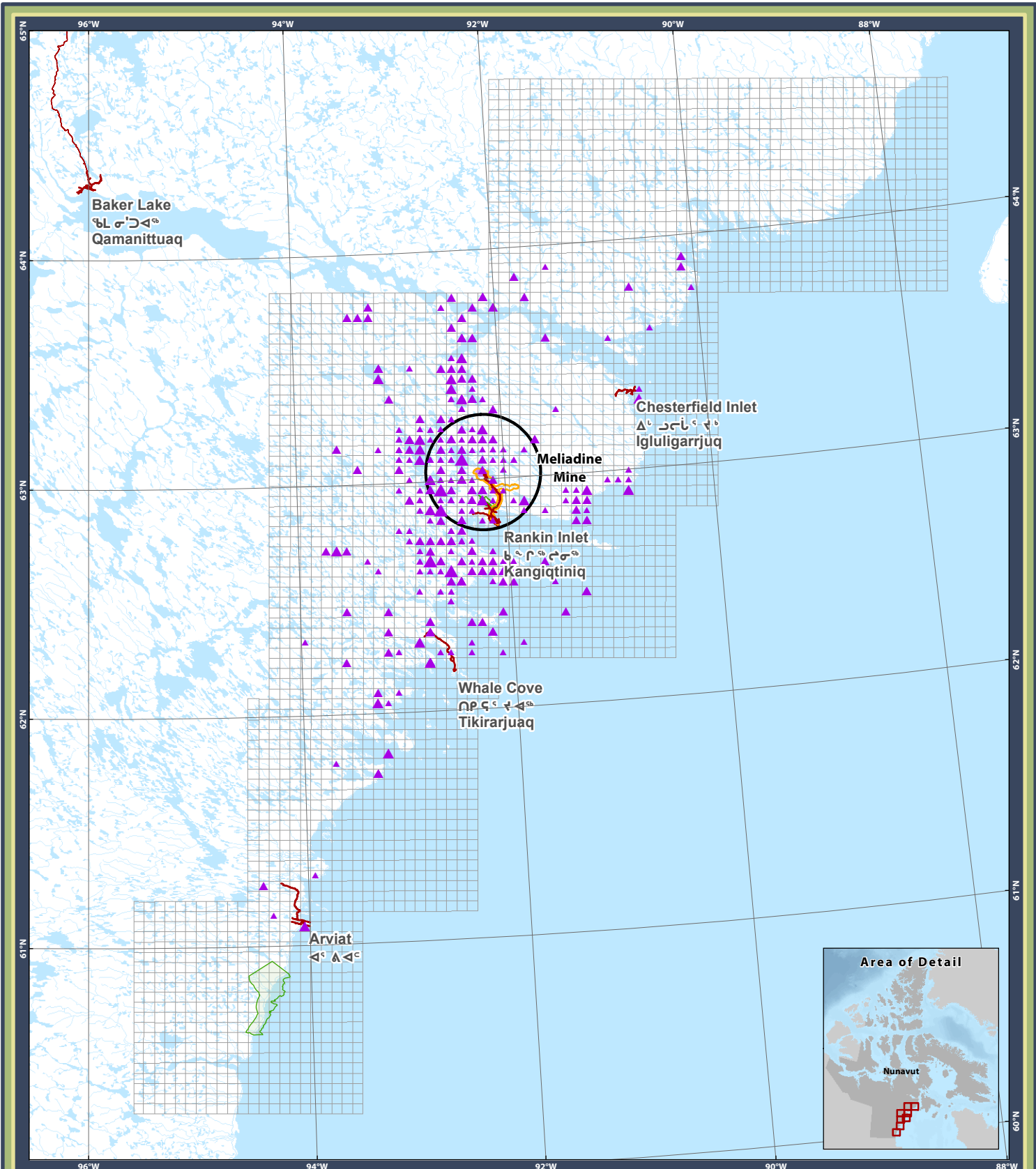
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**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Wildlife Management Board  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.2**  
**Distribution of NWMB Caribou Harvest By Community (1996 to 2001)**

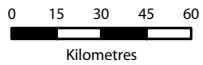
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
- Local Study Area
- Regional Study Area
- Production Lease
- Parks & Protected Areas
- NWMB Rankin Inlet Hunters
- Average # of Caribou per Participant
  - 1 - 2
  - 3 - 5
  - 6 - 10
  - >10



**Projection:**  
Canada Lambert Conformal Conic

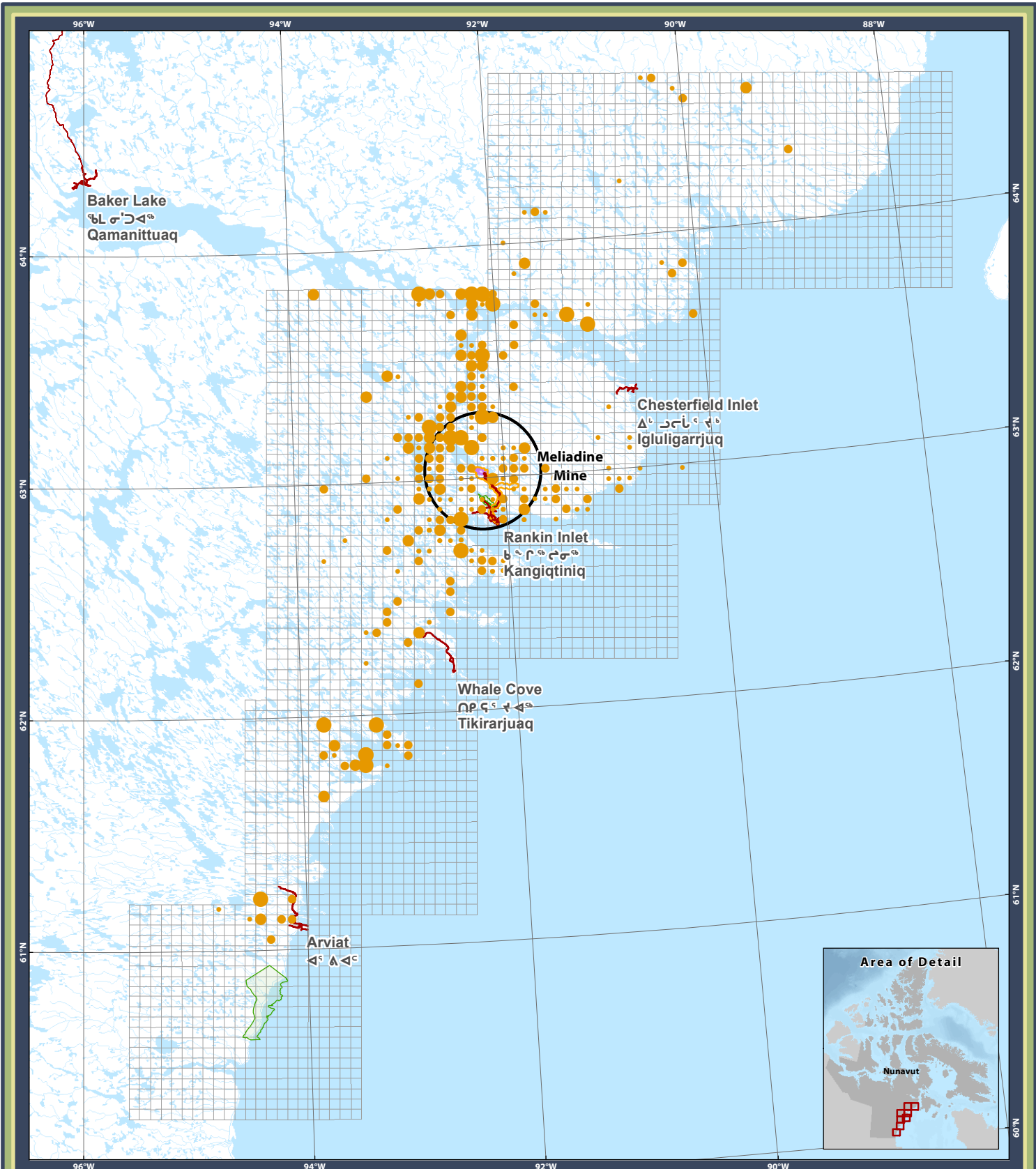
**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Nunavut Wildlife Management Board  
 Nunavut Environmental Consulting Ltd.  
 Caslys Consulting Ltd.

**Figure 6.3**

**Distribution of the Average # of Caribou per Participant for the Rankin Inlet Component of the NWMB Caribou Harvest (1996 to 2001)**

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- Rankin Inlet HHS  
Average # of Caribou per Participant
- 1 - 2
  - 3 - 5
  - 6 - 10
  - >10



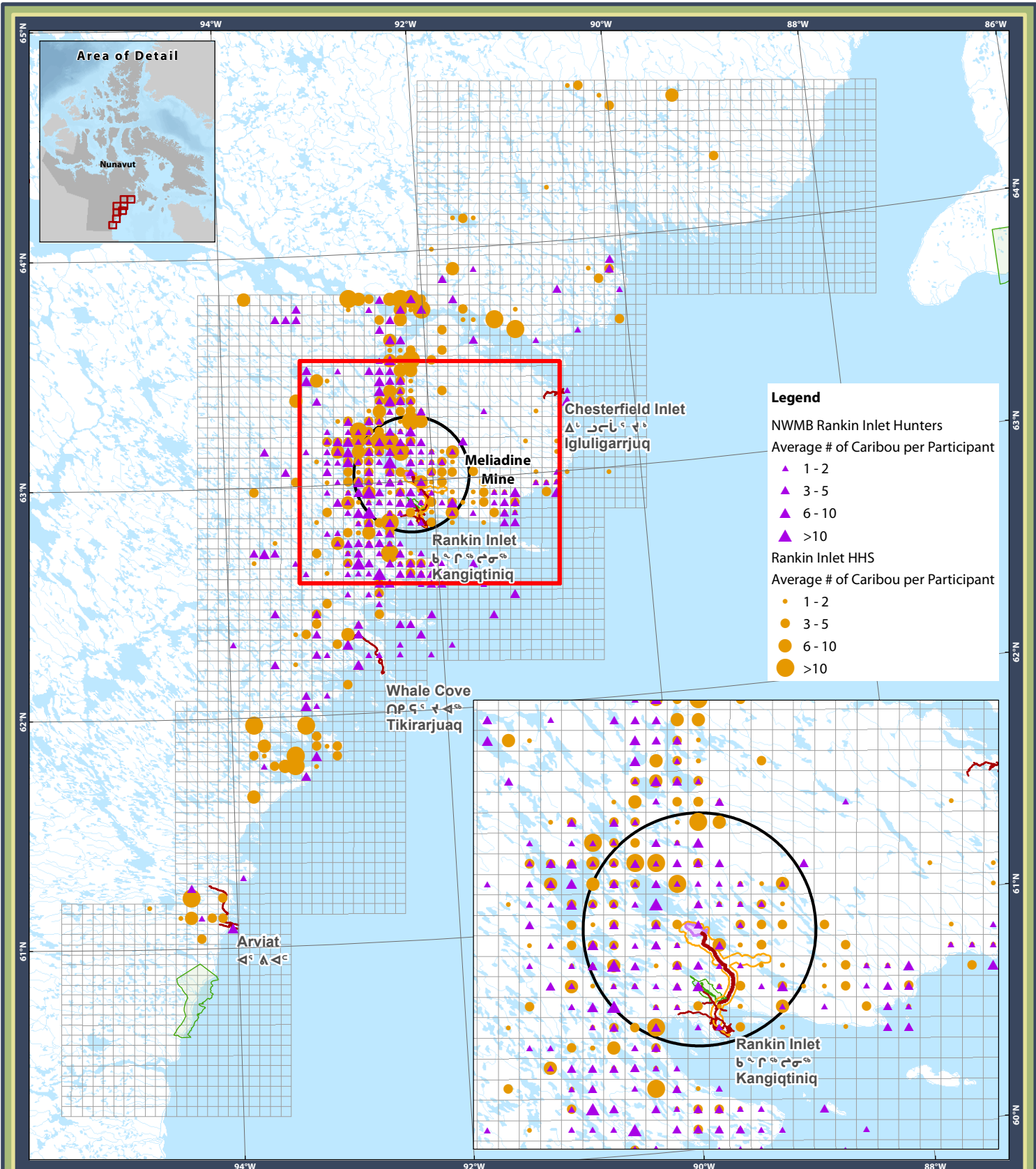
**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Wildlife Management Board  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.4**  
Distribution of Average # of Caribou per Participant for the Current Rankin Inlet Caribou Harvest (2021 to 2023)

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

NWMB Rankin Inlet Hunters  
Average # of Caribou per Participant

- ▲ 1 - 2
- ▲ 3 - 5
- ▲ 6 - 10
- ▲ >10

Rankin Inlet HHS  
Average # of Caribou per Participant

- 1 - 2
- 3 - 5
- 6 - 10
- >10

**Legend**

- 🛣️ Roads
- 🟡 Local Study Area
- ⬜ Regional Study Area
- 🟪 Production Lease
- 🟩 Parks & Protected Areas

0 15 30 45 60  
Kilometres

**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Wildlife Management Board  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.5**  
**Distribution of the Average # of Caribou per Participant for the Rankin Inlet HHS (2021 to 2023) and the NWMB Study (1996 to 2001)**

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:

The 2023 HHS data indicated that 5.0% of reported harvest occurred within 5 km of the AWAR (4.8% in 2022), and 26.9% occurred within the Meliadine RSA (29.4% in 2022; see Table 6.1). During the NWMB study from 1996 to 2001, 24.8% of reported harvest was within the Meliadine RSA. Unlike for the Meadowbank Mine project, threshold levels for monitoring the effects of the Meliadine Mine development on the distribution of Caribou harvest will not be set until three years of hunter harvest data have been collected as per TEMMP (i.e., after the 2023 HHS). Harvest data in this report will be discussed with the TAG to determine need for mitigation measures and harvest thresholds.

**Table 6.1:** Caribou Harvest Distribution along the AWAR and within the Rankin Inlet Local Study Area (LSA) and RSA (1996 to 2001 [NWMB], and 2021 to 2023 [Rankin Inlet HHS]).

Study	Participation Rate within 5 km of AWAR (% of total hunters)	Average Caribou Harvest within 5 km of AWAR per Participant	% of Annual Harvest within 5 km of AWAR	% of Annual Harvest within Meliadine LSA	% of Annual Harvest within Meliadine RSA
NWMB 1996 to 2001 (Rankin Inlet)	NA	4.1	4.5%	0.3%	24.8%
Rankin Inlet HHS 2021	16.7%	5.0	3.7%	3.3%	19.7%
Rankin Inlet HHS 2022	25.8%	3.3	4.8%	4.0%	29.4%
Rankin Inlet HHS 2023	16.2%	4.0	5.0%	2.9%	26.9%
Average (2021 to 2023)	19.6%	4.1	4.5%	3.4%	25.3%

### 6.1.3 Magnitude of Hunting

In 2023, a total of 483 Caribou were reported as being harvested by 37 participants in the Rankin Inlet HHS (see Table 6.2). Caribou harvest numbers during the five-year NWMB study for the hamlets of Rankin Inlet, Arviat, Chesterfield Inlet, and Whale Cove are also provided in Table 6.2.

Given that the 37 hunters may represent an estimated 11 to 12% of the Rankin Inlet hunting community (see Section 5 Historical Results), the total estimated number of Caribou harvested in 2023 was between 4,025 to 4,390 animals, which is considerably lower than estimates in 2022 (i.e., 5,470 to 6,077 animals) and 2021 (i.e., 6,700 to 7,444). This estimate appears to be conservative since participants likely represented a higher proportion of successful hunters in the community.

A detailed analysis of the difference in Caribou harvest rates between the current study and the NWMB (2005) study (1996 to 2001) found that the average number of Caribou harvested per participant within the HHS study area was higher during the current study for all months except November (see Table 6.3; Figure 6.6). Similar results, although not as compelling, were found in the RSA (see Table 6.3; Figures 6.7). The highest months (e.g., 2022) were because one hunter harvested a high number of Caribou (i.e., one participant reporting 14 Caribou harvests in February 2022 and one reporting 14 in March 2022). When analyzing overall Caribou harvest (i.e., average # of Caribou harvested per month) between the two studies, current harvest appears to be lower than historical levels (Table 6.4); however, the data table does not consider the number of hunters participating in the two studies.

**2023 HUNTER HARVEST STUDY**

**Table 6.2:** Hunter Caribou Harvest Statistics from the NWMB (2005) Study and Rankin Inlet HHS (2021 to 2023).

**2021 to 2023 Rankin Inlet Hunter Harvest Study**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
2021	283	36	37	78	96	0	13	14	51	27	8	27	670
2022	94	95	51	27	75	6	14	49	73	20	15	28	547
2023	61	39	26	64	29	12	23	32	84	76	8	29	483
Total #	438	170	114	169	200	18	50	95	208	123	31	84	1700
Average	146.0	56.7	38.0	56.3	66.7	6.0	16.7	31.7	69.3	41.0	10.3	28.0	340.0
% of Total	25.8	10.0	6.7	9.9	11.8	1.1	2.9	5.6	12.2	7.2	1.8	4.9	100.0

**1996 to 2001 Nunavut Wildlife Harvest Study (NWMB 2005) – Rankin Inlet Results within the Rankin Inlet HHS Survey Area**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
1996							35	67	67	87	138	116	510
1997	95	105	118	89	50	1	4						462
1998			117	33	6	7	15	12	72	15	15	28	320
1999	108	80	108	80	33	20	75	86	52	38	63	41	784
2000	34	35	68	111	69	29	17	40	78		30		511
2001		19	27	37	3								86
Total #	237	239	438	350	161	57	146	205	269	140	246	185	2673
Average	79.0	59.8	87.6	70.0	32.2	14.3	29.2	51.3	67.3	46.7	61.5	61.7	445.5
% of Total	8.9	8.9	16.4	13.1	6.0	2.1	5.5	7.7	10.1	5.2	9.2	6.9	100.0

Table 6.2: Continued.

**1996 to 2001 Nunavut Wildlife Harvest Study (NWMB 2005) – Arviat Results within the Rankin Inlet HHS Survey Area**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
1996						56	52	53	317	349	260	122	1209
1997	133	102	112	190	48	62	116	122	245	230	89	59	1508
1998	99	121	169	147	138	88	156	68	207	74	15	15	1297
1999	168	91	79	128	25	49	70	51	271	275	19	22	1248
2000	49	17	13	62	35	32	54	68	211	79	118	93	831
2001	44	181	6	211	159								601
Total #	493	512	379	738	405	287	448	362	1251	1007	501	311	6694
Average	98.6	102.4	75.8	147.6	81.0	57.4	89.6	72.4	250.2	201.4	100.2	62.2	1115.7
% of Total	7.4	7.6	5.7	11.0	6.1	4.3	6.7	5.4	18.7	15.0	7.5	4.6	100.0

**1996 to 2001 Nunavut Wildlife Harvest Study (NWMB 2005) – Chesterfield Inlet Results within the Rankin Inlet HHS Survey Area**

Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
1996						27	45	98	77	29	30	46	352
1997	112	51	89	24	17	31	31	30	71	33	150	29	668
1998	54	42	28	39	53	18	40	41	90	12	16	8	441
1999	88	40	47	16	33	21	23	37	35	18	34	27	419
2000	22	16	10	17	18	8	43	45	33	25	32	30	299
2001	17	24	37	26	24								128
Total #	293	173	211	122	145	105	182	251	306	117	262	140	2307
Average	58.6	34.6	42.2	24.4	29.0	21.0	36.4	50.2	61.2	23.4	52.4	28.0	384.5
% of Total	11.0	6.5	7.9	4.6	5.4	3.9	6.8	9.4	11.4	4.4	9.8	5.2	100.0

**Table 6.2:** Continued.

**1996 to 2001 Nunavut Wildlife Harvest Study (NWMB 2005) – Whale Cove Results within the Rankin Inlet HHS Survey Area**

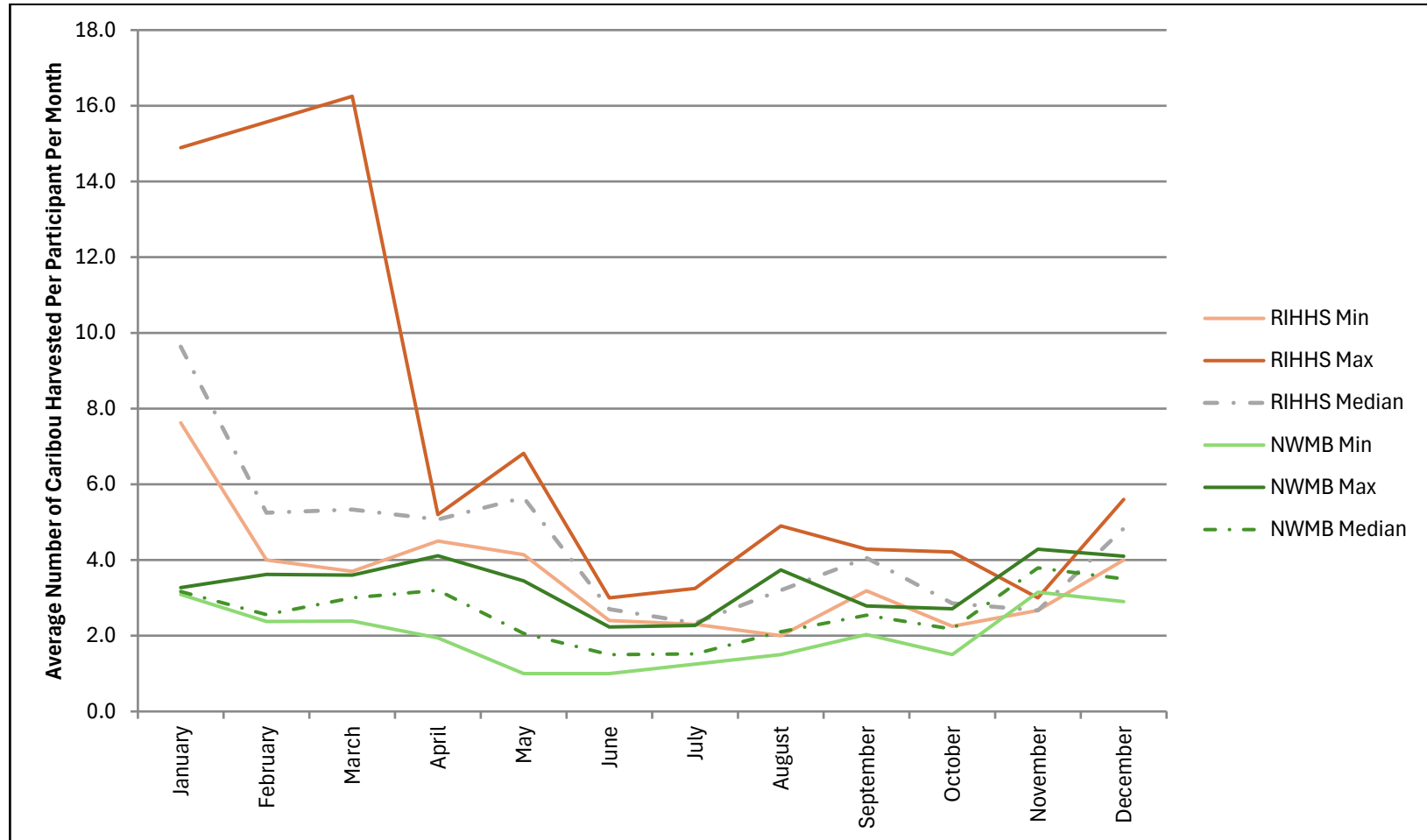
Year	January	February	March	April	May	June	July	August	September	October	November	December	Yearly Total
1996						13	25	43	58	50	82	40	311
1997	68	9	13	35	9	14	8	25	22	16	14	14	247
1998	21	11	21	22	65	21	39	31	43	19	31	19	343
1999	35	38	53	49	30	28	42	51	48	46	40	23	483
2000	27	29	15	23	20	11	42	37	42	55	56	18	375
2001	37	46	42	47	24								196
Total #	188	133	144	176	148	87	156	187	213	186	223	114	1955
Average	37.6	26.6	28.8	35.2	29.6	17.4	31.2	37.4	42.6	37.2	44.6	22.8	325.8
% of Total	7.0	5.0	5.4	6.6	5.5	3.3	5.8	7.0	8.0	7.0	8.3	4.3	100.0

**Table 6.3:** Difference in the Average Number of Caribou Harvested per Participant in the Rankin Inlet Hunter Harvest Study (RIHHS; 2021 to 2023) and the Nunavut Wildlife Management Board Study (NWMB; 1996 to 2001) within the HHS Boundaries and the Meliadine Regional Study Area.

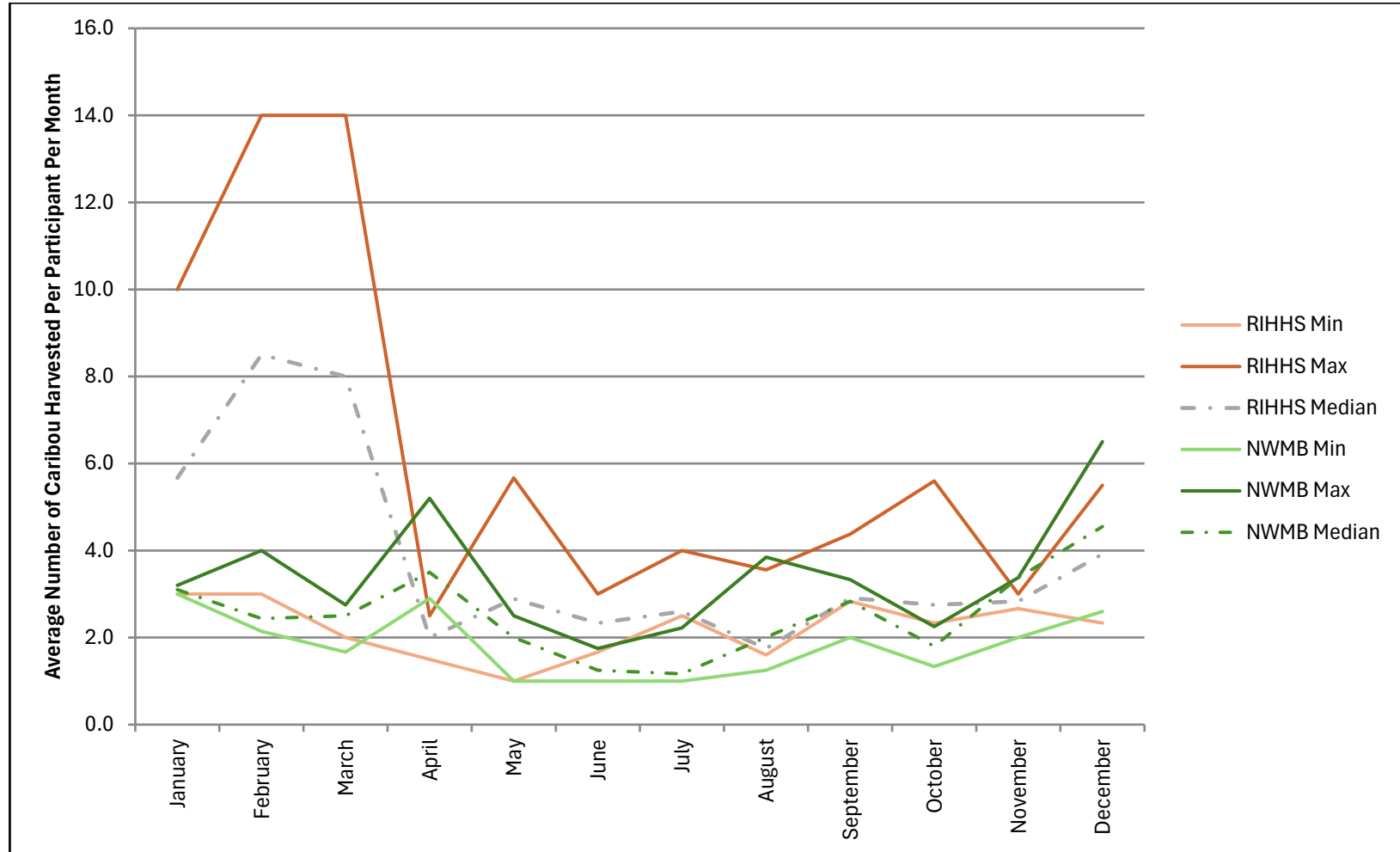
Month	Average # of Caribou Harvested per Participant			
	Rankin Inlet HHS Boundaries		Meliadine Regional Study Area	
	+/- Median Change	Result	+/- Median Change	Result
January	6.5	RIHHS > NWMB	2.6	RIHHS > NWMB
February	2.7	RIHHS > NWMB	6.1	RIHHS > NWMB
March	2.3	RIHHS > NWMB	5.5	RIHHS > NWMB
April	1.9	RIHHS > NWMB	-1.5	RIHHS < NWMB
May	3.6	RIHHS > NWMB	0.9	RIHHS > NWMB
June	1.2	RIHHS > NWMB	1.1	RIHHS > NWMB
July	0.8	RIHHS > NWMB	1.4	RIHHS > NWMB
August	1.1	RIHHS > NWMB	-0.3	RIHHS < NWMB
September	1.5	RIHHS > NWMB	0.1	RIHHS > NWMB
October	0.7	RIHHS > NWMB	1.0	RIHHS > NWMB
November	-1.1	RIHHS < NWMB	-0.5	RIHHS < NWMB
December	1.3	RIHHS > NWMB	-0.6	RIHHS < NWMB

**Table 6.4:** Difference in the Average Number of Caribou Harvested per Month over All Years in the Rankin Inlet Hunter Harvest Study (RIHHS; 2021 to 2023) and the Nunavut Wildlife Management Board Study (NWMB - Rankin Inlet only; 1996 to 2001) within the HHS Boundaries.

Average # of Caribou Harvested per Month over All Years per Study				
Month	RIHHS	NWMB	+/- Median Change	Result
January	146.0	79.0	67.0	RIHHS > NWMB
February	56.7	59.8	-3.1	RIHHS < NWMB
March	38.0	87.6	-49.6	RIHHS < NWMB
April	56.3	70.0	-13.7	RIHHS < NWMB
May	66.7	32.2	34.5	RIHHS > NWMB
June	6.0	14.3	-8.3	RIHHS < NWMB
July	16.7	29.2	-12.5	RIHHS < NWMB
August	31.7	51.3	-19.6	RIHHS < NWMB
September	69.3	67.3	2.1	RIHHS > NWMB
October	41.0	46.7	-5.7	RIHHS < NWMB
November	10.3	61.5	-51.2	RIHHS < NWMB
December	28.0	61.7	-33.7	RIHHS < NWMB



**Figure 6.6:** Minimum, Maximum, and Median Average Number of Caribou Harvested per Participant per Month for the Rankin Inlet Hunter Harvest Study (RIHHS; 2021 to 2023) and the Nunavut Wildlife Management Board Study (NWMB; 1996 to 2001) within the RIHHS Boundaries.



**Figure 6.7:** Minimum, Maximum, and Median Average Number of Caribou Harvested per Participant per Month for the Rankin Inlet Hunter Harvest Study (RIHHS; 2021 to 2023) and the Nunavut Wildlife Management Board Study (NWMB; 1996 to 2001) within the Regional Study Area (RSA).

#### 6.1.4 Seasonal Distribution and Timing of Hunting

The Rankin Inlet HHS results to date indicate that the highest Caribou harvests occurred in winter (January and February), with smaller peaks in spring (April and May), and fall (September and October) (see Figure 6.8). Similarly, during the five-year NWMB harvest study, the highest Caribou harvests occurred between March and May, and between September and November. The pattern between the studies indicates that seasonal hunting preferences are similar.

More details on the seasonal timing of harvest in 2023 can be found in Figure 6.9 (i.e., numbers of animals harvested, numbers of participants, and average number of animals harvested by participant by month) and Figure 6.10 (i.e., Caribou harvest numbers by season and proximity to the Meliadine AWAR). As can be seen from the latter figure, very few Caribou were harvested within 5 km of the AWAR.

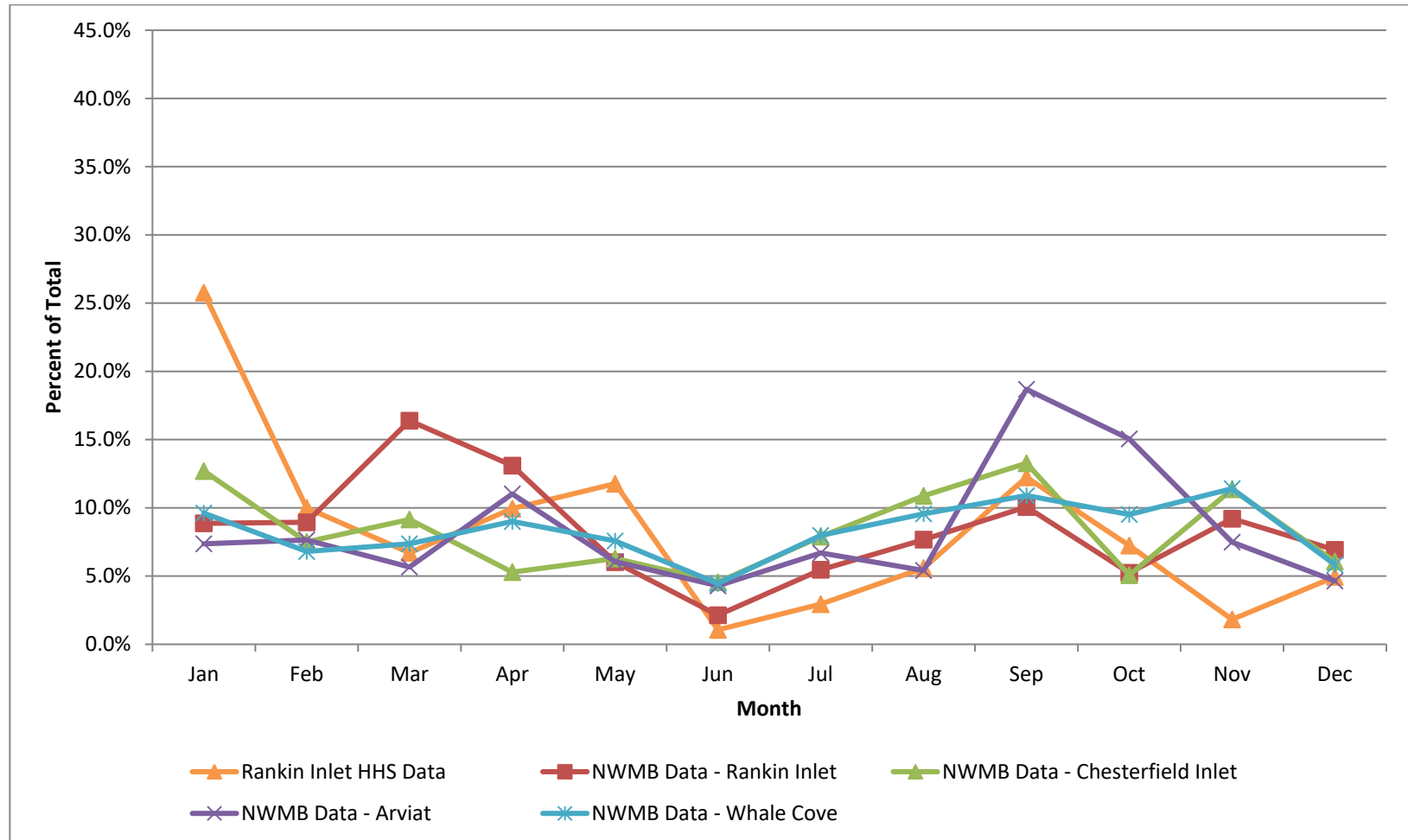
The distribution of hunting in the Rankin Inlet HHS study area is illustrated in Figure 6.1, which includes all 2023 results, and Figures 6.11a to 6.11d, representing the spring, summer, fall and winter Caribou seasons.

In spring, overall Caribou hunting occurred primarily south and west of the Hamlet of Rankin Inlet, within and west of the Meliadine RSA, around the Hamlet of Whale Cove, between the hamlets of Whale Cove and Arviat (Figure 6.11a). Very few or no harvests were reported near the hamlets of Chesterfield Inlet and Arviat.

During the summer, most Caribou were harvested in the vicinity of the Hamlet of Rankin Inlet and within the Meliadine Mine RSA (Figure 6.11b). A small number of Caribou were reported as being harvested along Chesterfield Inlet and south of the Hamlet of Whale Cove, while none were reported near the Hamlet of Arviat (Figure 6.11b).

In the fall, hunting was concentrated north of the Hamlet of Rankin Inlet, within and outside the Meliadine Mine RSA, and southeast of the Hamlet of Rankin Inlet (Figure 6.11c). Some hunting may have been associated with the Meliadine Mine AWAR. No harvesting was reported near the hamlets of Chesterfield Inlet or Arviat.

In winter, most reported Caribou harvests were north of the Meliadine RSA (Figure 6.11d). A smaller number of harvests were reported around the hamlets of Chesterfield Inlet, Whale Cove, and Arviat (Figure 6.11d). Successful hunters during winter appeared to be those that travelled further afield by snowmobile.



**Figure 6.8:** Seasonal Trends in Caribou Harvest from the Rankin Inlet Hunter Harvest Study (2021 and 2023) and the NWMB Study (1996 to 2001).

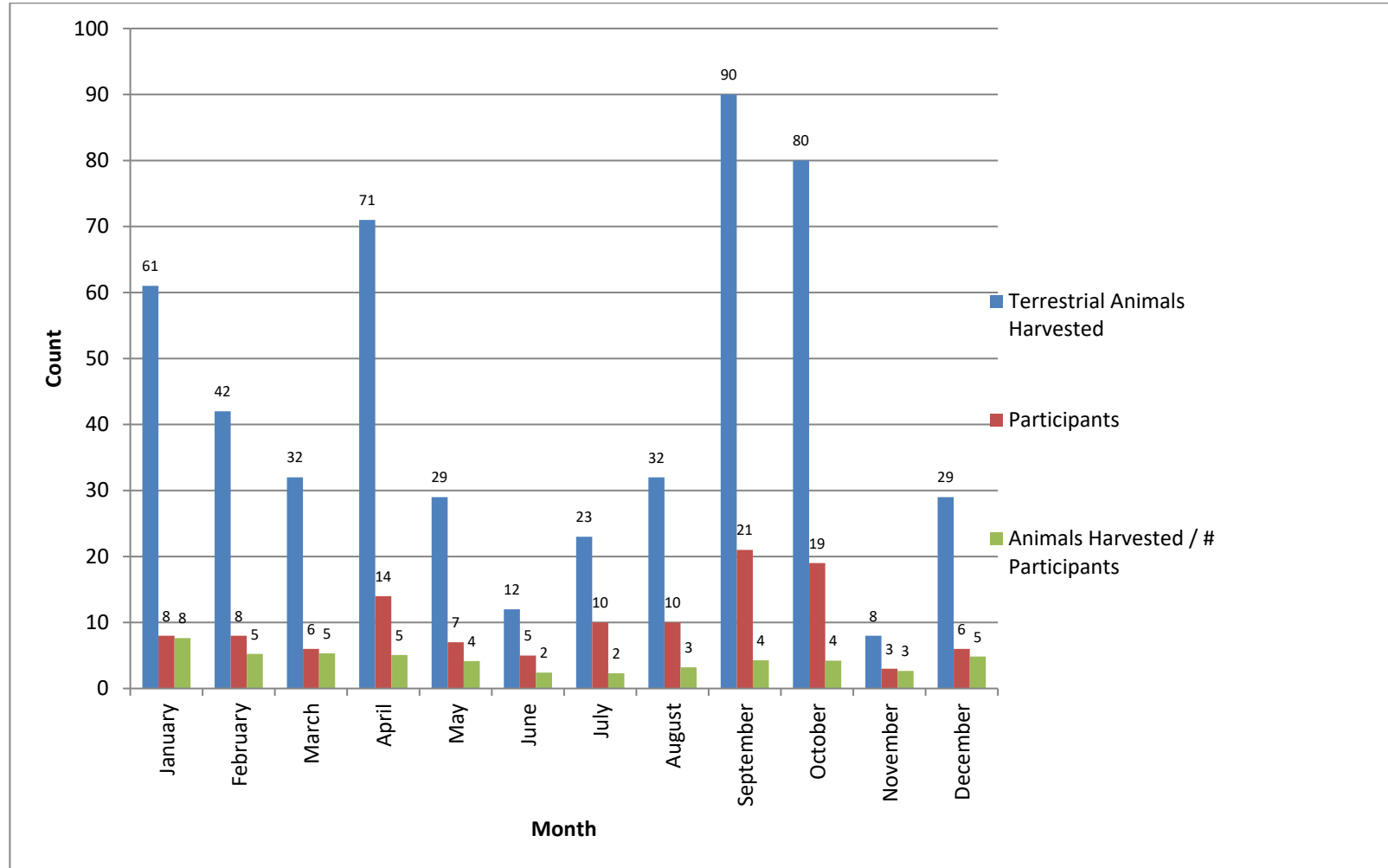
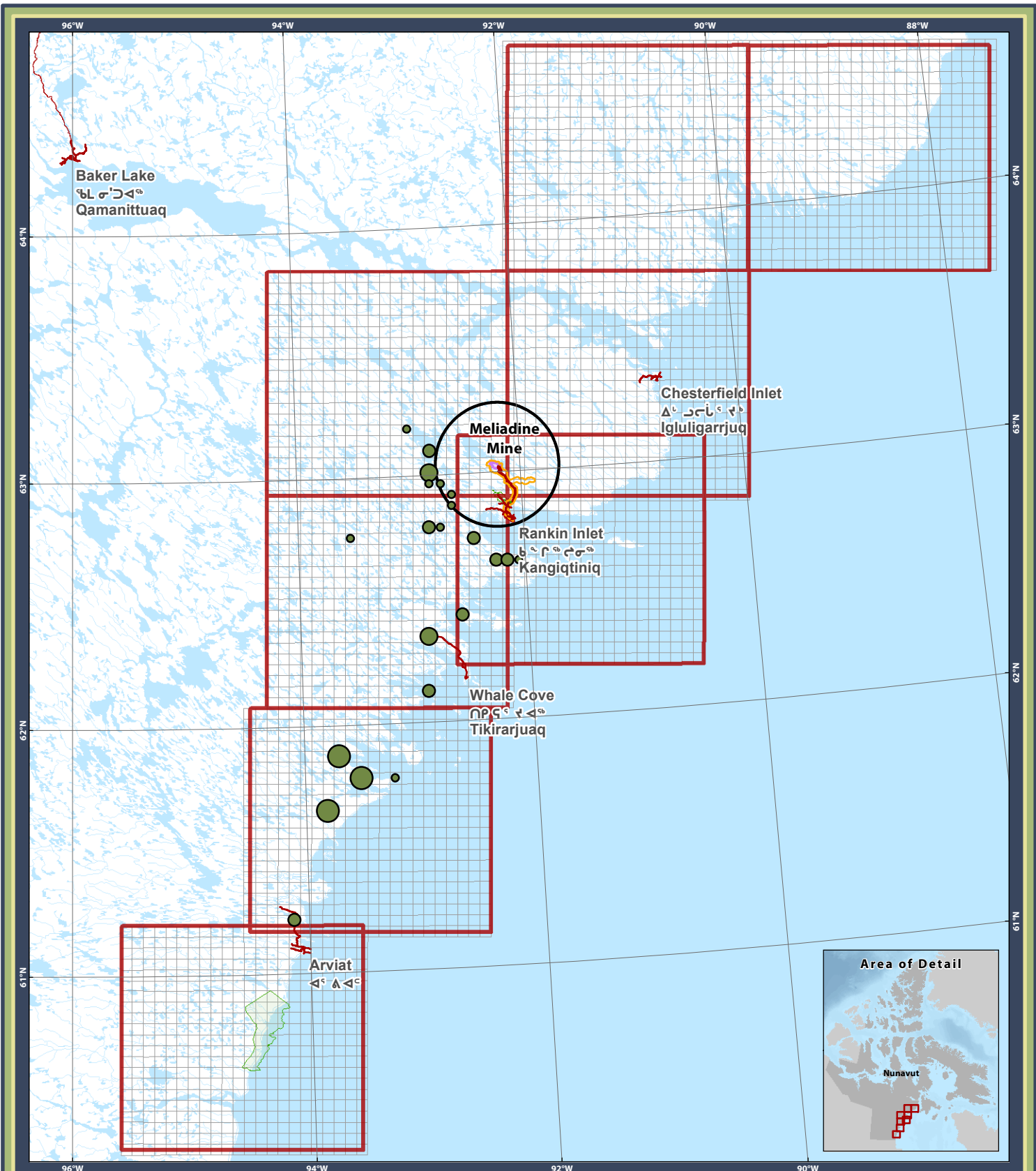


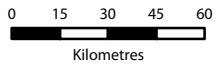
Figure 6.9: Terrestrial Animals Harvested per Month and by Participant in 2023.





**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- 
- Total Caribou Harvested
  - 1 - 2
  - 3 - 5
  - 6 - 7
  - > 8

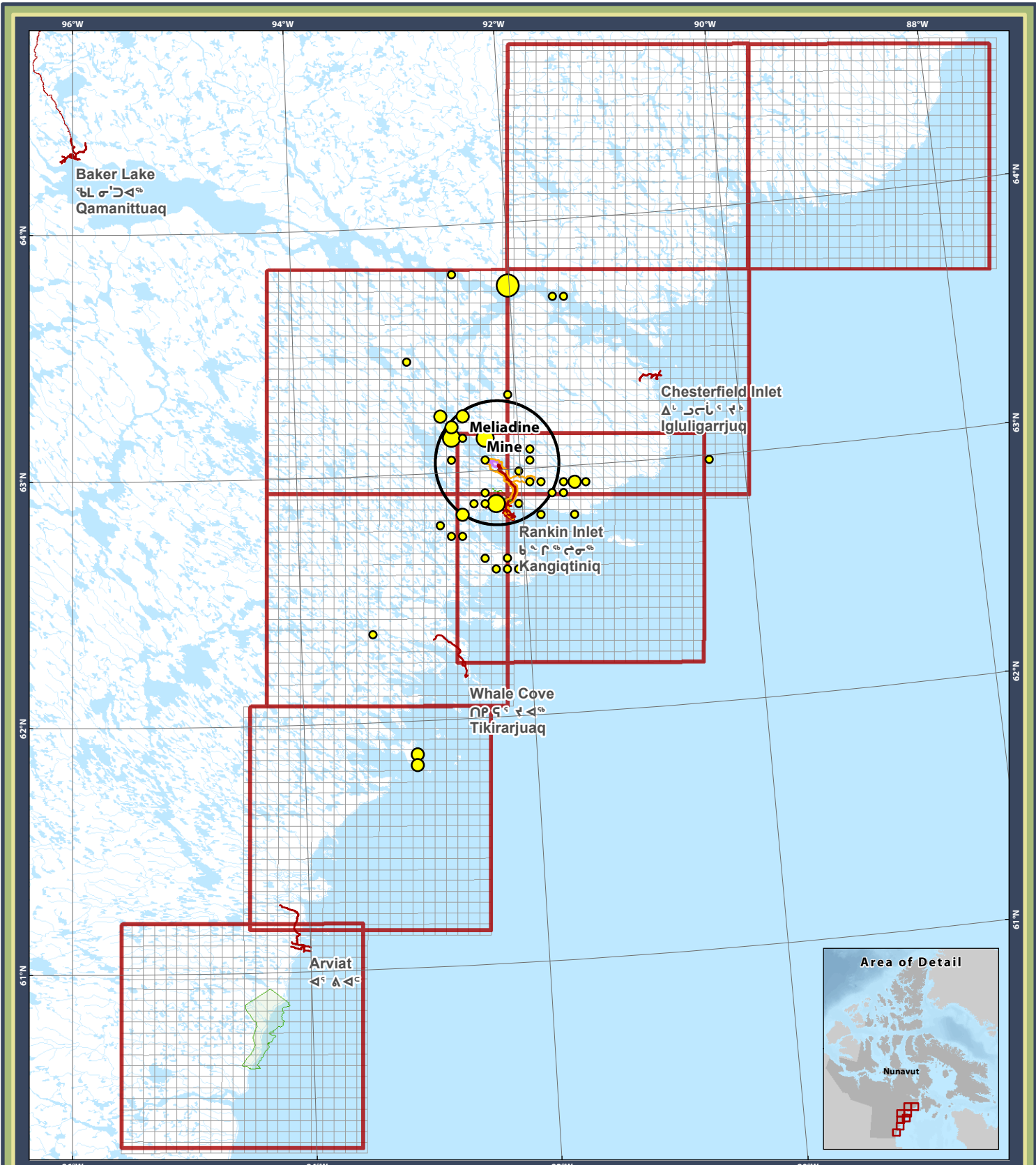


**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

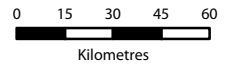
**Figure 6.11a**  
**Total Number of Caribou Harvested in Spring 2023 (Apr 1 to May 25)**  
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- 
- Total Caribou Harvested
  - 1 - 2
  - 3 - 4
  - 5 - 6
  - > 6

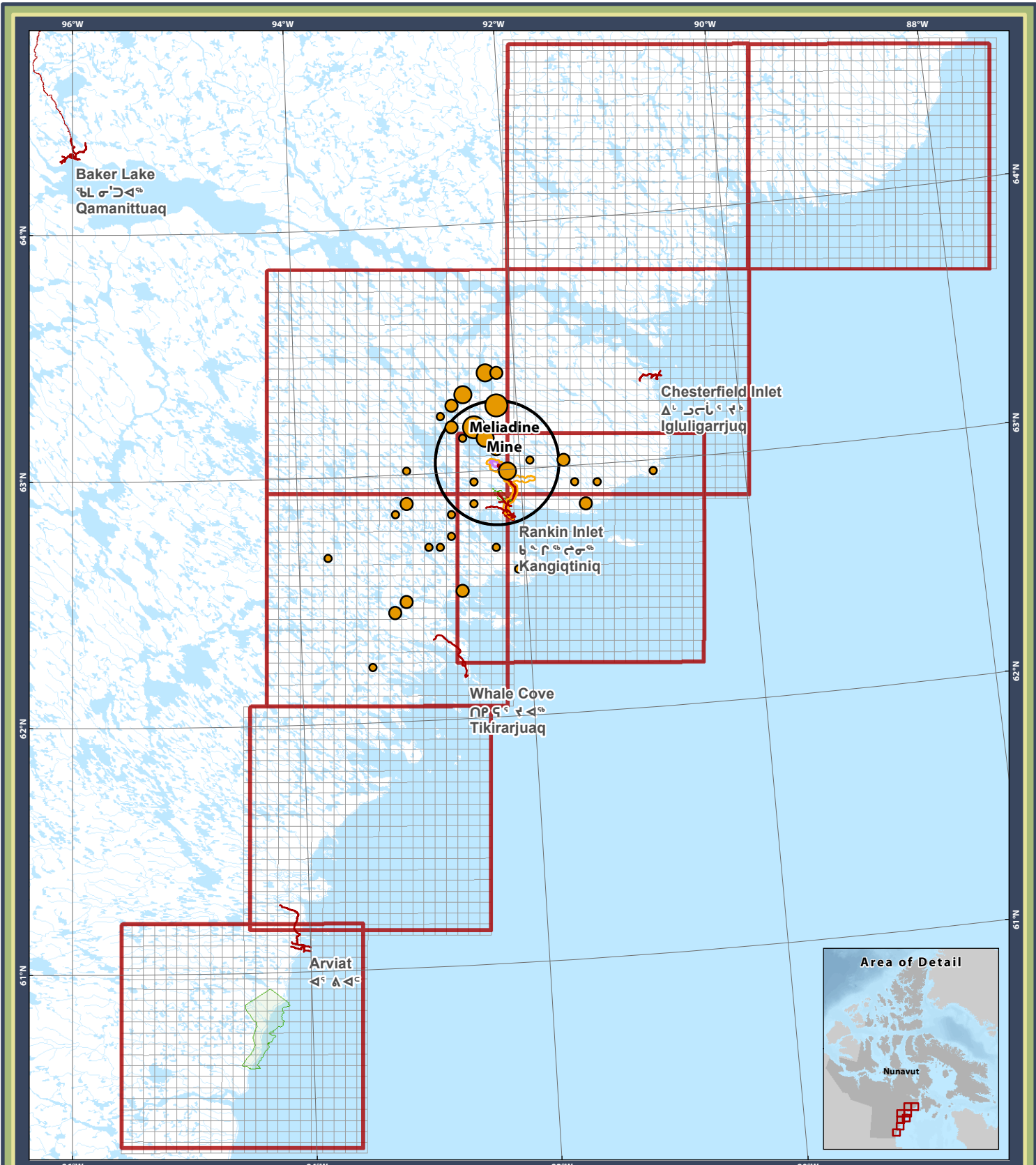


**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

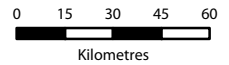
**Figure 6.11b**  
**Total Number of Caribou Harvested in Summer 2023 (May 26 to Sep 21)**  
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- 
- Total Caribou Harvested
  - 1 - 2
  - 3 - 5
  - 6 - 10
  - > 10

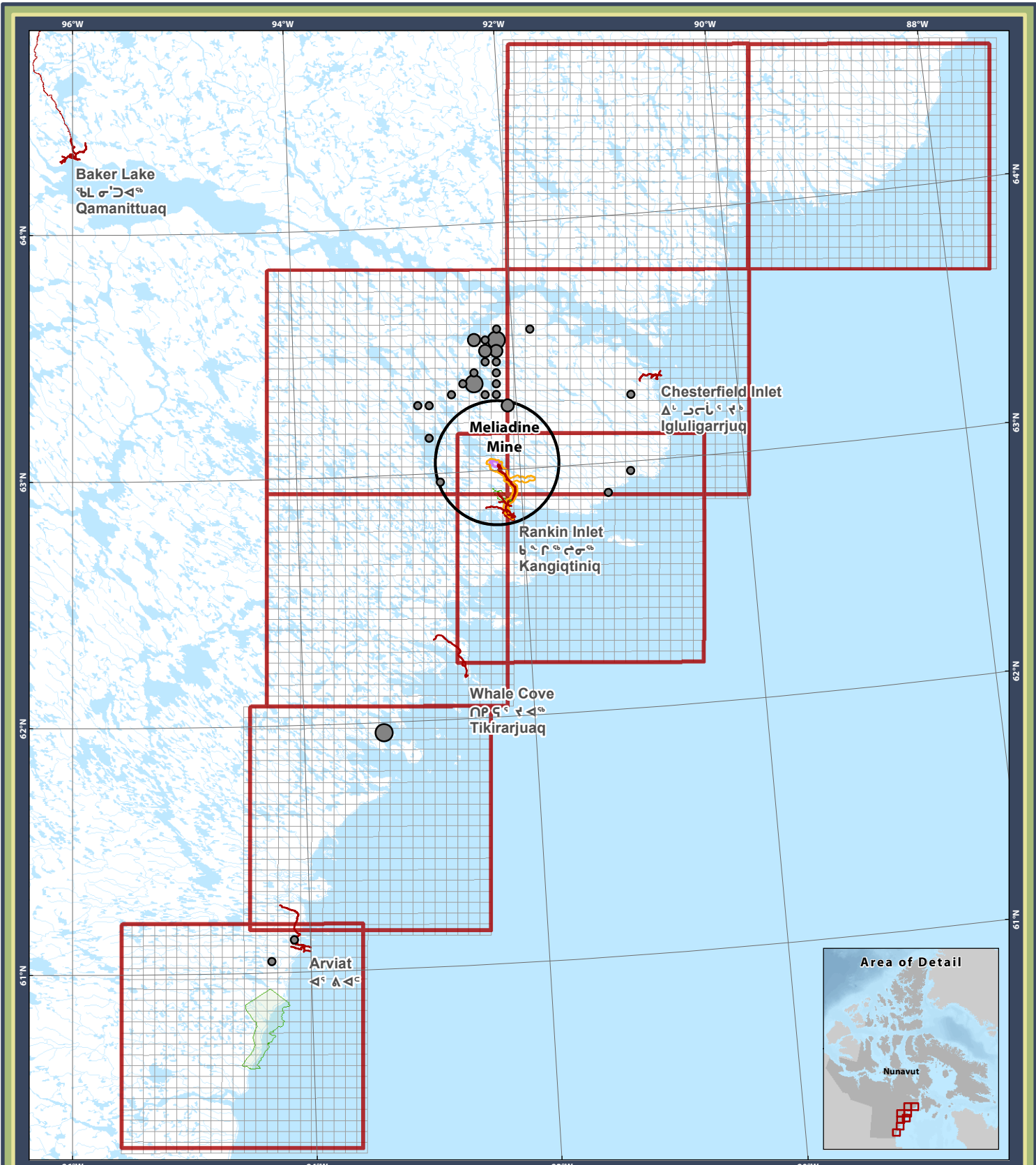


**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

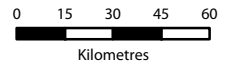
**Figure 6.11c**  
**Total Number of Caribou Harvested in Fall 2023 (Sep 22 to Dec 15)**  
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- 
- Total Caribou Harvested
  - 1 - 5
  - 6 - 10
  - 11 - 25
  - > 25



**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.11d**  
**Total Number of Caribou Harvested**  
**Winter 2023 (Dec 16 - Mar 31)**  
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:

### 6.1.5 Caribou Health

Study participants reported many incidences of sick Caribou in 2023. Most incidences were reported by harvesters in Rankin Inlet from animals in the eastern Kivalliq. Brucellosis, roundworms, eye diseases, and symptoms such as 'sand-papery' lining to organs, cysts, and nodules in the meat were commonly reported. Harvesters reported leaving the sick animals on the land for scavengers. One group of harvesters, which was reported by several of the hunters involved and adjacent friends and family, harvested 15 Caribou, of which 14 were significantly ill. Wildlife Officers and other individuals who were informed about meat testing results, indicated high prevalence of the diseases listed above. Some participants commented that a low abundance of wolves in the Rankin Inlet area was preventing the natural removal of sick, old, and weakened Caribou from the population and thus contributing to disease transmission.

## 6.2 OTHER TERRESTRIAL MAMMAL SPECIES

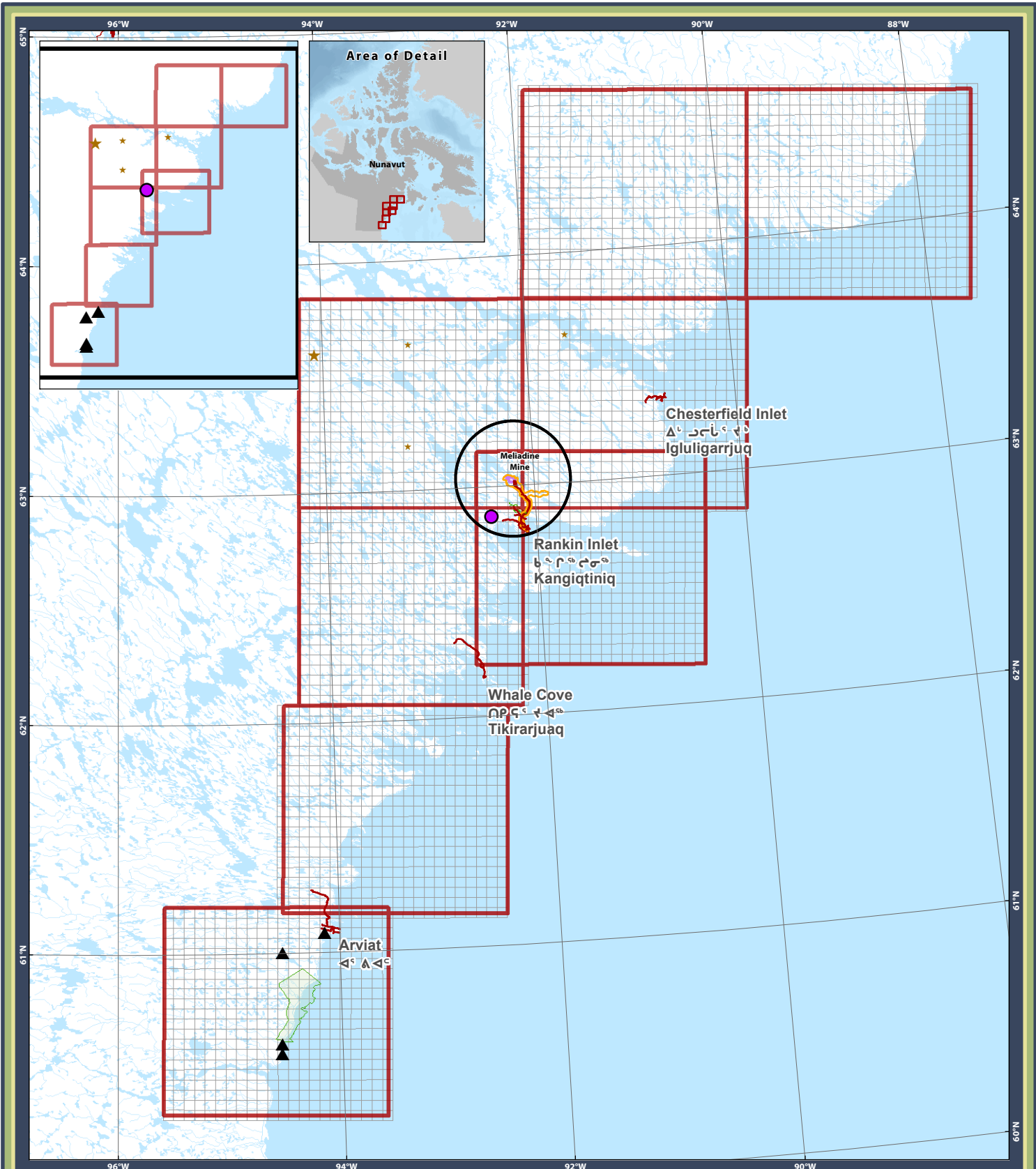
### 6.2.1 Muskox

A total of 14 Muskox harvests were reported on the Rankin Inlet HHS in 2023, which is higher than was reported in 2022 (i.e., 10 animals) and the same as in 2021 (i.e., 14). Muskox were harvested more northwest of the community of Rankin Inlet with some outside the HHS survey area (see Figure 6.14).

### 6.2.2 Wolverine, Wolf, Grizzly Bear, and Polar Bear

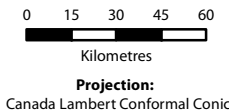
Three (3) Wolverine were reported as being harvested in 2023 compared to eight (8) in 2022 and two (2) in 2021. All Wolverine harvests within the study area were far away from the Hamlet of Rankin Inlet (see Figure 6.13). Arctic Wolf (only four reported as harvested in 2023 compared to 14 in 2022 and 18 in 2021) were all harvested outside the Meliadine Mine RSA. In general, low densities of Wolverine and Arctic Wolf, and their general aversion to humans, requires hunters to hunt well away from the AWAR. Participants reported a low abundance of wolves in the Rankin Inlet in 2023 and suggested that the high incidence of diseases in Caribou may have been because wolves were not culling the sick, old, and weakened. As was the case in 2021 and 2022, there were no reported harvests of Grizzly Bear by HHS participants in 2023.

For the first year, Polar Bear harvests were reported (i.e., 4 individuals), all of which were in or south of the Arviat area (Figure 6.12). Participants described proposed changes to Polar Bear quotas, which would permit more of the total allowable take to be allocated for commercial (sport) hunting. This proposed change is quite controversial, with many community members in support and many opposed.



**Legend**

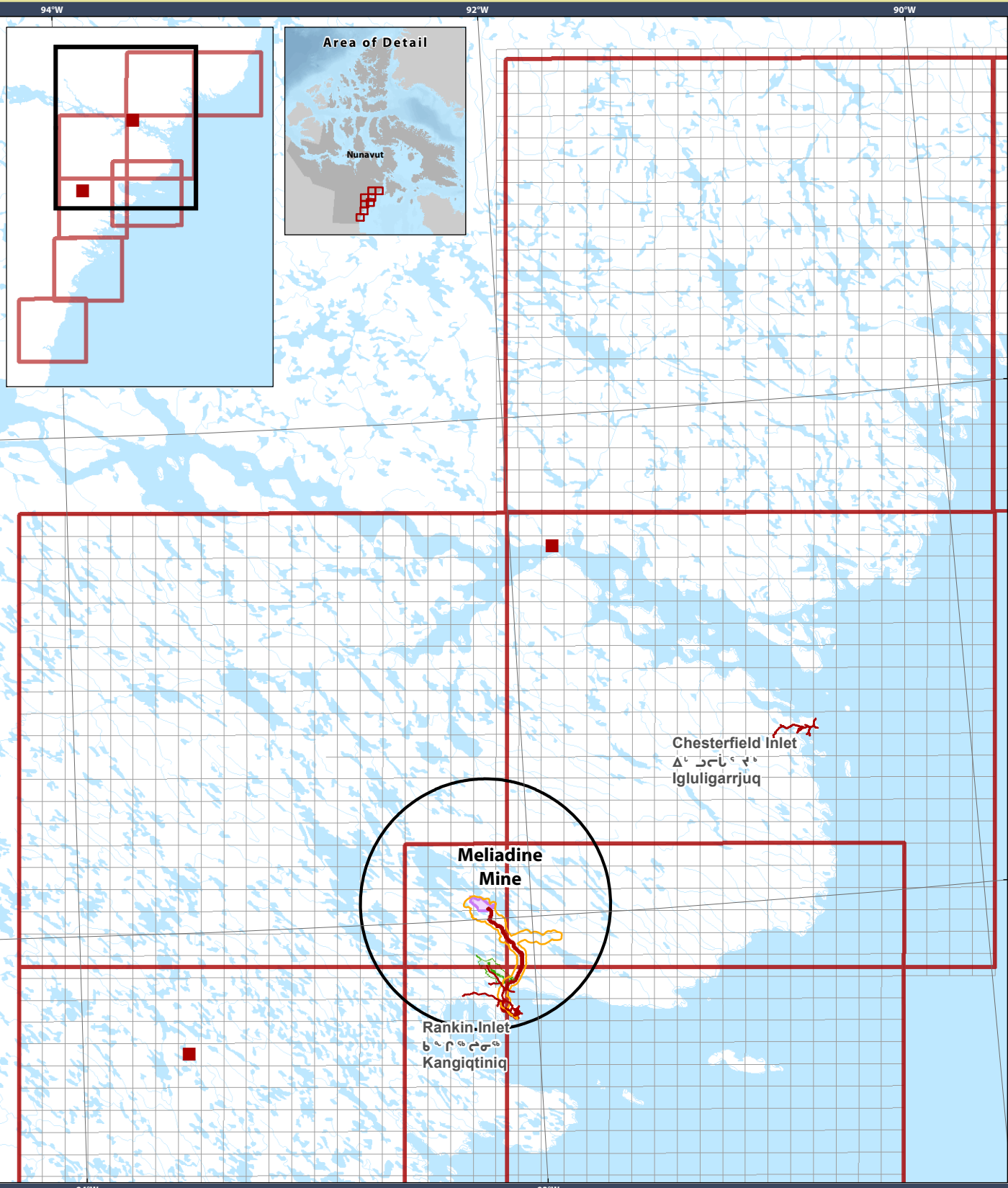
- Roads
- HHS Extents
- Local Study Area
- Regional Study Area
- Production Lease
- Parks & Protected Areas
- Total Arctic Hare Harvest**
- 1
- Total Muskox Harvest**
- 1 - 2
- 3
- Total Polar Bear Harvest**
- 4



**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Nunavut Environmental Consulting Ltd.  
 Caslys Consulting Ltd.

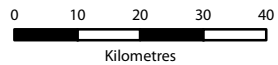
**Figure 6.12**  
**Total Number of Arctic Hare, Muskox, and Polar Bear Harvested in 2023**  
**Rankin Inlet Hunter Harvest Study**

Prepared for: By:



**Legend**

- Roads
- Total Wolverine Harvest
- HHS Extents
- Local Study Area
- Regional Study Area
- Production Lease
- Parks & Protected Areas



**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.13**  
**Total Number of Wolverine Harvested in 2023**

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:

### 6.2.3 Arctic Fox and Arctic Hare

As was the case in 2022, Arctic Fox was not reported as being harvested in 2023. Only one (1) Arctic Fox was reported as harvested in 2021. Unlike in 2021 and 2022, when seven (7) Arctic Hares were harvested near the Hamlet of Rankin Inlet, only one (1) was reported as being harvested in 2023 (Figure 6.12). One hunter in 2021 indicated that the hare fur was used primarily for women's mittens.

## 6.3 BIRD SPECIES

In 2023, 202 birds were reported as being harvested compared to 136 individuals in 2022 and 394 in 2021. Canada Goose (*Branta canadensis*) and Snow Goose (*Anser caerulescens*) made up 45% (90 individuals) of total birds harvested in 2023 compared to 65% in 2022 and 66% in 2021. Bird species reported as being harvested by Rankin Inlet HHS participants in 2023 included Canada Goose (78 individuals), Common Eider (65), gull sp. (1), goose sp. (8), Northern Pintail (*Anas acuta*; 6), ptarmigan (*Lagopus* sp.; 33), Sandhill Crane (*Grus canadensis*; 6), Snow Goose (12), and Tundra Swan (*Cygnus columbianus*; 1). Most birds were harvested in marine shoreline areas and lakes around the Hamlet of Rankin Inlet, particularly northeast of town (Figure 6.14), during the spring (i.e., May to June) migration (Figure 6.15).

## 6.4 MARINE MAMMAL SPECIES

### 6.4.1 Seals

As was the case in 2022, Ringed Seal (*Pusa hispida*) and Bearded Seal (*Erignathus barbatus*) were the only seal species reported as harvested by HHS participants in 2023. Ringed Seal was the most harvested seal species (i.e., 29 individuals vs 5 Bearded Seal). Reported seal harvests generally occurred near shoreline areas east and southeast of the Hamlet of Rankin Inlet (Figure 6.16). Bearded Seal was considered by one hunter in 2021 to be particularly delicious if prepared properly.

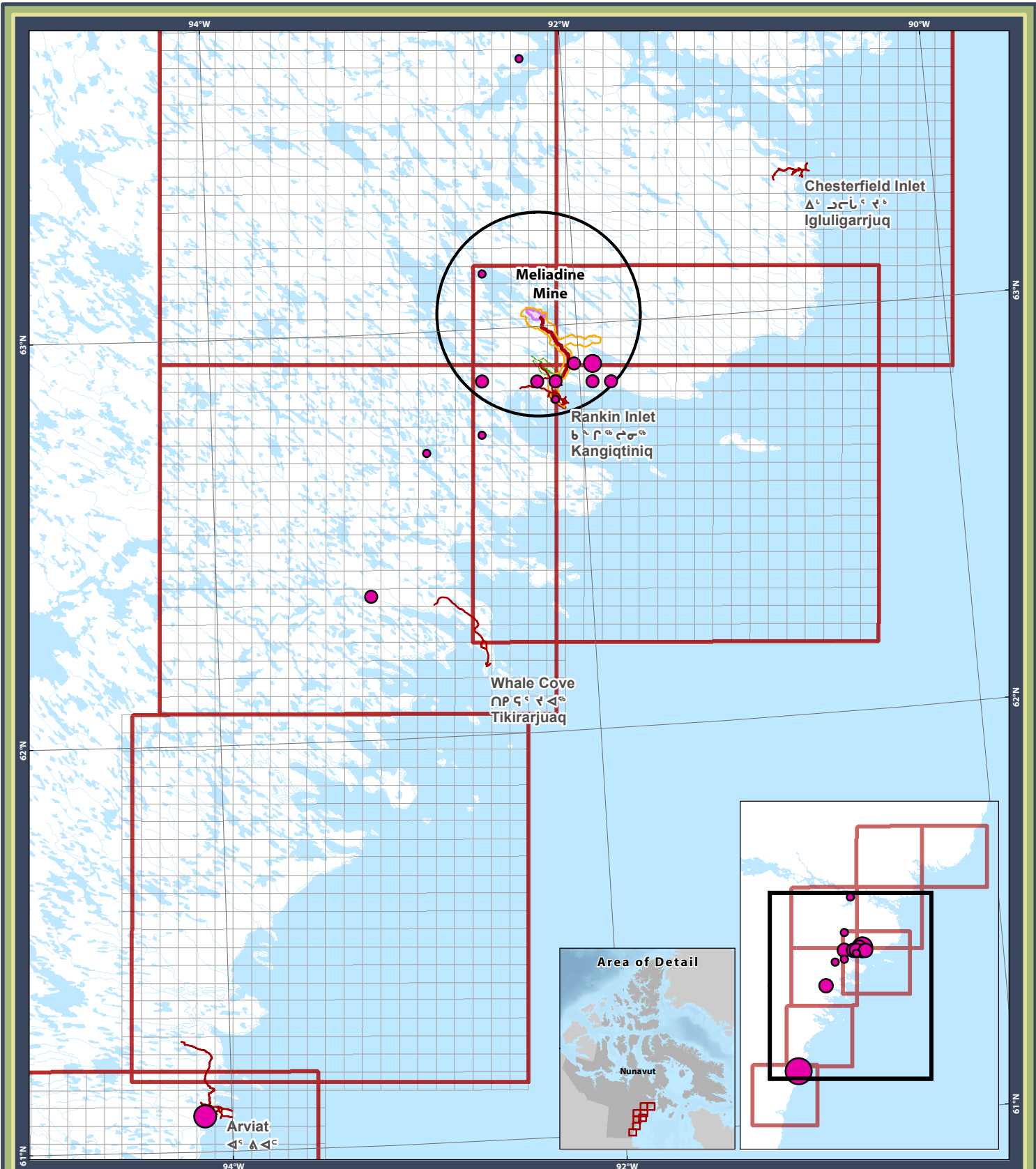
The floe edge was described by participants as being “much closer than usual” in 2023, which meant easier access to floe-edge hunting of seals. Participants also noted that travel on sea ice has become “increasingly dangerous” due to instabilities and reduced ice thickness.

### 6.4.2 Beluga, Walrus, and Narwhal

Other marine mammal species harvested in 2023 included Beluga (45 individuals) and Narwhal (*Monodon monoceros*; 2). Two (2) Walrus (*Odobenus rosmarus*) were reported as being harvested in 2023 compared to none (0) in 2022 and three (3) in 2021. Belugas were harvested in offshore areas in outer Rankin Inlet around Marble Island, in Corbett Inlet, and off Baker Foreland (Figure 6.16).

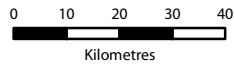
### 6.4.3 Mussels

One participant reported harvesting 816 mussels in 2022 but none were reported in 2023.



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- 
- Total Bird Harvest**
- 1 - 5
  - 6 - 20
  - 21 - 40
  - > 40



**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
Natural Resources Canada  
National Topographic Database  
Government of Nunavut  
Agnico-Eagle Mines Inc.  
Nunavut Environmental Consulting Ltd.  
Caslys Consulting Ltd.

**Figure 6.14**  
**Total Number of Birds Harvested in 2023**

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:

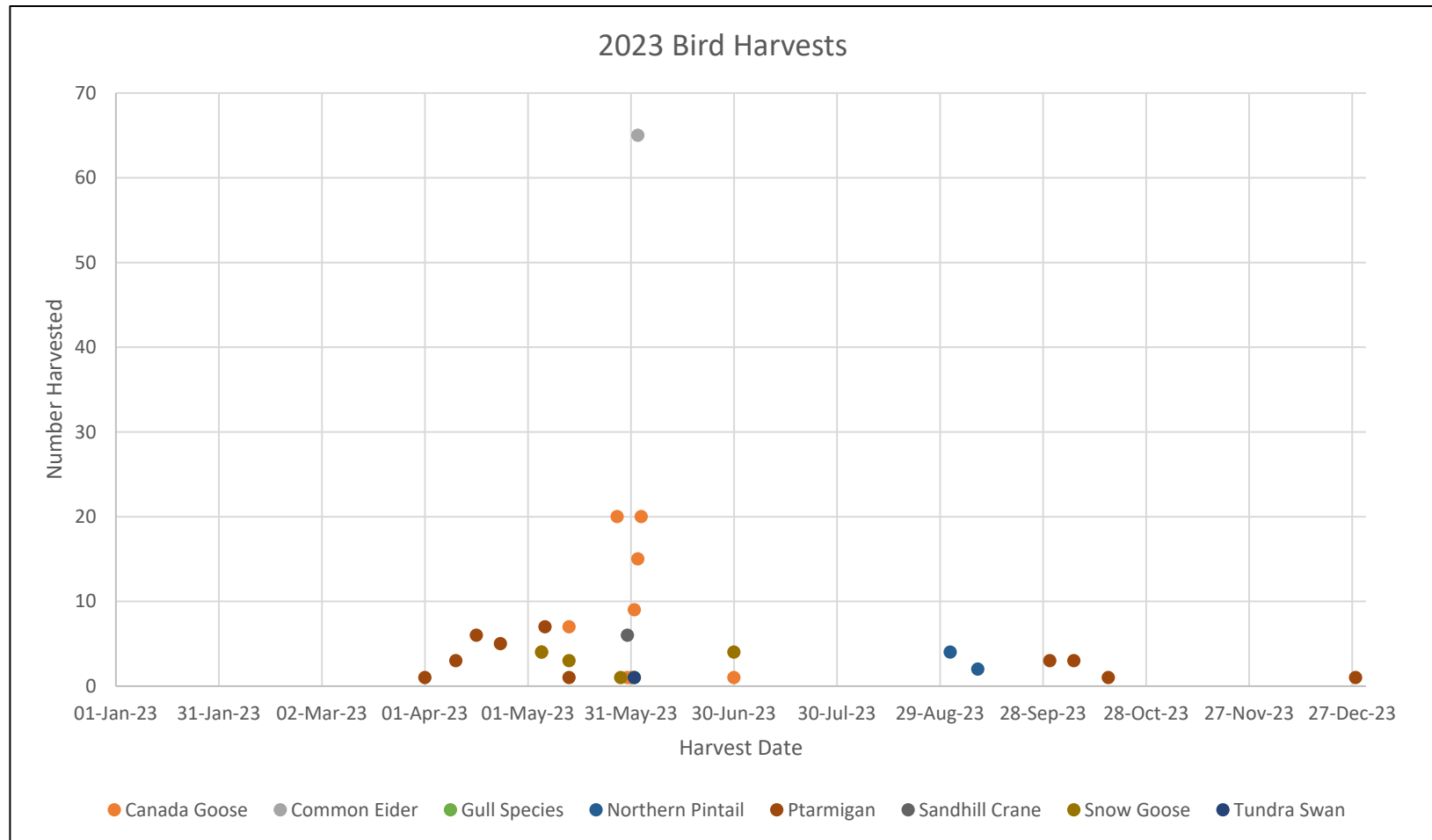


Figure 6.15: Seasonal Distribution and Number of Birds Harvested in 2023.



## SECTION 7 • CREEL SURVEY RESULTS

### 7.1 NUMBER OF FISHERMEN

The number of fishermen reporting successful fishing trips in 2023 was 33, which is higher than in 2022 (27) and 2021 (24). The highest numbers of fisherman reporting success in 2023 were in the May through August period (see Table 7.1) (see Section 7.4 Magnitude of Fishing).

**Table 7.1:** Number of Fisherman in Rankin Inlet who Recorded Fishing Success by Year and Month.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	0	0	0	4	19	10	6	4	3	2	3	1
2022	1	1	1	0	12	11	9	10	3	3	0	0
2023	0	0	0	4	7	14	11	14	6	1	5	3
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>8</b>	<b>38</b>	<b>35</b>	<b>26</b>	<b>28</b>	<b>12</b>	<b>6</b>	<b>8</b>	<b>4</b>

### 7.2 COMPOSITION OF CATCH

The most common fish species captured, Arctic Char, represented 93% of the total catch in 2023 (Table 7.2; compared to 77% in 2022 and 72% in 2021). Lake Trout (4.5%) were also captured at reasonably high numbers. The other two species that were the focus of the HHS, Arctic Grayling and Lake Whitefish, were caught at very low numbers.

**Table 7.2:** Total Number of Fish Caught from 2021 to 2023.

Species	2021	2022	2023	Total
Arctic Char	628	878	2525	4,031
Arctic Cod	12	115	54	181
Arctic Grayling	7	26	3	36
Burbot	2		1	3
Lake Trout	216	124	122	462
Lake Whitefish	3	2	6	11
<b>Totals</b>	<b>868</b>	<b>1,145</b>	<b>2,711</b>	<b>4,724</b>

### 7.3 DISTRIBUTION OF FISHING

Fishing trips, regardless of success rate, generally occurred close to the Hamlet of Rankin Inlet, in lakes and rivers west of the community up to Peter Lake, and in coastal areas east to Baker Foreland (Figure 7.1). Fishing by Rankin Inlet participants occurred to a lesser extent in the Chesterfield Inlet and Whale Cover areas (Figure 7.1). Some study participants reported fish harvests close to the Meliadine Mine AWAR (Figure 7.1).

Char harvesting at the Diana River mouth was described by participants as being abundant. New trails, improved truck roads, and many new cabins near the river have greatly increasing the number of people fishing at this spot. Not only has the crowd been described as a nuisance but many HHS participants have described a concern about over-harvesting of char.

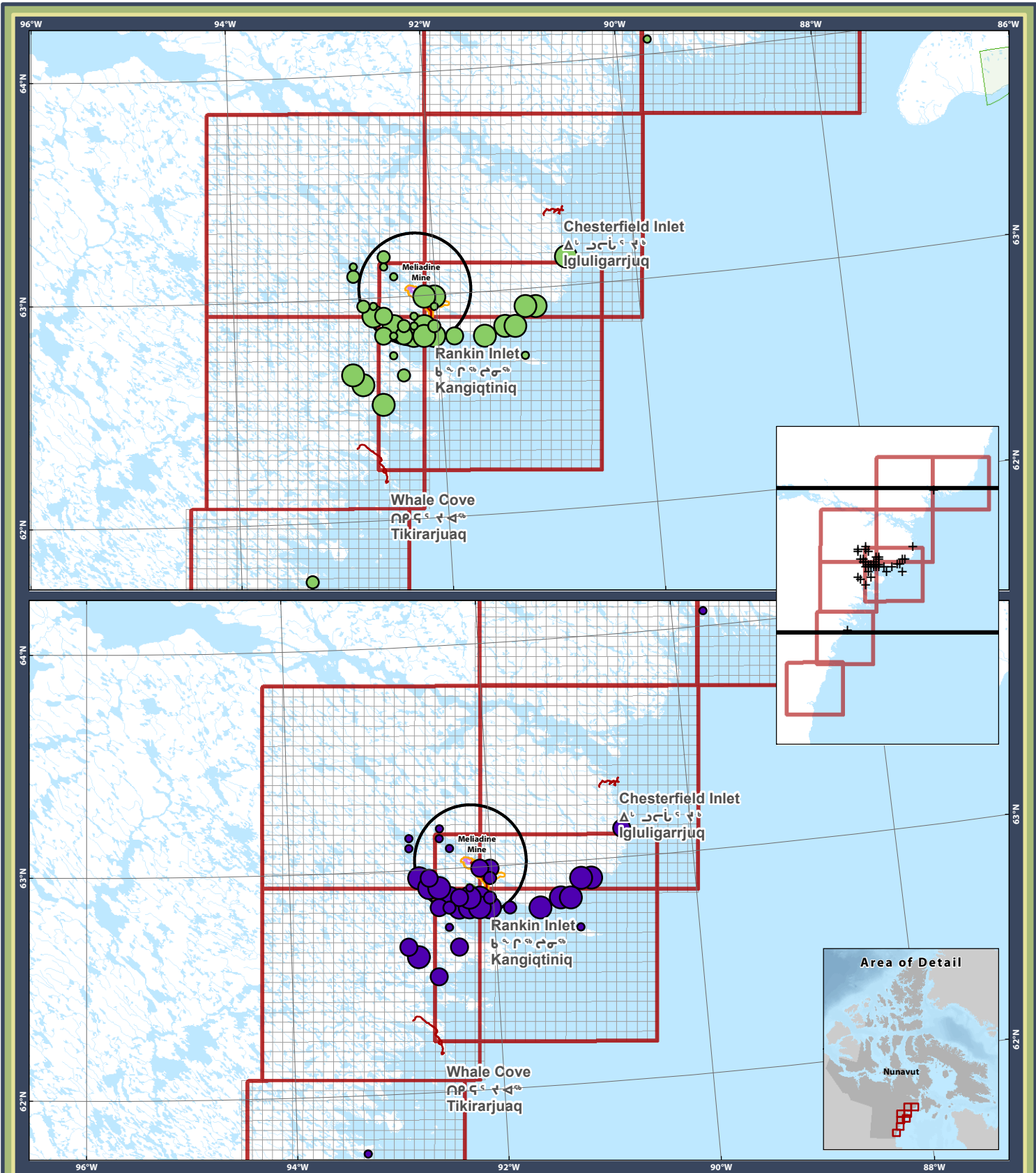
### 7.4 MAGNITUDE OF FISHING

The total number of fish harvested per fisherman in each month was highest in July and August with moderate numbers in June and December (Figure 7.2). The higher numbers in August differed from what was observed in 2021 and 2022 (Figure 7.2). In 2023, the most captured fish species, in order of abundance, were Arctic Char, Lake Trout, Arctic Cod, and Lake Whitefish (see Table 7.2).

The increased access at the Diana River mouth has been described as a positive, providing food for more families and connecting more people with traditional harvesting techniques. This is especially true of the fish weir, which is present near the river mouth and enables efficient harvest of many fish. Seen as both a positive for providing healthy, local, country food to many people in the community, and a negative as a potential cause of overfishing char stocks.

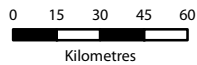
### 7.5 SEASONAL TIMING OF FISHING

In 2023, fishing periods with the most active fisherman was from June through August (see Table 7.1) while the greatest number of fish caught was July and August (Figure 7.2).



**Legend**

- Roads
  - HHS Extents
  - Local Study Area
  - Regional Study Area
  - Production Lease
  - Parks & Protected Areas
- |                           |                                       |
|---------------------------|---------------------------------------|
| <b>Total Fish Harvest</b> | <b>Average Number Fished per Trip</b> |
| 1 - 5                     | 1 - 3                                 |
| 6 - 10                    | 4 - 5                                 |
| 11 - 20                   | 6 - 10                                |
| > 20                      | > 10                                  |



**Projection:**  
Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Nunavut Environmental Consulting Ltd.  
 Caslys Consulting Ltd.

**Figure 7.1**  
**Total Number of Fish Harvested in 2023**

**Rankin Inlet Hunter Harvest Study**

Prepared for: By:

ENVIRONMENTAL CONSULTING LTD

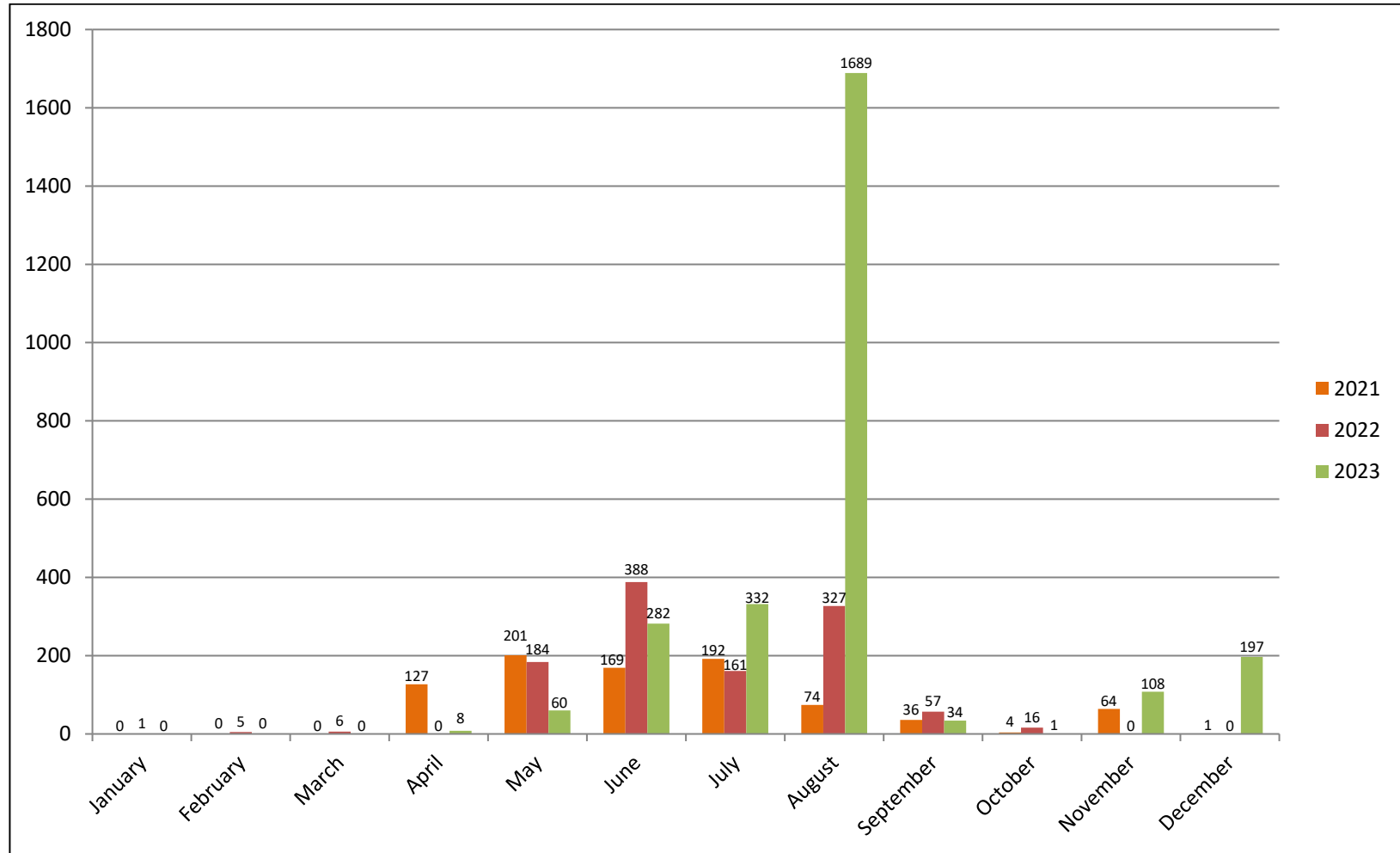


Figure 7.2: Total Number of Fish Caught by Month from 2021 to 2023.

## SECTION 8 • ACCURACY OF IMPACT PREDICTIONS

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The TEMMP indicates that project effects determinations and threshold levels for Caribou harvest will be set after three full years of data from the Rankin Inlet HHS and following discussions with the Government of Nunavut. A Caribou harvest threshold will be discussed within the TAG prior to including this information in the TEMMP. A detailed analysis of current and historical data for this report determined that the average number of Caribou harvested per participant has increased within the HHS boundaries, although this result is less evident within the RSA. The increase in average harvest per participant does not necessarily indicate an increase in overall harvest rates. The demand for country meat and the increase in guide outfitters in the last few years are also factors that need to be considered when analyzing Caribou harvest rates.

A more detailed description of data and data analysis limitations are included below:

- 1) Methodologies and participation rates are different between the two studies, making comparisons of some results difficult as the differences may be due to these factors and not hunting activities;
  - Only data from the Rankin Inlet hunters, and not other community hunters, is being analysed. Because harvesting of Caribou within the RSA from other community hunters is not included, this could affect the total number of Caribou harvested and potentially change the differences in the average number of Caribou/participant statistics.
  - Spatially, the two studies have different specifications on how the location of harvests was reported. The Rankin Inlet HHS is represented by a 5x5 km area, whereas the NWMB is represented by specific locations (points). Although the NWMB data may have been collected using a grid pattern, it is different than the Rankin Inlet HHS specifications, meaning that the results have a minimum accuracy of +/- 5 km.
- 2) The analysis does not consider seasonality of Caribou occurrence or differences in movement patterns between the two time periods; therefore, changes in harvest rates could be due to availability of Caribou within the study area; and
- 3) Several other factors that could affect hunting practices and distribution have not been considered in this analysis. Examples include:
  - Climate change – changing landscapes, ice and snow conditions, and weather could be affecting when and where the hunters are able to hunt at certain times of year, and the movement patterns of Caribou.
  - Hunting motivations – patterns in hunting for profit or providing for family and community may be different between the two time periods.

## SECTION 9 • MANAGEMENT RECOMMENDATIONS

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The Rankin Inlet HHS and Creel Survey should be continued on an annual basis to monitor the hunting and fishing patterns of Rankin Inlet residents, and the potential effects of the mine and AWAR. Meetings with participants in 2024 will be particularly important in maintaining contact, building relationships, expanding the study, and collecting good harvest data.

Furthermore, ongoing collaboration with the KHTO will ensure that the HHS program runs smoothly, incorporates local IQ, TK, and community concerns, and increases participant rates.

Participation rates can be maintained and enhanced by continuing to use social media platforms such as Facebook and Instagram, expanding connections on these platforms, ensuring that all participants are visited during the three scheduled field visits, and continuing with distribution of the well-received year-end prizes while in the community. In 2023, recruitment efforts resulted in new participants joining the study. Recruitment efforts should be ongoing to bring on other participants in 2024.

## APPENDIX A

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### 2023 Rankin Inlet Hunter Harvest Study Calendar





Seal Hunting Success

Darren Aupilardjuk









# March | ᐃᑦᓂᐱᑦ 2023

Rankin Inlet Harvest Study  
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# April | ገጥሙ 2023

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<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>  Earth Day
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# June | ᐱᓐᓂᓐ 2023

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Father's Day			National Indigenous Peoples Day			
25	26	27	28	29	30	



Not too Close

AJ Curley





Sunset on the Tundra

Andre Aokaut





Waiting

Neil Ammaklak





The Work Begins

Tommy Makkigak





Plenty of Snow Geese

Darren Ikakhik

# November | ᐃᑦᑕᑦᑎᑦᑲᑦ 2023

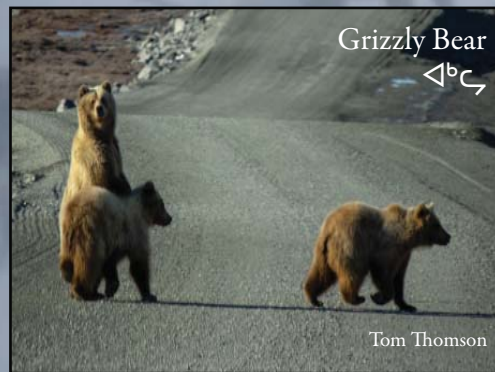
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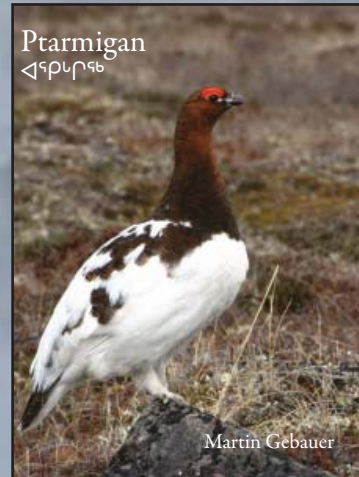




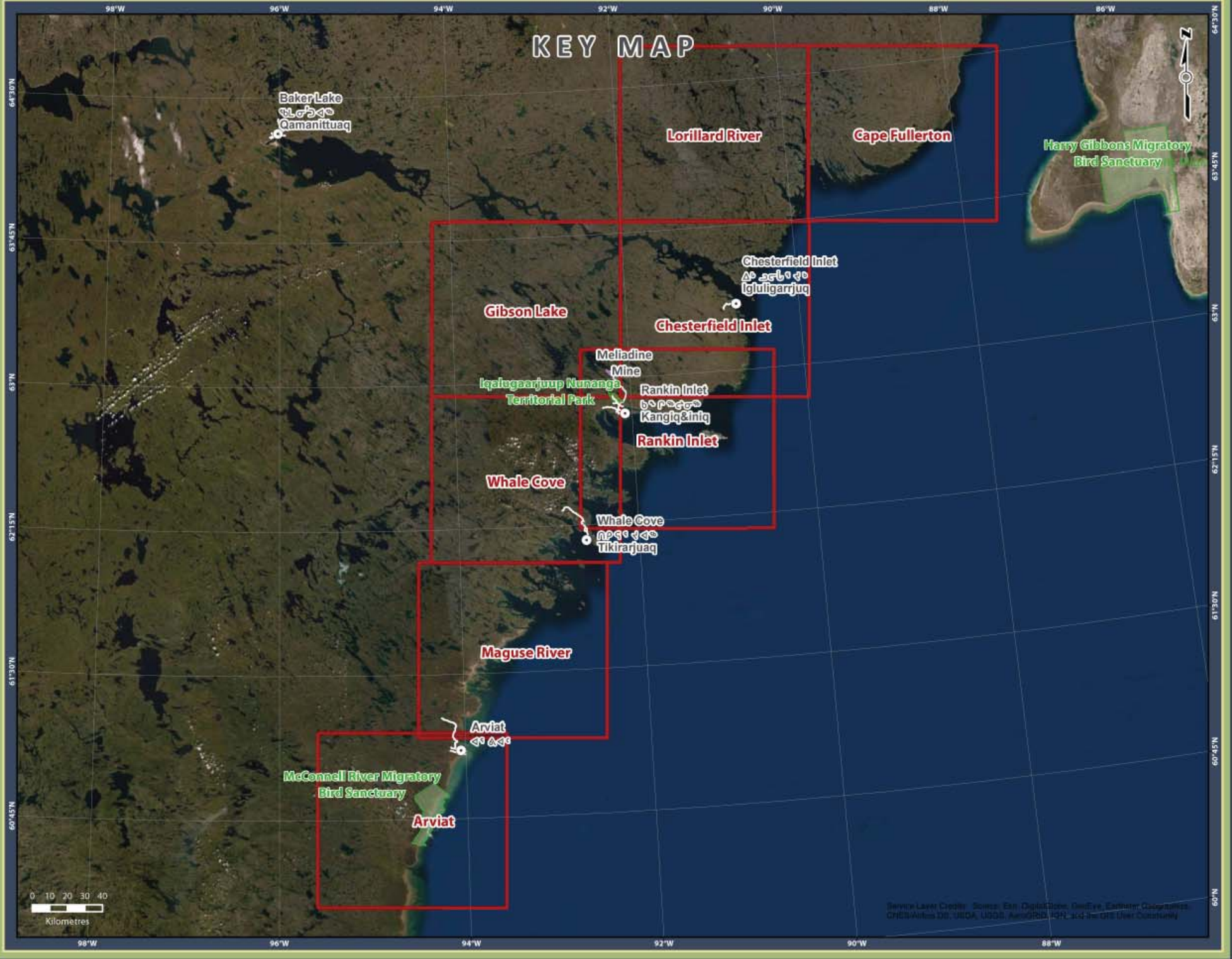
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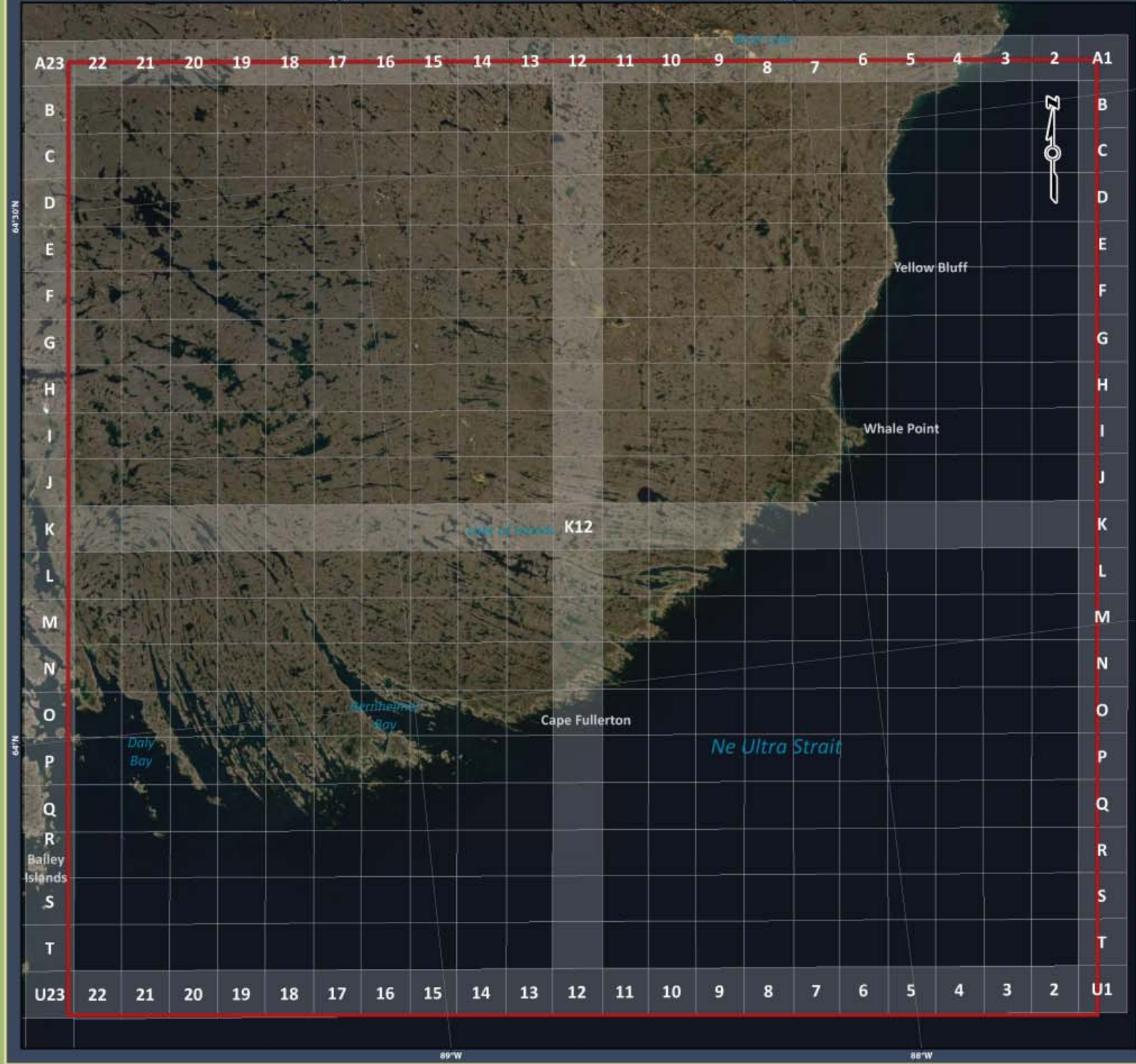


# Wildlife and Fish Species of Interest



# KEY MAP



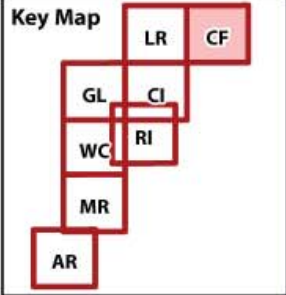


N 05.19

N 64.19

# Rankin Inlet Harvest Study

## Cape Fullerton



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:

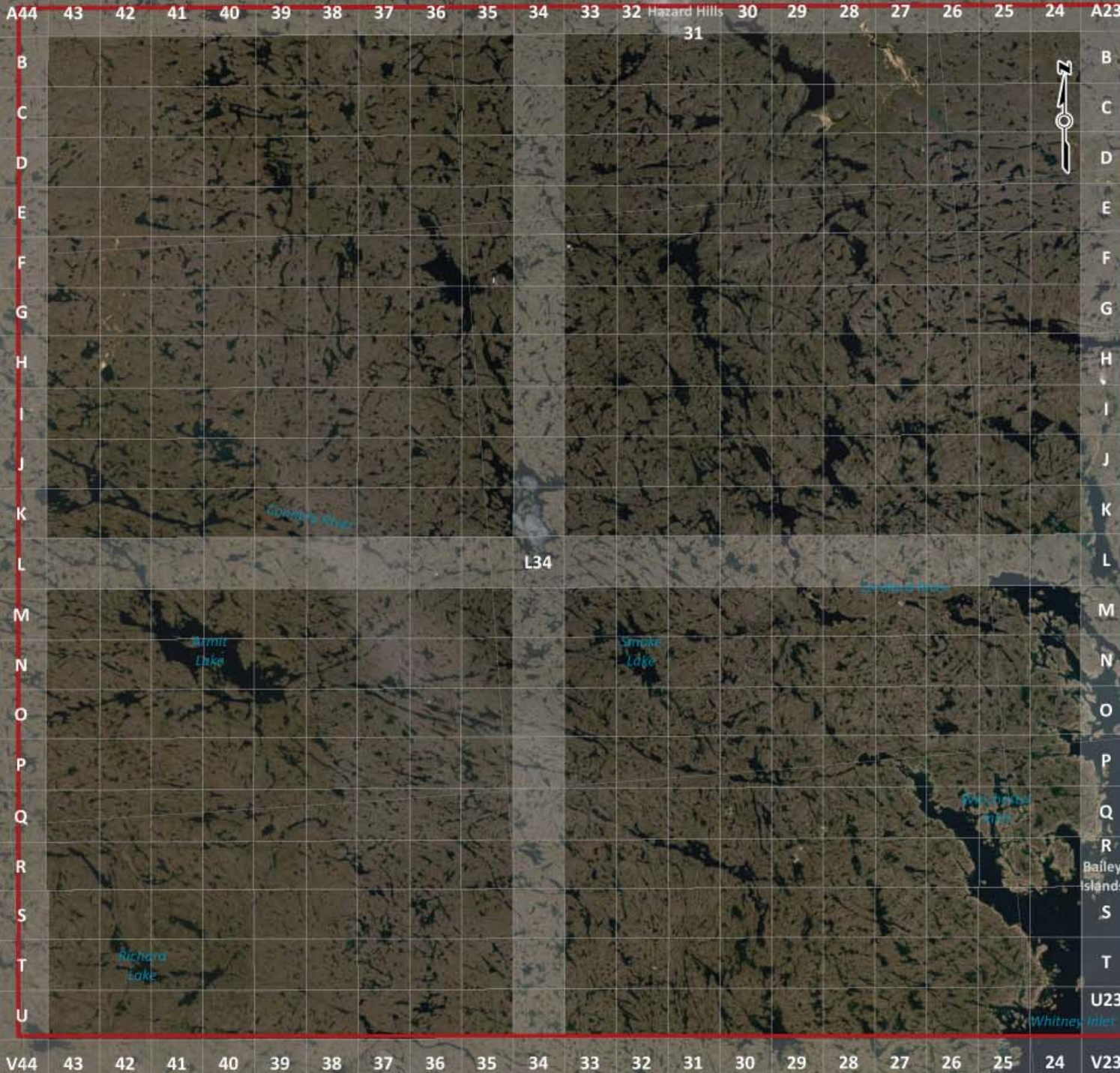


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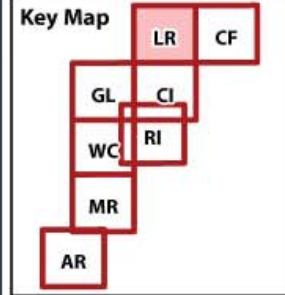
91°W

90°W



# Rankin Inlet Harvest Study

## Lorillard River



### Area of Detail



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:



By:



92°W

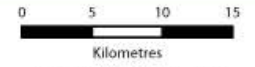
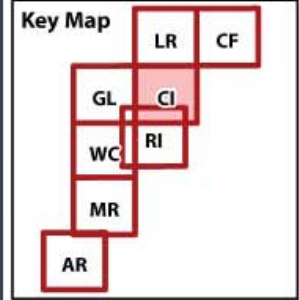
91°W

90°W



### Rankin Inlet Harvest Study

### Chesterfield Inlet



**Projection:** Canada Lambert Conformal Conic

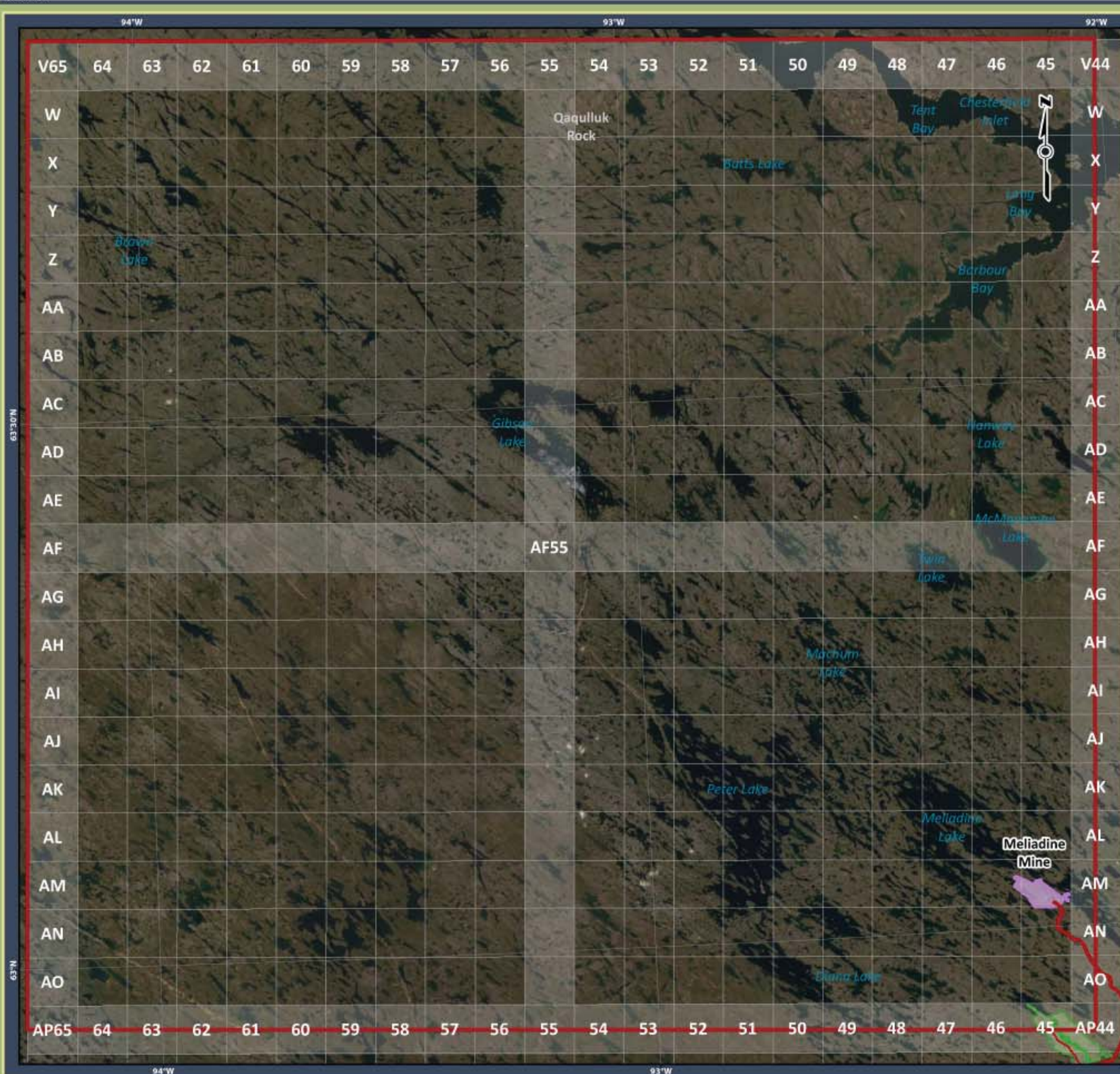
**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:



By:



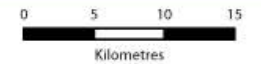


# Rankin Inlet Harvest Study

## Gibson Lake



### Area of Detail



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:



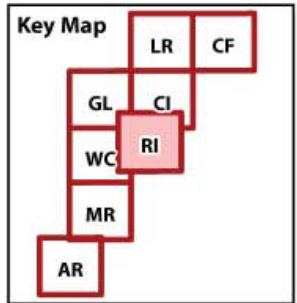
By:





# Rankin Inlet Harvest Study

## Rankin Inlet



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:



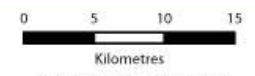
By:





# Rankin Inlet Harvest Study

## Whale Cove



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:

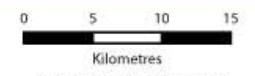
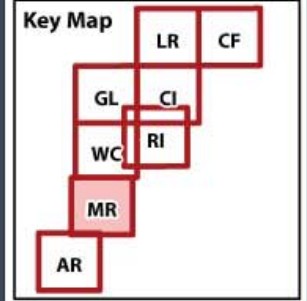
By:

62°55'N  
62°50'N  
62°45'N  
62°40'N  
62°35'N  
62°30'N  
62°25'N  
62°20'N  
62°15'N  
62°10'N  
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60°05'W  
60°00'W



# Rankin Inlet Harvest Study

## Maguse River



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:



By:




62°N

61°30'N

94°W

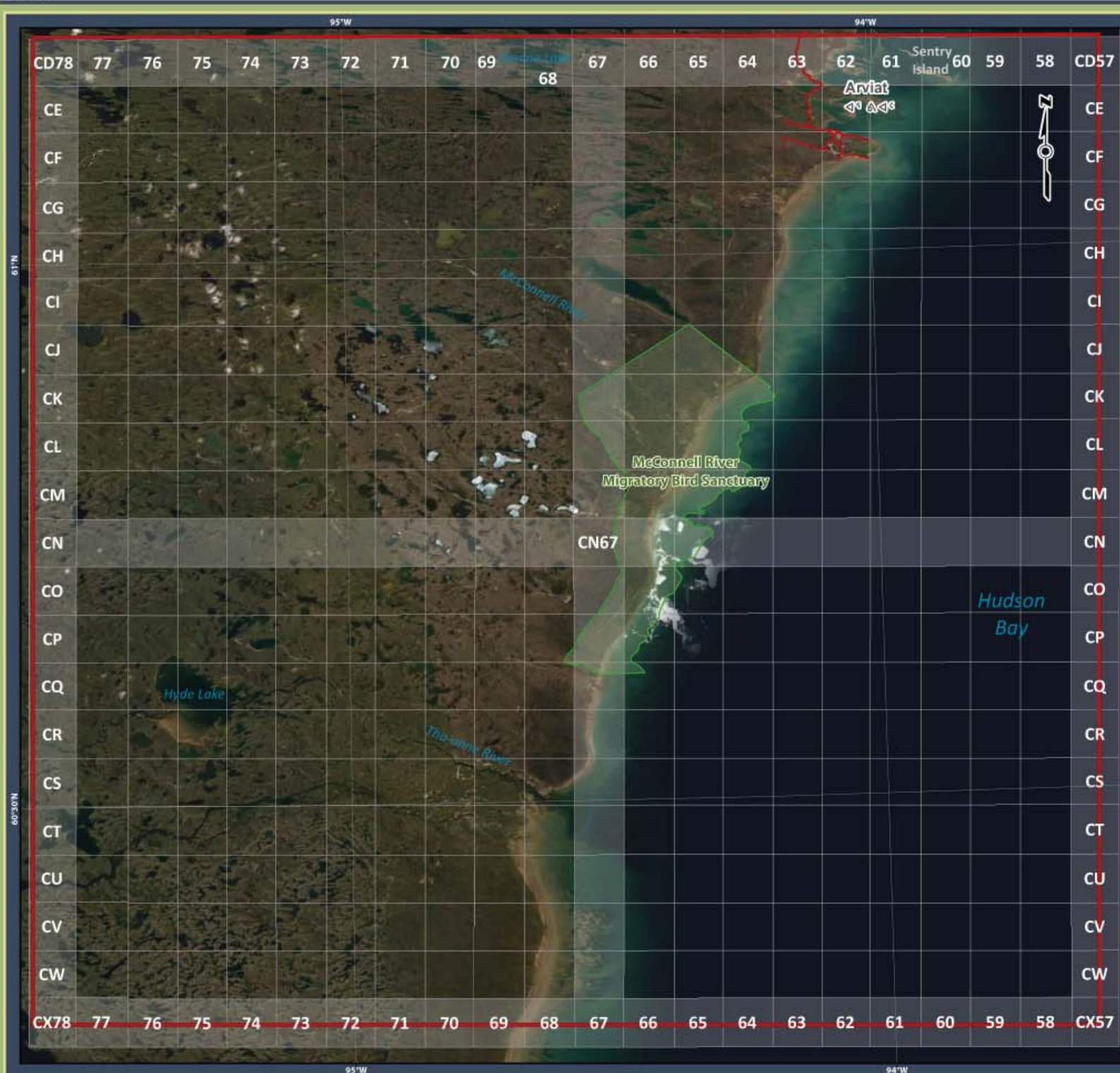
93°W

62°N

61°30'N

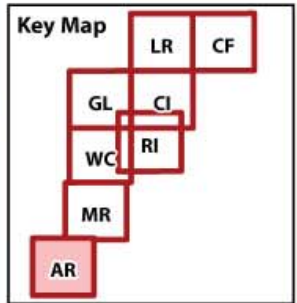
94°W

93°W



# Rankin Inlet Harvest Study

## Arviat



**Projection:** Canada Lambert Conformal Conic

**Data Sources:**  
 Natural Resources Canada  
 National Topographic Database  
 Government of Nunavut  
 Agnico-Eagle Mines Inc.  
 Caslys Consulting Ltd.

Prepared for:

By:



Produced By:



and



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