Appendix H-6

TEMMP report

Report

Agnico Eagle - Meliadine Division

2018 Terrestrial Effects Monitoring and Mitigation Program Annual Report

Submitted to:

Agnico Eagle Mines Limited

Attention: Martin Theriault/Nancy Duquet Harvey

Submitted by:

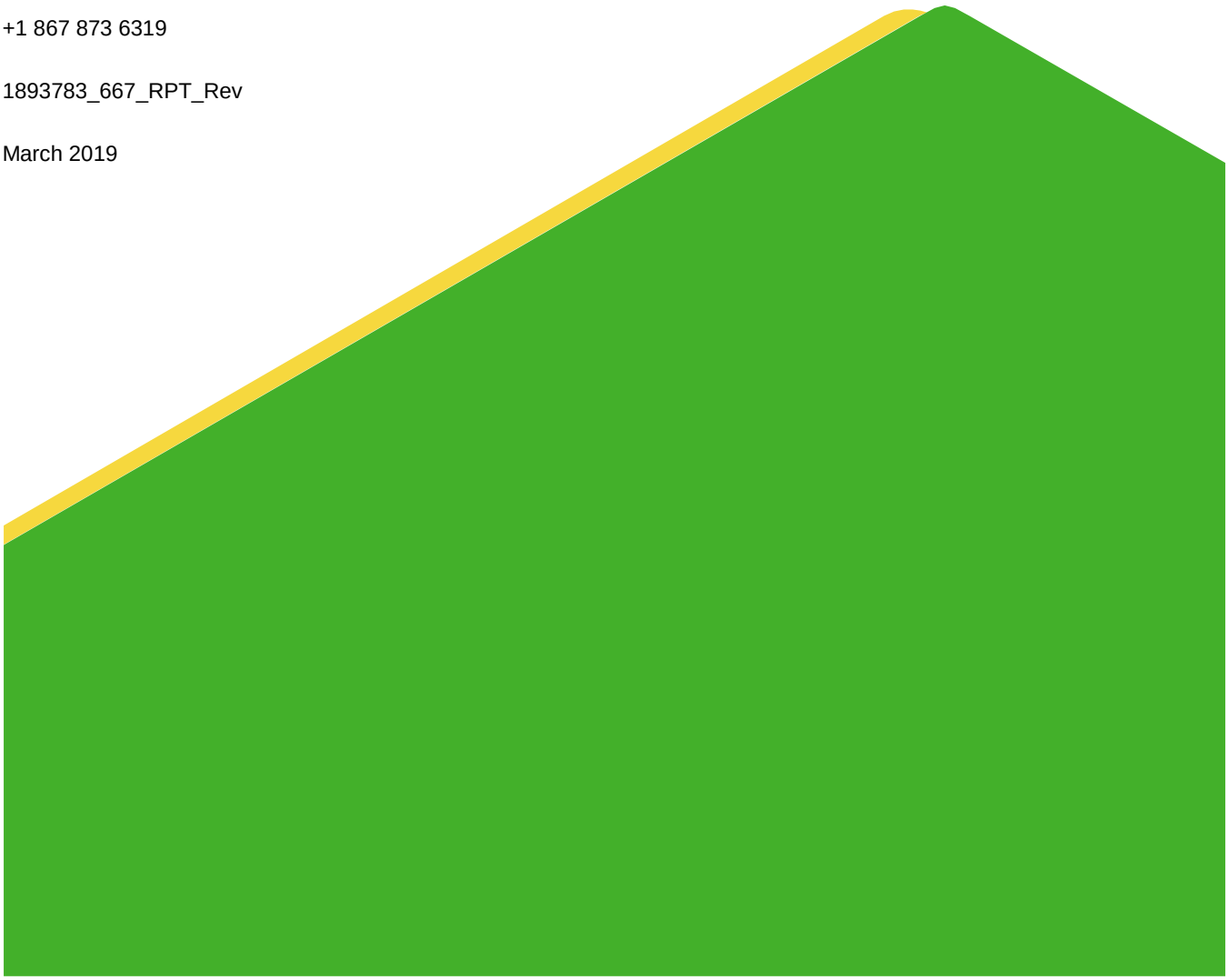
Golder Associates Ltd.

4905 - 48 Street Yellowknife, Northwest Territories, X1A 3S3 Canada

+1 867 873 6319

1893783_667_RPT_Rev

March 2019



Distribution List

Electronic Copy - Agnico Eagle Mines Limited

Electronic Copy - Golder Associates Ltd.

Executive Summary

The Agnico Eagle Mines Limited (Agnico Eagle) Meliadine Gold Mine (the Project), received a Project Certificate (No. 006) from the Nunavut Impact Review Board (NIRB) in February 2015. A conceptual Terrestrial Environment Mitigation and Management Plan (TEMMP) for the Project 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. This report addresses requirements of the Project Certificate (No. 006) (Appendix A).

The objectives of the Terrestrial Effects Monitoring and Mitigation Plan (TEMMP) Report are to summarize annual data (2018) 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 Project. The data was collected according to procedures outlined in the Project's Standard Operating Procedures and the TEMMP. The 2018 annual report describes monitoring objectives and methodology, 2018 annual results, mitigation activities, and management recommendations based on 2018 monitoring results. The following report documents results collected for the 2018 TEMMP for the Meliadine Project located in the Kivalliq Region of Nunavut.

Incorporation of Inuit Quajimajatuquangit

- When possible, field programs in 2018 were guided by Inuit Qaujimajatuqangit (IQ), including the assistance of local field assistants. Annual contributions from Inuit to the monitoring programs are presented in Table 8.1-1.

Direct Habitat Loss

- In 2018, a total area of 484 ha has been altered due to Project construction, representing 29% of the Predicted Project footprint (1,682 ha). Table 1.2-1 summarizes the impacts by each vegetation community/habitat type. Of the total project impacted habitat, 343 ha is vegetated heath types (36% of the predicted impacts), 95 ha is wetland riparian types (22% of the predicted impacts) and 6 ha of un-vegetated sand community (75% of predicted impacts).
- The project has altered 46 ha of unvegetated areas, representing 16% of the Predicted Project footprint. Of these, 40 ha (14% of the predicted project footprint) are associated with waterbodies and watercourses.

Indirect Habitat Loss

- Indirect habitat loss for caribou and wildlife habitat (soils and vegetation) was not assessed in 2018.

Wildlife Observations

- Between 4 January and 27 November there were 214 incidental wildlife observations among 13 different species comprising approximately 7,187 individual animals.

Wildlife Track Surveys

- On-site wildlife track surveys were conducted on 3 and 23 November 2018 and 8, 15 and 25 of December 2018.
- All observations were limited to arctic fox hare tracks - no caribou tracks were observed.
- A predatory mammal observation report was completed for wolf tracks which were observed on the main camp site on April 10, 2018, and for two polar bears observed on November 10, 2018.

Nest Relocation

- In July 2018, an active Common Redpoll nest was observed within an active construction zone.
- A Damage or Danger Permit (the permit) was issued under the Environment Canada Migratory Birds Regulations (MBR), which authorized the relocation of the migratory birds, eggs (3) and nest.
- The nest and eggs were successfully relocated, allowing the birds to fledge.

Incidents and Mortalities

- A gosling was found deceased near the Meliadine Lake gen set area. It is believed to died on the lake of unknown causes and was brought to shore through wave action.
- A total of 22 arctic foxes were trapped and dispatched by on GN DoE officers in 2018. (Table 6.3-1). The mortality rate varies based on frequency of trapping by GN DoE officers.

Wildlife Deterrents

- Bird deterrent canons were initially deployed on P1 and P3 dykes on June 21, 2018. Shortly after deployment, a deterrent canon was moved to the landfarm at the request of the NIRB. Concerns were raised about the canons impacts on caribou and other wildlife at which point canons were removed on July 2, 2018 (D. Gorton, Agnico Eagle, Per. Comm. 2019). No wildlife deterrents were used to deter caribou in 2018.

Barren-ground Caribou

Caribou Advisory

- Mass migration through the Project and AWAR took place between 5 July and 22 July 2018. The caribou work suspension protocol (complete work stoppage) was in effect for periods from 8 July to 17 July 2018 (Table 8.2-1). Closure and restrictions on AWAR took place on 7-20 July (Table 8.2-1).
- There was a complete work stoppage for 191 hours and restricted duties for 93 hours in 2018 (Mine and AWAR).

Caribou Behavior

- Caribou behavior observations were completed on seven groups of caribou in 2018.

Hunter Harvest

- Agnico Eagle is currently in working on a Memorandum of Understanding (M.O.U.) with the Rankin Inlet Inlet Hunters and Trappers Organization (HTO).

Birds

Shoreline Surveys

- All waterbodies within 200 m of mining related infrastructure (excluding the AWAR) were surveyed on foot by trained biologists to locate and identify nesting waterbirds from 12 to 18 June 2018. (Figure 3.8-1).
- A total of eight different species were observed (Table 10.1-1). No fledglings were observed, all observations were nesting adults, and eggs observed in nests. In total, 56 adult birds were recorded with 27 eggs observed among eight different species. Waterbodies within 200 m of the AWAR were not completed due to time constraints.

Point Counts

- Avian point count locations were chosen to be within 1 km on either side of the AWAR (2 km in total) with the first point counts occurring at 50 m from the road on either side, with subsequent plots spaced 100 m from the preceding plot. In 2018, a total of 6 transects were completed for a total of 72 point count surveys. The survey method is described in more detail in the TEMMP (Golder 2015).
- In total, seven passerine (i.e. songbird) species were recorded on the point count surveys (Table 9). The most abundant species was horned lark (*Eremophila alpestris*) and the least abundant species was American robin (*Turdus migratorius*).

PRISM

- Agnico Eagle contributed to the Environment and Climate Change Canada (ECCC) PRISM surveys in 2018 and will continue to do so every three years. For the 2018 surveys, a representative from ECCC, Golder biologists, and two local assistants completed PRISM surveys at the Project at randomly chosen locations (by ECCC). Observers recorded the species encountered, estimated their breeding status, and recorded habitat conditions.
- A total of ten PRISM survey plots were surveyed with a total of thirteen bird species observed (Table 10.3.2). The most common bird species observed in the plots were Lapland longspur (*Calcarius lapponicus*), and savannah sparrow (*Passerculus sandwichensis*). No species-at-risk were observed on survey plots. Breeding evidence of three species of shorebirds was found during the surveys.
- Due to the late spring in 2018, and the relatively early timing of the field work, no actively nesting songbirds were found during PRISM surveys.

Raptors

- The 2018 annual report of the Arctic Raptors Research Program is included in Appendix B.

Soil and Vegetation Monitoring

- Invasive Plant surveys were completed along the AWAR and Project footprint. Two occurrences of common dandelion were recorded along the AWAR. Common dandelion was not observed in the Project footprint or ship loading areas.
- Soil and vegetation contamination (metals and dust) will be monitored in 2019.

Environmental Variables

- The max annual temperature of 27.5°C was recorded on July 11, 2018 and the minimum annual temperature -46.8°C was recorded on February 19, 2018. Snowmelt began June 9, 2018 when the average daily air temperature exceeded 0°C. Environmental variables will continue to be monitored on an on-going basis.

Table of Contents

TABLES

FIGURES

APPENDICES

APPENDIX A
Project Certificate (No. 006)

APPENDIX B
Arctic Raptor Research Program, 2018

APPENDIX C
Photographs of Non-Native Plant Occurrences

APPENDIX D
CESCC – Non-Native & Invasive Species In Nunavut

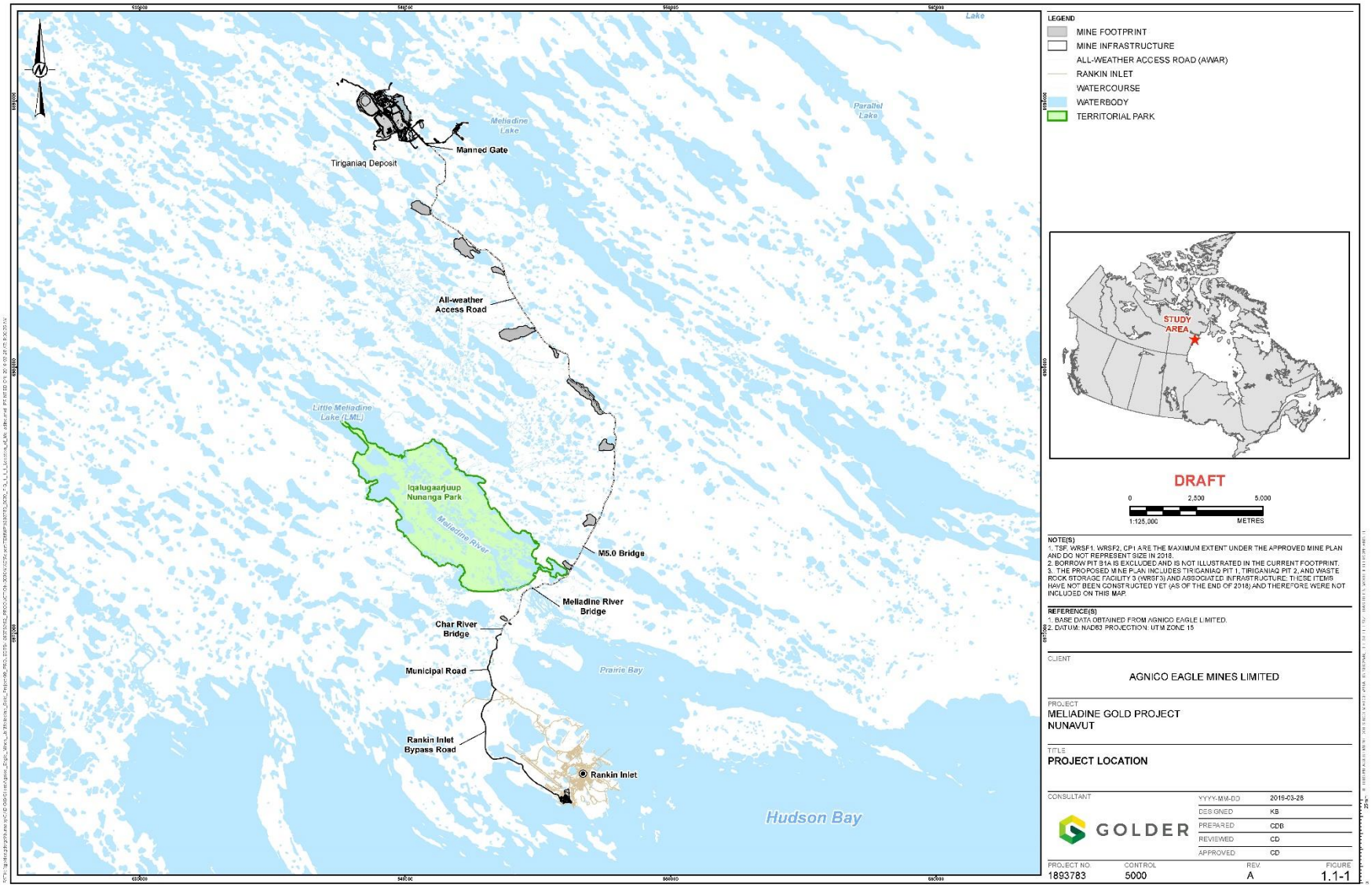
1.0 INTRODUCTION

1.1 Background

The Agnico Eagle Mines Limited (Agnico Eagle) Meliadine Gold Mine (the Project), located in the Kivalliq Region of Nunavut (Figure 1.1-1), received a Project Certificate (No. 006) from the Nunavut Impact Review Board (NIRB) in February 2015. 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. This report addresses requirements of the Project Certificate (No. 006) (Appendix A). A conceptual Terrestrial Environment Mitigation and Management Plan (TEMMP) for the Project 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 will be reviewed and updated on a regular basis as the Project proceeds into detailed design, construction, operations, closure and post-closure.

The 2018 annual report (this document) is the second of a series of annual TEMMP summary reports for the Project. The purpose of this report is to summarize the 2018 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 Project. The 2018 annual report describes monitoring objectives and methodology, 2018 annual results, mitigation activities, and management recommendations based on 2018 monitoring results. It should be noted however, that the Project is not currently active and is in the construction phase of development. The Project is anticipated to be operational from 2019 to 2037, where effects to wildlife may be more realized during open pit operations.

Figure 1.1-1: Project Location



1.2 Project Description

The Project, with an expected operating life of about eight years (until 2027), is located approximately 25 kilometers (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).

The scope of the TEMMP annual report is to report on monitoring of the Project during construction, operation, maintenance, reclamation, and closure. This report includes data collected in 2018, the second year of construction. Project site facilities include a plant site and accommodation buildings, a water management system that includes collection ponds, water diversion channels, retention dikes/berms, and a Water Treatment Plant. Project components include two ore stockpiles, a temporary overburden stockpile, a tailings storage facility, three waste rock storage facilities, a landfarm, incinerator, and landfill.

Environmental baseline studies were completed in the Project area prior to Project approval and integrated into the current project design according to the 2015 TEMMP (Golder 2015). Vegetation and wildlife Valued Ecosystem Components (VECs) were identified in consultation with regulatory agencies, the Kivalliq Inuit Association (KivIA) and the Rankin Inlet Hunters and Trappers Organization (HTO). Vegetation VECs include plant populations and communities, listed (rare) plant species, and traditional use plant species. Wildlife VECs include ungulates (caribou and muskox), carnivores (grey wolf and polar bear), raptors, waterbirds, and upland birds (including migratory birds). Further details on VEC selection can be found in the FEIS (Agnico Eagle 2014) and the TEMMP (Golder 2015).

1.2.1 Concordance with Terms of Reference

The initial purpose of this document was to address the Guidelines issued by the Nunavut Impact Review Board for the Mine (NIRB 2012), and specifically those relating to the presentation of a Wildlife Mitigation and Management Plan (Section 9.4.17 of the Guidelines). Specific requirements set out in the Guidelines relating to the preparation of a Wildlife Mitigation and Management Plan were used to guide this TEMMP and are provided in FEIS Volume 1, Appendix 1.0-A.

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 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:** Supporting the GN's caribou satellite-collaring program for the Qamanirjuac herd (and other herds in the Kivalliq), facilitating monitoring of cumulative effects at the herd level (Golder (2015), Section 3.4, page 12).
- **Regional Muskoxen Surveys:** 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.
- **Hunter Harvest Program:** Agnico Eagle will establish a harvest study in association with the Rankin Inlet HTO to document harvest rates, harvesting distribution and seasonality, and monitor these data over time (Golder (2015), Section 3.5, page 13). This will contribute to an understanding of cumulative effects by increasing understanding of the regional distribution and seasonality of hunting.
- **Raptor Monitoring Program:** Agnico Eagle, in collaboration with the Arctic Raptor Project, has developed and implemented the raptor monitoring program (Golder (2015), Section 3.6, page 14). This will directly align monitoring efforts at Meliadine with this long-term regional research program which already involves government, non- government, Indigenous communities, and academic partnerships.
- **Waterfowl and Shorebird Monitoring:** Agnico Eagle, in collaboration with Environment and Climate Change Canada, have agreed to implement the Program for Regional and International Shorebird Monitoring (PRISM) (Golder (2015), Section 4.11, page 39) on a three-year schedule. This will directly align monitoring efforts at Meliadine with other Agnico Eagle properties for waterfowl and shorebirds.
- **Wildlife Surveys:** Agnico Eagle, in collaboration with the HTO, will conduct wildlife surveys twice weekly along the All- Weather Access Road (AWAR) and with environment technicians around the proposed mine site. This will contribute to an understanding of cumulative effects by collecting routine wildlife survey data (including caribou) and assist in anticipating large herd migrations, communicating with the HTO and managing mine activities during migration events. In addition, Agnico Eagle has contributed to regional muskoxen survey programs and will continue to do so in the future.

The Project Certificate (NIRB 006) for the Meliadine Gold Mine was issued on February 26, 2015. This third iteration of the TEMMP addresses the Terms and Conditions of that Project Certificate as they relate to Terrestrial and Wildlife Mitigation and Management.

Table 1.2-1 Concordance Table with Project Certificate Terms and Conditions

Term	Condition	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.	12.1
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.	12.0
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.	12.0
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.	6.1, 8.1.1, 8.2.1 and 8.2.2
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.	6.0
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.	6.5
56	The Proponent shall report annually to the NIRB regarding its terrestrial environment monitoring efforts, with inclusion of the following information: a. Description of all updates to terrestrial ecosystem baseline data; b. A description of the involvement of Inuit in its monitoring programs; 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; d. Results of the annual monitoring program, including field methodologies and statistical approaches used to support conclusions drawn; and e. An assessment and presentation of annual environmental conditions including timing of snowmelt, green-up, as well as standard weather summaries.	4.1.2 and 5.0
57	Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting; b. A detailed analysis of wildlife responses to operations with emphasis on wildlife behaviour, mortalities and displacements (if any), and responses to operations of the all-weather access road and associated access roads/trails; c. A demonstration and description of how the monitoring results, including the all-weather access road and associated access roads/trails contribute to cumulative effects of the project; and d. Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program.	6.3
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.	6.2
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 Mitigation and Monitoring Plan (TEMMP).	6.2, 10.1.2 and 10.3.2
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 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.	6.2, 10.1.2 and 10.3.2
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.	10, 11
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 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.	10, 11
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.	4.1
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.	9.0
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.	6.1, 8.1.1, 8.2.1 and 8.2.2
119	The Proponent shall include within its updated Terrestrial Wildlife Management and Monitoring Plan, a commitment to establishing deterrents along the 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.).	TEMMP (Golder 2015) Appendix 3 – Wildlife Protection and Response Plan

1.3 Study Area Boundaries

The Local Study Area (LSA) includes a 500 meter (m) radius buffer centered on the Project footprint and includes 1000 m buffer on the AWAR, Discovery access road and the Rankin Inlet bypass road. The total area of the LSA is 10,598 hectares (ha) (Figure 1.3-1). The Regional Study Area (RSA) encompasses an area that includes a 28 km radius area around the Project, including Rankin Inlet for a total area of 246,300 ha (Figure 1.3-2).

Further details on the justification for study area sizes can be found in the Final Environmental Impact Statement (Agnico Eagle 2014) and the TEMMP (Golder 2015).

Figure 1.3-1: Project Local Study Area

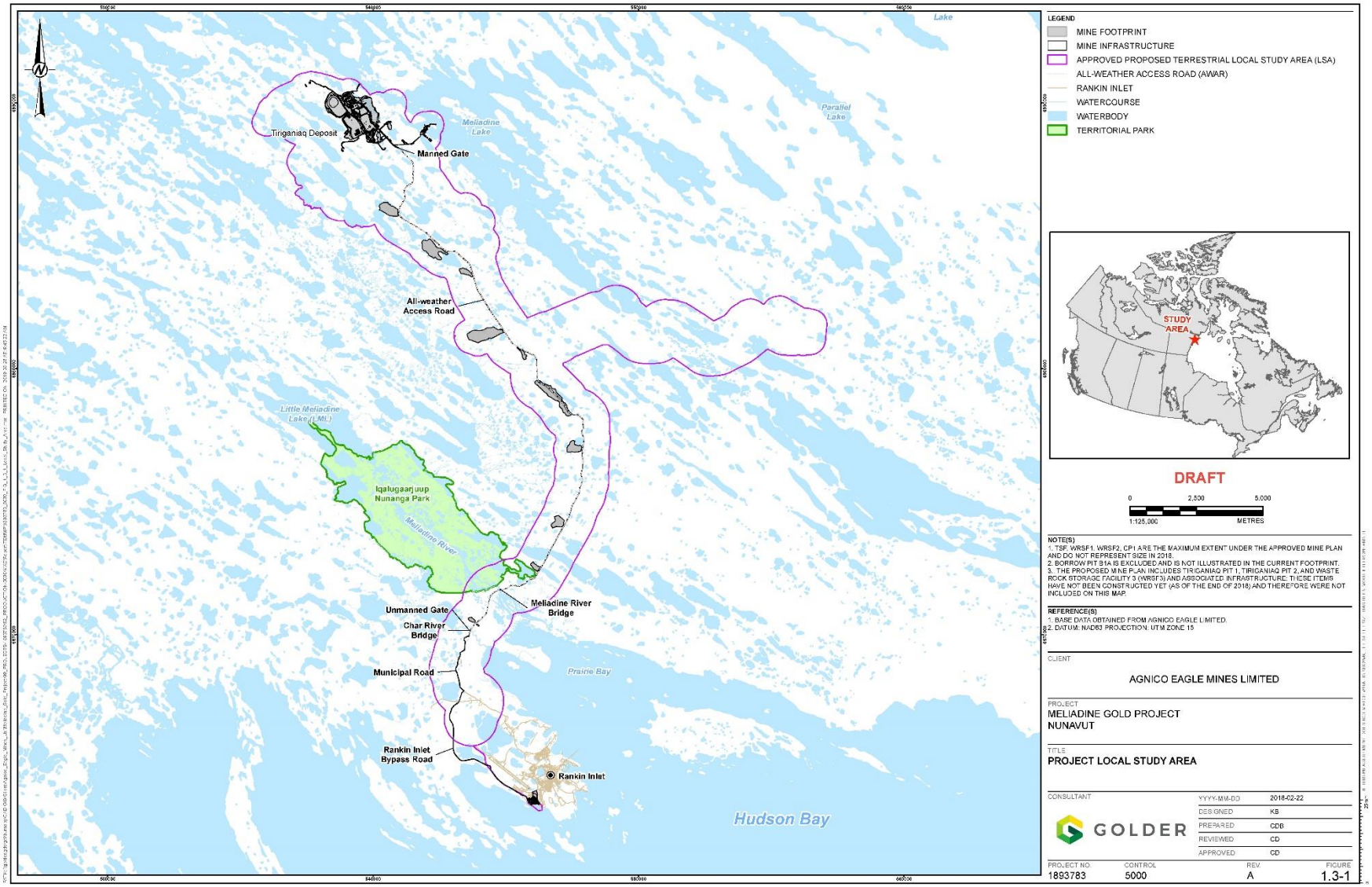
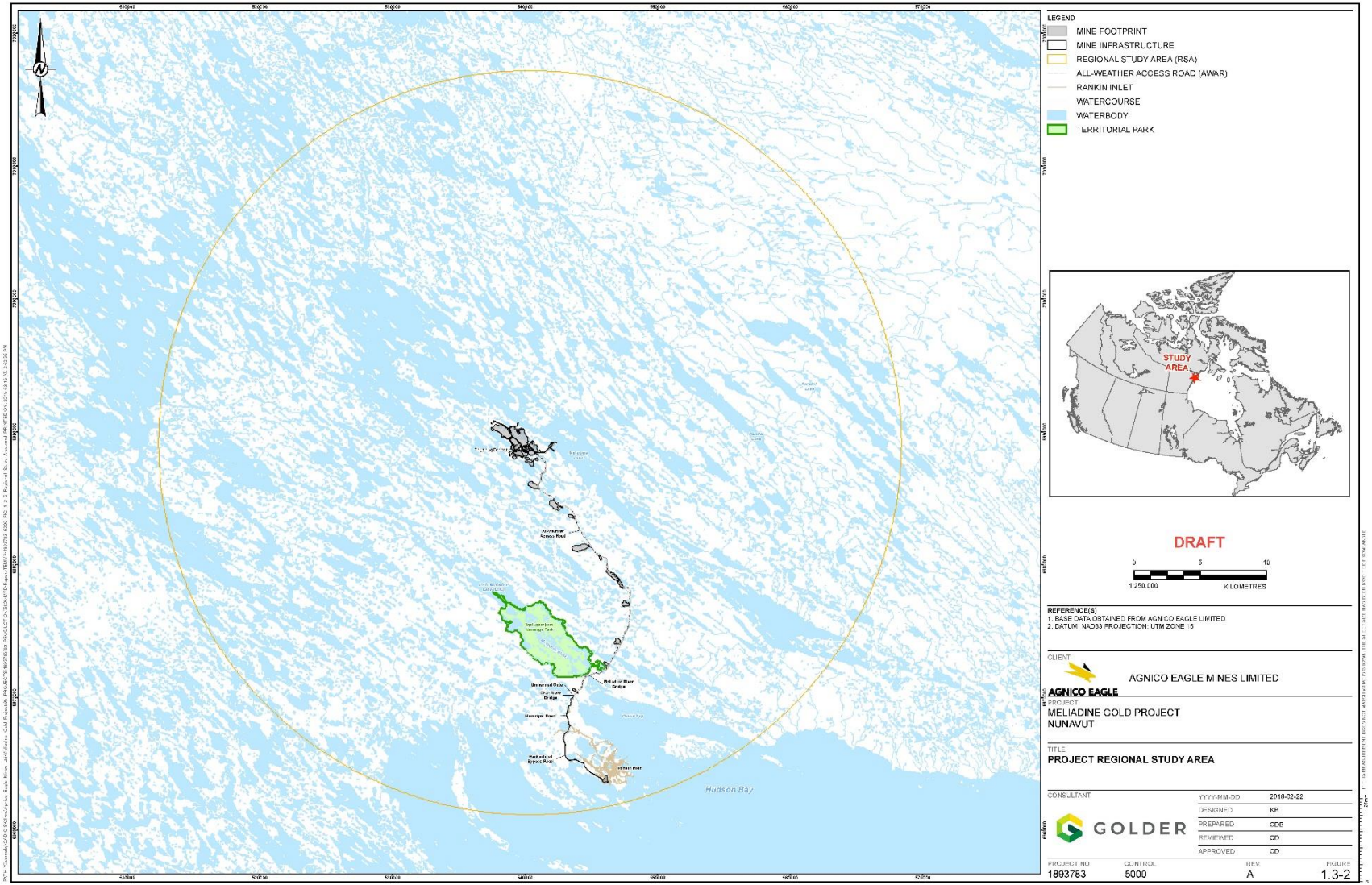


Figure 1.3-2: Project Regional Study Area



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, as required, is adapted to meet the objectives of the management strategy and methods set out in the TEMMP (Golder 2015). Monitoring programs evaluate the effectiveness of mitigation measures and assess Project-related impact 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.

To effectively evaluate the accuracy of impact predictions, a series of quantitative monitoring indicators, which are within the broad categories of habitat distribution, wildlife distribution, wildlife richness, wildlife diversity, wildlife abundance, and environmental health, have been developed. However, as stated earlier, the Project is currently in the construction phase of development and this is the second year of monitoring, consequently not all of the objectives below can be answered at this time.

1.5 Objectives

The primary objectives of the 2018 Annual Report include:

- Collect information that will assist Agnico Eagle to determine if there are effects on wildlife and if these effects were accurately predicted in the FEIS.
- Reporting the results of the 2018 wildlife 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 2018.
- Allowing regulators to contribute advice for improving wildlife 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 is 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 TEMMP (Golder 2015) is provided in Table 2.0-1. Adaptive management will be implemented if the Project impacts exceed the predictions. The corresponding section of this annual report, where monitoring indicators are discussed is also listed. Project related mortalities are defined as those caused as a direct result of project activities and exclude those resulting from trapping conducted by regulatory organizations.

Table 2.0-1: Summary of Predicted Effects, and accuracy of Impact Predictions, 2018

Monitoring Indicator	Proposed thresholds	Surveyed in 2018?	Exceeded in 2018?	Monitoring Methods	Frequency of Data Collection	Section Reference
Vegetation (Wildlife Habitat)						
Habitat Loss	Terrestrial – 2951 ha Aquatic – 515 ha	Yes	No	Ground Surveys, Mapping, GIS Analysis	Annually	4.1
Habitat Degradation by Contamination	No invasive plant species established	Yes	Yes	Invasive Plant Survey of AWAR and Project site	Annually	12.0
Habitat Degradation by Contamination	TBD – SLRA No effects to plant health from dust deposition	No	-	Vegetation and Soil Samples	Every 3 Years	6.0
Habitat Reclamation following Mine Closure	NA	No	-	Ground Surveys, Vegetation Plots, Mapping	Once pre - construction (this year) baseline and 3 times Post-Closure	12.0
Ungulates						
Habitat Loss and Degradation	No greater than 2951 ha of terrestrial habitat loss	Yes	-	Ground Surveys, Mapping, GIS Analysis	Annually	4.1
Sensory Disturbance	<10% caribou deflections from AWAR	No	-	Ground Surveys, Satellite-collaring	Daily/Weekly	4.2
Vehicle Collisions	1 individuals	Yes	No	Ground Surveys	Daily	6.1
Hunting by Rankin Inlet Residents	After 3 years of data collection, in collaboration with GN, establish a threshold level	No	-	Hunter Harvest Study	Collected throughout the year and reported annually	10.0
Other Project-related Mortality	1 Individual	Yes	Yes	Ground Surveys	Daily	6.1
Exposure to Contaminated Water or Vegetation	TBD – SLRA	No	-	Vegetation and Soil Samples	Every 3 Years	4.2
Predatory Mammals						
Project-related Mortality	1 Arctic Fox	Yes	Yes	Ground Surveys, Cameras in attractant areas	Daily	6.1
Raptors						
Disturbance of Nesting Raptors	To be determined in consultation with GN and Alastair Franke, related to occupancy and productivity.	Yes (Appendix B)	TBD	Active Nest Monitoring	Nests within 200 m – Daily Nests from 200-1000 m – Weekly	12.0
Project-related Mortality	To be determined in consultation with GN and Alastair Franke	Yes (Appendix B)	TBD	Ground Surveys, Collision Reporting System	Mine Site-Daily AWAR – 2x/Week	1.0
Waterbirds						
Habitat Loss and Degradation	515 ha of Aquatic Habitat	Yes	No	Ground Surveys, Mapping, GIS Analysis	Annually	4.1
Disturbance of Nesting Waterfowl	TBD once NRV is established through consultation with ECCC and GN	Yes	No	Shoreline Surveys	TBD	10.1
Exposure to Contaminated Water or Vegetation	TBD – SLRA	No	-	Vegetation and Soil Samples	Every 3 Years	4.2
Project-related Mortality	1 Individual	Yes	No	Ground Surveys, Collision Reporting System	Mine Site-Daily AWAR - 2x/Week	6.1
Other Breeding Birds						
Habitat Loss and Degradation	No greater than 2951 ha of terrestrial habitat loss	Yes	No	Ground Surveys, Mapping, GIS Analysis	Annually	4.1
Exposure to Contaminated Water or Vegetation	TBD – SLRA	No	-	Vegetation and Soil Samples	Every 3 Years	4.2
Changes in Breeding Bird Populations	TBD once NRV is established through consultation with ECCC	Yes	-	Breeding Bird Plots and Transects	Every 3 Years	9.0

SLRA = Screening Level Risk Assessment; NRV = Natural Range of Variability; ECCC = Environment and Climate Change Canada; GN = Government of Nunavut Department of Environment; AWAR = All-Weather Access Road; *TEMMP = Terrestrial Environment Management and Monitoring Plan (Golder 2015)

3.0 INCORPORATION OF INUIT QUAJIMAJATUQANGIT

Field programs were guided by Inuit Qaujimajatuqangit (IQ), including the assistance of local field assistants. Annual contributions from Inuit to the monitoring programs are presented below (Table 3.0-1).

Table 3.0-1: IQ Field Contributions from Inuit to Monitoring Programs

Name	Date(s) Worked on Site	Total Days	Programs Contributed To
Brenda Anderson	■ June 11 to June 24, 2018; ■ July 16 to July 20, 2018; and ■ July 26, 2018.	19	■ Breeding bird surveys ■ Shoreline surveys ■ PRISM surveys
John Papak	■ August 6 to August 19, 2018.	14	■ Fish Sampling
Matt Adams	■ June 1 to June 20, 2018; ■ June 22 to June 25, 2018; ■ July 17 to July 27, 2018; and ■ August 13 to August 19, 2018.	32	■ Breeding bird surveys ■ PRISM surveys ■ Shoreline surveys ■ Water/sediment quality sampling ■ Archaeology survey

4.0 HABITAT LOSS

4.1 Direct Habitat Loss

The vegetation component of the TEMMP (Golder 2015) outlines the means by which AEM 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. Environmental monitoring programs are used to track conditions and implement further mitigation as required, and the follow-up monitoring used to verify the accuracy of impact predictions and adaptively manage. This section provides the results of the follow-up monitoring from Project construction initiation to 2018 and summarizes the current Project impacts to vegetation communities/habitat type.

Direct effects to wildlife populations includes the physical disturbance and loss of habitat (e.g., upland and riparian vegetation, wetlands, and water), which results in the direct displacement of wildlife. Direct habitat disturbance is expected to occur through the construction of the Project footprint, such as the creation of roads, Project rock piles, core Project facilities, and increased water levels in some local lakes and streams. Impacts to vegetation communities/habitat types are considered long-term as the recovery of vegetation is slow in arctic environments (Burt 1997).

The objective of this component of the annual report is to determine if direct vegetation/habitat loss due to Project footprint stays within impact predictions of 2,950 ha (Agnico Eagle 2014).

4.1.1 Methods

The Project development area was delineated through aerial photographs, satellite imagery, or ground surveys, and calculated using ArcGIS software. The actual area of the Project footprint will be compared to the permitted area and monitored over the life of the Project at key phases of development, or at 3 year intervals (Golder 2015).

A shapefile with the most current Project footprint from 2018 was obtained from Agnico Eagle and used to determine impacts to vegetation communities/habitat type due to the Project. The footprint layer was compared against 2017 GoogleEarth imagery and laid over the vegetation unit layer available for the Project and developed by Golder (2012). Each vegetation community/wildlife habitat disturbed by the Project was selected and calculations were made using ArcGIS to determine the area (ha) of each habitat type replaced by the Project footprint.

Changes to vegetation communities/habitat types were assessed for the maximum predicted Project footprint (Golder 2015), which should have the largest magnitude and geographic extent of effects to vegetation. The maximum predicted Project footprint includes Project site and associated infrastructure (e.g., tailings storage facility [TSF], open pits, waste rock storage facilities, and camp), the AWAR between the Project and Rankin Inlet and the proposed infrastructure within the boundary of the Hamlet of Rankin (associated roads, floating dock, laydown yard and tank farm).

A portion of the bypass road connecting Rankin Inlet and the AWAR (Figure 1.3-1) was not included in this assessment because this portion was developed outside the original Project LSA as per the Hamlet's instruction. This portion of the road is 4 km in length and 10 m wide.

4.1.2 Results

As of December 2018, a total area of 484 ha has been altered due to Project construction, representing 29% of the Predicted Project footprint (1,682 ha). Table 2.0-1 summarizes the impacts by each vegetation community/habitat type. A total of 343 ha of vegetated heath types have been impacted by the Project (35 % of the predicted impacts). The wetland riparian types have been impacted by Project by 95 ha (22% of the predicted impacts). In total 6 ha of un-vegetated sand community have been impacted due to the Project (75 % of predicted impacts) (Figure 4.1-1)

Figure 4.1-1: Project Footprint Comparison by Vegetation Community/Habitat Type

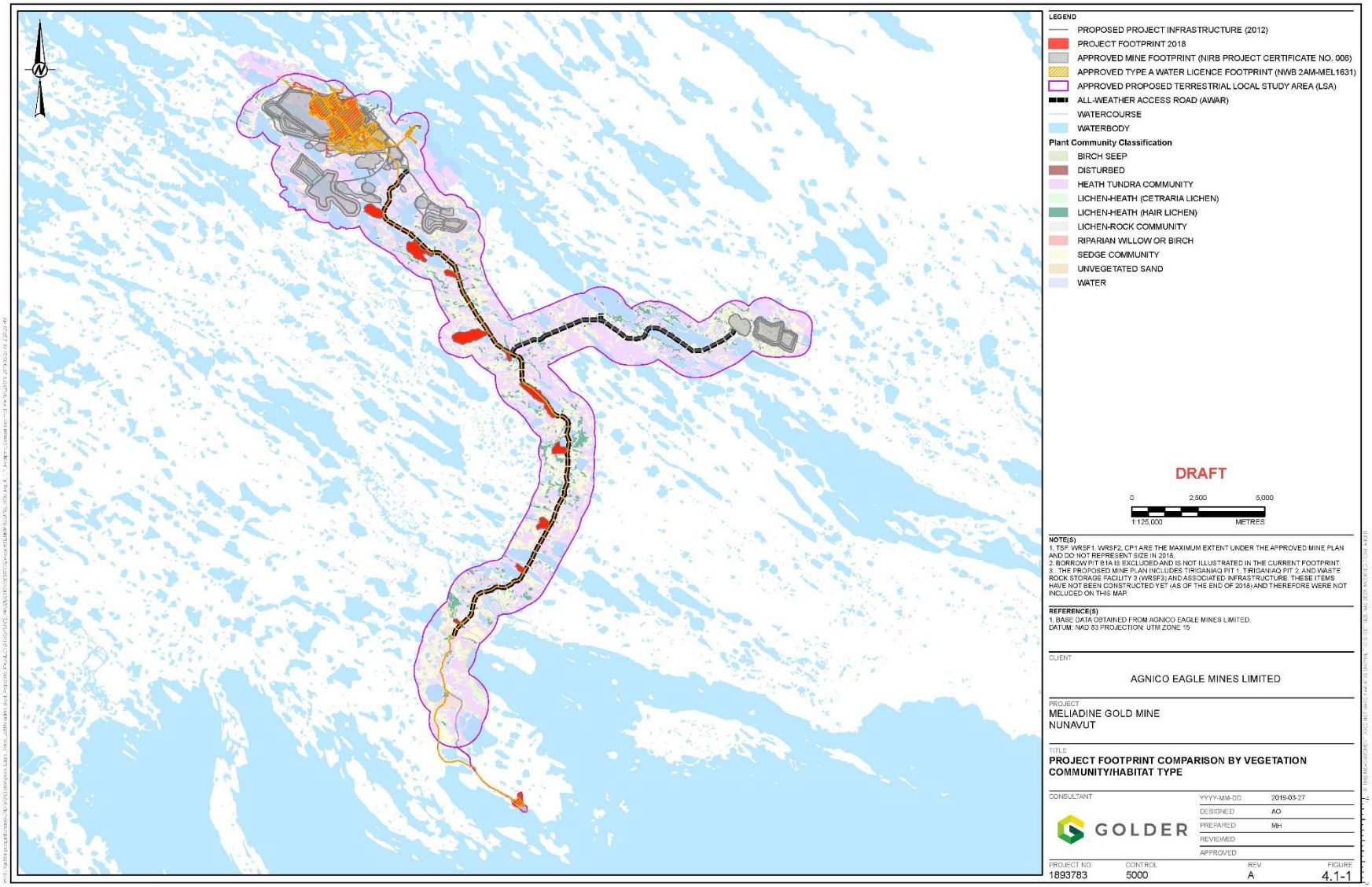


Table 4.1-1: Total and Predicted Vegetation Community/Habitat Type loss from Project approval to 2018

Vegetation Community Type	Vegetation Community Type Description	Total Area of LSA (ha)	Project Predicted Impacts [ha]	2018 Project Impacts [ha] [(a)]
Heath				
Lichen-Rock Community	characterized by crustose lichens growing on the boulders or rocks that predominate on eskers or rocky plateaus	233	37	28
Lichen-Heath (*Cetraria* Lichen)	occurs on lower slope positions, often below the lichen-health – hair lichen community, on more rapidly drained sandy substrates	560	86	35
Lichen-Heath (Hair Lichen)	occurs almost exclusively on the higher ridges of slopes and on drumlin and esker crests, where the ground cover consists of a high percentage of black and green hair lichens	601	110	59
Heath Tundra Community	occurs on uplands and slopes of most ridges characterized by gently rolling to undulating terrain with rapidly to well-drained soils	4,036	722	222
	Heath subtotal	***5,429***	***956***	***343***
Wetland/Riparian				
Birch Seep	occurs on imperfectly poor to poorly drained soils such as the edges of solifluction lobes, on the slopes of some eskers, in stream valleys and along transitions to some sedge associations	305	87	10
Sedge Community	occurs adjacent to lakes and streams on very poorly drained soils and in low-lying areas	2,449	1	85
Riparian Willow or Birch	typically occurs along the banks of stream courses; characterized by imperfectly drained, nutrient enriched soils	12	351	<1
	Wetland/Riparian subtotal	***2,767***	***440***	***95***
Un-vegetated				
Disturbed [(b)]	cleared areas and access roads associated with the Project as well as various natural disturbance features	<1	<1	<1
Un-vegetated (Sand)	associated with steep sandy slopes and the margins of rivers and lakes; limited to no vegetation cover	182	8	6
Water	associated with waterbodies and watercourses	2,221	278	40
	un-vegetated subtotal	***2,403***	***286***	***46***
	Total	**10,598**	**1,682**	**484**

(a) Impacts to vegetation communities/habitat types from Project approval to December 2018.
(b) Disturbance include areas that were already disturbed at baseline conditions when the vegetation community/habitat type mapping was developed.

Note: Some numbers are rounded for presentation purposes; totals may not equal the sum of the individual values.

4.2 Recommendations

Although, Project footprint is currently 29% of the total predicted footprint, follow up monitoring should continue at 3 year intervals, as monitoring studies are used to provide feedback to Project 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.

4.3 Accuracy of Impact Predictions

Impact predictions related to habitat loss is summarized in Table 2.0-1. Terrestrial and aquatic habitat loss is currently below predictions. Effects to plant health from dust deposition were not scheduled for assessment in 2018. Plant health related to dust deposition is assessed every at three years intervals from baseline (2017) as per the TEMMP (Golder 2015), the next assessment was to be completed in 2020 but to align the assessment frequency with the first year of construction, the next assessment will happen in 2019.

5.0 INDIRECT HABITAT LOSS

Indirect effects to wildlife are associated with changes in habitat that can alter the movement and behavior of individuals in the vicinity of the Project as a result of sensory disturbance. Indirect Project effects such as dust deposition on vegetation communities and presence of heavy metals on vegetation tissue and soils were assessed in 2017 and presented in the 2017 Annual report (Golder 2018). Indirect Project effects are assessed every three years, with the next field assessment scheduled for summer 2019 to align sampling years with the first year of construction. The results will be compared against values from samples collected at Reference Areas (10 to 15 km from the site infrastructure).

Indirect habitat loss for caribou and wildlife was not assessed in 2018.

6.0 WILDLIFE OBSERVATIONS

Environmental technicians conduct site surveillance monitoring and road surveillance monitoring regularly of the AWAR and the Project. In addition to planned surveys, all supervisors ask their employees to report wildlife sightings; Wildlife logs are posted throughout the Project and easily accessible to employees to facilitate wildlife reporting before, during, and after work shifts.

In 2018, there were over 214 incidental wildlife observations among 13 different species and approximately 7,187 individual animals (Table 6.0-1). Observations were recorded between 4 January and 27 November 2018.

Table 6.0-1: Incidental Wildlife Observations, 4 January to 27 November 2018

Species	Observations	Individuals
Bald eagle	1	1
Canada goose	6	67
Common Raven	2	2
Duck sp.	2	20
Ptarmigan sp.	4	19
Sandhill crane	1	4
Snow goose	1	100
Snowy owl	2	2
Tundra swan	2	4
Arctic hare	28	31
Caribou	76	6839

Table 6.0-1: Incidental Wildlife Observations, 4 January to 27 November 2018

Species	Observations	Individuals
Arctic fox	97	105
Polar bear	1	2
Sik sik	1	1
Wolverine	1	1

Specific GPS locations were not recorded for incidental wildlife observations in 2018.

6.1 Wildlife Track Surveys

On-site wildlife track surveys were conducted on 3 and 23 November 2018 and 8, 15 and 25 of December 2018. All observations were limited to arctic fox hare tracks - no caribou tracks were observed. In addition to scheduled wildlife track surveys, a predatory mammal observation report was completed for wolf tracks observed on the main camp site on 10 April 2018, and for two polar bears observed on 10 November 2018. A wildlife inspection was completed on 11 April 2018 and no further signs of wolves in the area were observed. Wildlife track surveys will continue to be conducted in 2019.

6.2 Common Redpoll Nest Relocation

In July 2018 an active Common Redpoll nest was observed within an active construction zone within rebar installed for a concrete foundation of a building. A Damage or Danger Permit (the permit) was issued under the Environment Canada Migratory Birds Regulations (MBR) under subsection 4.(1) of the MBR on 27 July, 2018, which authorized the relocation of the migratory birds, eggs (3) and nest. The nest containing the eggs was relocated, and passively monitored daily until successfully fledging.

Summary of events

- Nest was observed at 63.026774N, -92.219641W.
- Prior to relocation, all four eggs hatched.
- The nest was moved a total of 31.5 m from the active construction zone.
- Successful with nestlings fledging from the nest on 7 August 2018.

6.3 Incidents and Mortalities

6.3.1 Methods

Project-related incidents and mortalities are reported to the Environment Department for documentation in a detailed incident investigation for immediate follow-up. All incidental wildlife mortalities are reported immediately to the Government of Nunavut Department of Environment (GN DoE), and the GN DoE is consulted for follow-up mitigation and disposal procedures. In addition, the KivIA will also immediately be 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, and all deterrent actions are recorded.

6.3.2 Results

The following wildlife incidents in Table 6.3-1 were reported at the Project in 2018:

Table 6.3-1: Wildlife Mortality Incidents Recorded at Meliadine (Including AWAR) in 2018

Date	Species	Number	Location	Comments
Jan. 22 – 28	arctic fox	1	n/s[(a)]	trapped and disposed in incinerator[(c)]
Jan. 29 – Feb. 5	arctic fox	1	n/s	trapped; unknown cause of death
Feb. 1	arctic fox	1	snow disposal area /industrial pad	unknown cause of death
Feb. 12 - 19	arctic fox	1	n/s	trapped and disposed in incinerator
Feb. 21	arctic fox	1	n/s	trapped and disposed in incinerator
Mar. 6	arctic fox	3	n/s	trapped and disposed in incinerator
Mar. 7	arctic fox	2	n/s	trapped and disposed in incinerator
Mar.8	arctic fox	1	n/s	trapped and sent to lab for rabies testing (bit employee)
Mar.8	arctic fox	2	n/s	trapped and disposed in incinerator
Mar. 9	arctic fox	1	process plant	aggressive fox chasing people, killed in self-defense and incinerated
Mar. 9	arctic fox	2	n/s	one of animals was aggressive and suggested by GN to have potential for rabies, both incinerated
Mar. 15	arctic fox	1	landfill	trapped - disposed in incinerator
Mar. 22	arctic fox	1	landfill	trapped - disposed in incinerator
Mar. 22	arctic fox	1	landfill	shot – disposed in incinerator
Mar. 23	arctic fox	1	landfill	trapped - disposed in incinerator
Mar.26	arctic fox	1	n/s	snared by fox monitor, and disposed of in incinerator – potential rabies
Jun. 17	arctic fox	1	under explo.kitchen	disposed of in incinerator – potential rabies
Jul. 6	arctic fox	1	Mel esker	found deceased, and disposed of in incinerator – potential rabies
Aug. 2	gosling	1	Mel Lake gen set area	found deceased – retrieved by GN
Aug. 2	arctic fox	1	n/s	trapped and disposed of by GN
Aug. 29	arctic hare	1	behind SWTP	unknown cause of death
Sep. 22	arctic fox	1	n/s	trapped and disposed of by GN
Oct. 3	arctic fox	1	n/s	trapped by GN and disposed of by GN in incinerator (on-site)
Nov. 29[(b)]	arctic fox	1	n/s	trapped and disposed of by GN

(a) n/s – location not specified
(b) no additional mortalities after November 29, 2018.
(c) all trapping and site mortalities were completed by GN

Mortalities were reported to the GN DoE, which collected the gosling and 4 arctic foxes for disposal. Other mortalities were disposed of in the incinerator.

Following initial guidance from the GN DoE, traps were placed around the Project starting 19 September 2017. A total of 22 arctic foxes were trapped and dispatched by on site staff and GN DoE officers from 1 January 2018, to 29 November 2018.

6.4 Recommendations

Mortalities can occur as fox and other wildlife 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. In response to incidents, employees of the Environment Department will continue to hold toolbox meetings with various departments and contractors, stressing that the harassment and feeding of wildlife are harmful, unacceptable and against company rules.

6.5 Accuracy of Impact Predictions

A summary of the impact predictions proposed in the TEMMP (Golder 2015) is provided in Table 2.0-1. Through systematically recording the presence of all wildlife within and around the Project footprint, Environmental staff will remain appraised 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.

Monitoring thresholds are not well established, however, Agnico Eagle will work with the GN DoE to better refine these thresholds and adapt their practices, nevertheless, the following thresholds in Table 6.5-1 are suggested as a starting point for adaptive management and TEMMP (Golder 2015) refinement. Impact predictions related to wildlife incidents are summarized in Table 6.5-1.

Table 6.5-1: Accuracy of Impact Predictions – Wildlife Incidents

Monitoring Indicator	Preliminary Threshold	Exceeded in 2018?	Adaptive Management	Monitoring Method	TEMMP[a] Section
Project Related Mortality[b]	No more than 1 ungulate/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring	4.4.2
Project Related Mortality	No more than 1 Arctic fox/year	Yes	On-going waste management and, regular toolbox meetings reiterating that harassing and feeding wildlife are harmful, unacceptable and against company rules	Wildlife Sightings Log, Site Surveillance Monitoring, with particular emphasis around waste management areas	4.4.2
Vehicle Collisions	No more than 1 ungulate/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	4.4.2
Project Related Mortality	No more than 1 raptor/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring	4.9
Project Related Mortality	No more than 1 waterbird/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring	4.10

(a)TEMMP = Terrestrial Environment Management and Monitoring Plan (Golder 2015)
(b) Project related Mortality = A death that can be directly linked to the mine or mining activity.

7.0 WILDLIFE DETERRENTS

Bird deterrent canons were initially deployed on P1 and P3 dikes in accordance with Agnico Eagle licence requirements, project certificate TC #74 on June 21, 2018, which states that 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. Shortly after deployment, NIRB requested a deterrent canon be moved to the landfarm to prevent birds landing and nesting in the sump area. Inuit workers raised concerns (verbally) about the canons impacts on caribou and other wildlife at which point canons were removed on July 2, 2018 (D. Gorton, Agnico Eagle, Per. Comm. 2019). No caribou were deterred in 2018.

8.0 BARREN-GROUND CARIBOU

Barren-ground caribou (including Lorillard and Qamanirjuaq herds) currently have a federal status of 'Threatened' (COSEWIC 2018), but are not listed under the *Species at Risk Act (*SARA 2018) and are considered 'Apparently Secure' in Nunavut by the Canadian Endangered Species Conservation Council (CESCC 2016). Annual home ranges mapped by GN DoE show that the Project is within the annual home range of the Qamanirjuaq (Kaminuriak) Caribou Herd (Campbell et al. 2014; Campbell et al. 2012). However, the Lorillard caribou are migratory (Campbell et al. 2014) and generally distributed north of Chesterfield Inlet, based on radio-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 is very low. 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, 2000a, 2000b).

The annual range of the Qamanirjuaq herd occupies an area from northern Manitoba and Saskatchewan in the south, to southwestern NU and southeastern NT (BQCMB 1999; Campbell et al. 2012). Barren-ground caribou are migratory, and movements and range use varies 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 1983). A portion of the Qamanirjuaq herd may pass through the RSA in summer but in some years they may linger from late October through March (Hubert and Associates 2007). Thus, impacts to the Qamanirjuaq herd due to the Project have the potential for transboundary effects. For additional discussion on the Qamanirjuaq herd please refer to the FEIS (Agnico Eagle 2014).

8.1 Caribou Behavior

Concern has been raised regarding the effect of the Project AWAR and mining operations on caribou movement and behavior, particularly during the post-calving migration/aggregation which has occurred over the past 4 to 5 years. The Qamanirjuac herd calves approximately 57 km to the west-northwest of the Project and after calving the herd aggregates into a post-calving movement east towards the coast and then moves back to the west and southwest of the Project where their summer movement and distribution patterns commence. During the post-calving movements to the coast, thousands of caribou can come through the Meliadine Project site and reside within and around the Project area for approximately 5 to 10 days. Once 50 caribou are observed within 5 km of the Project footprint boundary (visual detection or based on collar data), a stop work procedure commences on site. 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.

Activity budgets (i.e., time spent feeding, resting, walking, running) of caribou exposed to disturbances from the Project and AWAR will be used to provide inputs for assessing the impact to the energy balance of caribou (Section 4.5.2 of the TEMMP (Golder 2015) for additional discussion). The immediate effect of specific stressors (e.g., aircraft, vehicles, other wildlife) on caribou behavior will also provide general insight into the relative effect of natural versus road stressors on caribou behavior. Essentially this data will contribute to a larger data set from information collected at other mine sites to help determine a weight of evidence of caribou behavioral response to stressors on the Project site and from the AWAR. Consequently, opportunistic surveys should be completed when appropriate to do so during the caribou post-calving migration, without causing additional stress to caribou (based on surveyor opinion).

The objectives of this component of the monitoring program are to:

- determine the effect of the Project AWAR on caribou activity budgets
- determine the effect of other mining activities (e.g., blasting, human presence, light truck traffic) that may elicit a response in caribou
- determine which stressors associated with the Project have the greatest influence on caribou behavior, and the variation in caribou behavior from these stressors

8.1.1 Methods

Ground-based behavioral observations, or scan sampling, are conducted to provide data on changes in caribou behavior 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 (Golder 2015) for additional details on the behavior scan method.

8.1.2 Results

Caribou behavior observations were completed on July 11, July 12, July 13, July 15 and July 21, 2018. A summary of caribou behavior observation in 2018 is present in Table 8.1-1. Observations showed no obvious behavioral response to mine activity.

Table 8.1-1: Caribou Behavior Observations (2018)

Date of Observation	Location	Approximate Number of Caribou	Behavior(s) Observed
11 July 2018	Between CP5 and Exploration Camp	8	Bedding, Feeding, Standing
12 July 2018	NW of Old Anfo. Plant	73	Feeding, Walking
13 July 2018	South of Landfarm B	604	Bedding, Feeding, Walking
13 July 2018	Western Edge of Project	520	Feeding, Swimming, Walking
15 July 2018	Between H15and MSB Pad	231	Feeding, Standing, Walking
21 July 2018	NW of Old Anfo. Plant	162	Bedding Feeding, Walking
21 July 2018	West of CP1	1	Feeding, Standing, Walking

8.2 Caribou Advisory

The objective of the Caribou Advisory Monitoring program is ensure workers are aware of the approximate numbers of caribou on and in close proximity the Project, which is related to the potential for interactions between caribou and mining activities. This 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., haul road closure, closing specific areas on the Project site, speed reduction).

8.2.1 Methods

Agnico Eagle in collaboration with the GN and KIA undertook an extensive preparation for caribou migration at Meliadine, including the implementation of a caribou monitoring and work suspension protocol to minimize sensory disturbance at the Project site and along the AWAR. HTO and KIA members assist AEM staff conducting surveys during caribou migration. KIA members, assisted by Government of Nunavut (GN) staff worked with AEM staff to monitor caribou from July 5th to July 22nd, 2018 during the caribou migration period. 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 (Appendix IV; Golder 2015) including the use of collar data and regular surveys, and issued 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.

8.2.2 Results

Mass migration through the Project and AWAR took place between 5 July and 22 July 2018. At the Project, the caribou work suspension protocol (complete work stoppage) was in effect for periods of 8 July to 17 July (Table 8.2-1). Closure and restrictions on AWAR took place on 7-20 July (Table 8.2-1). In total for both the Project and AWAR there was a complete work stoppage for 191 hours (~8 days) and restricted duties for 93 hours (~4 days).

Table 8.2-1: Caribou Advisories Meliadine, 2018

Date	Hours	Location	Mitigation
5 July	11.25	Mine[(a)]	Light duties permitted
6 July	14.5	Mine[(a)]	Light duties permitted
6 July	7.5	Mine[(a)]	Light duties at main site, full stoppage at exploration camp
7 July	5.5	Mine[(a)]	Light duties at main site, full stoppage at exploration camp
7 July	6.5	Mine[(a)]	Exploration camp restricted to light duties
7 July	6	Mine[(a)]	Light duties permitted
7 July	4	Mine[(a)]	Light duties at main site, full stoppage at exploration camp
7 July	2	Mine[(a)]	Complete work stoppage
7 July	12	AWAR	Speed limit restricted to 30 km/hr
8 July	24	Mine[(a)]	Complete work stoppage
8 July	18	AWAR	Complete work stoppage
9 July	24	Mine[(a)]	Complete work stoppage
9 July	24	AWAR	Complete work stoppage
10 July	12	Mine[(a)]	Complete work stoppage
10 July	24	AWAR	Complete work stoppage

Table 8.2-1: Caribou Advisories Meliadine, 2018

Date	Hours	Location	Mitigation
11 July	6	Mine[(a)]	Light duties permitted
11 July	12	AWAR	Speed limit restricted to 30 km/hr
12 July	9	AWAR	Speed limit restricted to 30 km/hr
12 July	15	AWAR	Complete work stoppage
13 July	17	Mine[(a)]	Complete work stoppage
13 July	24	AWAR	Complete work stoppage
14 July	6	Mine[(a)]	Complete work stoppage
14 July	12	AWAR	Complete work stoppage
14 July	12	AWAR	Speed limit restricted to 30 km/hr
15 July	20	Mine[(a)]	Complete work stoppage
15 July	24	AWAR	Complete work stoppage
16 July	5	Mine[(a)]	Complete work stoppage
16 July	4	Mine[(a)]	Portal 1 work stoppage
16 July	15	Mine[(a)]	Complete work stoppage
16 July	5	AWAR	Complete work stoppage
16 July	4	AWAR	Speed limit restricted to 30 km/hr
16 July	15	AWAR	Complete work stoppage
17 July	6	Mine[(a)]	Complete work stoppage
17 July	1	Mine[(a)]	Work stopped at industrial pad and portal 1
17 July	2	Mine[(a)]	Light duties at industrial pad and portal 1
17 July	6	AWAR	Complete work stoppage
18 July	16	AWAR	Complete work stoppage
19 July	5	AWAR	Complete work stoppage
19 July	13	AWAR	Speed limit restricted to 30 km/hr
20 July	3	AWAR	Speed limit restricted to 30 km/hr

(a) Mine includes Site vehicle traffic, UG operations, Exploration Camp and Industrial Pad.

8.3 Accuracy of Impact Predictions

A summary of the impact predictions proposed in the TEMMP (Golder 2015) is provided in Table 2.0-1. Though not fully developed, the following thresholds are suggested as a starting point for adaptive management and TEMMP (Golder 2015) refinement and is tested against the results of the 2018 observational data (Table 8.3-1).

Table 8.3-1: Accuracy of Impact Predictions - Caribou

Monitoring Indicator	Preliminary Threshold	Exceeded in 2018?	Adaptive Management	Monitoring Method	TEMMP* Section
Hunting by Rankin Inlet Residents	After 3 years of data collection in collaboration with GN, establish a threshold level	Not assessed in 2018	Not Currently Identified	Hunter Harvest Survey, Collected throughout the year and reported annually	4.8
Sensory Disturbance	<10% caribou deflections from AWAR	Not assessed in 2018	Not Currently Identified	Ground Surveys, Satellite-collaring	4.7

Table 8.3-1: Accuracy of Impact Predictions - Caribou

Monitoring Indicator	Preliminary Threshold	Exceeded in 2018?	Adaptive Management	Monitoring Method	TEMMP* Section
Vehicle Collisions	No more than 1 ungulate/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	4.4.2
Project Related Mortality	No more than 1 ungulate/year	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring	4.4.2

AWAR = All-Weather Access Road; GN = Government of Nunavut Department of Environment; *TEMMP = Terrestrial Environment Management and Monitoring Plan (Golder 2015)

8.4 Recommendations

To harmonize methods with other Agnico Eagle projects in Nunavut, further discussions between Agnico Eagle and GN DoE should be initiated on establishing the best path forward for determining effects from mining development on caribou and the Zone of Influence and data collection measures to support these analyses.

Agnico Eagle will continue to focus monitoring on caribou activity near the Project and AWAR while continuing to support GN DoE led caribou monitoring and/or research where possible.

9.0 HUNTER HARVEST INFORMATION

Agnico Eagle is currently in working on an Memorandum of Understanding (M.O.U.) with the HTO (M. Theriault, Agnico Eagle, 2019, pers. comm).

10.0 BIRDS

Four types of surveys were completed in 2018 for waterfowl, waterbirds, upland birds and shorebirds including: shoreline surveys, point counts, avian use surveys, and Program for Regional and International Shorebird Monitoring (PRISM) surveys. These surveys are designed to measure mining-related effects on upland bird (i.e., songbirds and waterfowl) and shorebird species richness, diversity, and relative abundance. Specifically, the intent is to measure these parameters in response to mining development and increased traffic along the AWAR.

Shoreline surveys are designed to determine nesting distribution within 200 m of the shore, which is considered to be the approximate zone of influence from sensory disturbance in the FEIS, of mining and Project-related infrastructure (e.g., AWAR). The program will attempt to determine mated pair distribution and nesting success in ponds, wetlands, and lake shorelines within 200 m of Project infrastructure.

Point counts, avian use surveys, and PRISM surveys for upland birds and shorebirds were completed in 2018. The objectives of PRISM include estimating breeding population size; describing the distribution, abundance, and habitat relationships; and monitoring trends in breeding population size of shorebirds (Bart et al. 2005), can be expanded to include upland birds. The PRISM survey methods (CWS 2008), avian use survey and point count methods employed are used consistently across North America so data can be compiled and compared across the continent.

10.1 Shoreline Surveys

This program is designed to determine the nesting distribution of waterfowl and waterbirds on waterbodies within 200 m of mining related infrastructure including the AWAR. All waterbodies within this search area are surveyed on foot by trained biologists to locate and identify nesting waterbirds.

10.1.1 Methods

Survey methods are described in more detail in the TEMMP (Golder 2015). Due to limited survey time, the field crew deviated from described methods and worked separately on shorelines that were completely surveyed. All waterbodies within 200 m of the Project, excluding the AWAR, were surveyed on 12 to 18 June 2018 (Figure 10.1-1).

10.1.2 Results

A total of eight different species were observed (Table 10.1-1). No fledglings were observed, all observations were nesting adults, and eggs were observed in nests. Canada Goose were the most numerous species observed with 28 adults recorded. In total, 56 adult birds were recorded with 27 eggs observed among eight different species. A total of 27 nests were observed, eggs counts were confirmed in 14 nests, 6 nests contained no eggs, and eggs counts could be completed in the remaining 7 nests. Waterbodies within 200 m of the AWAR were not completed due to time constraints.

Figure 10.1-1: Breeding Bird Survey Plot Locations

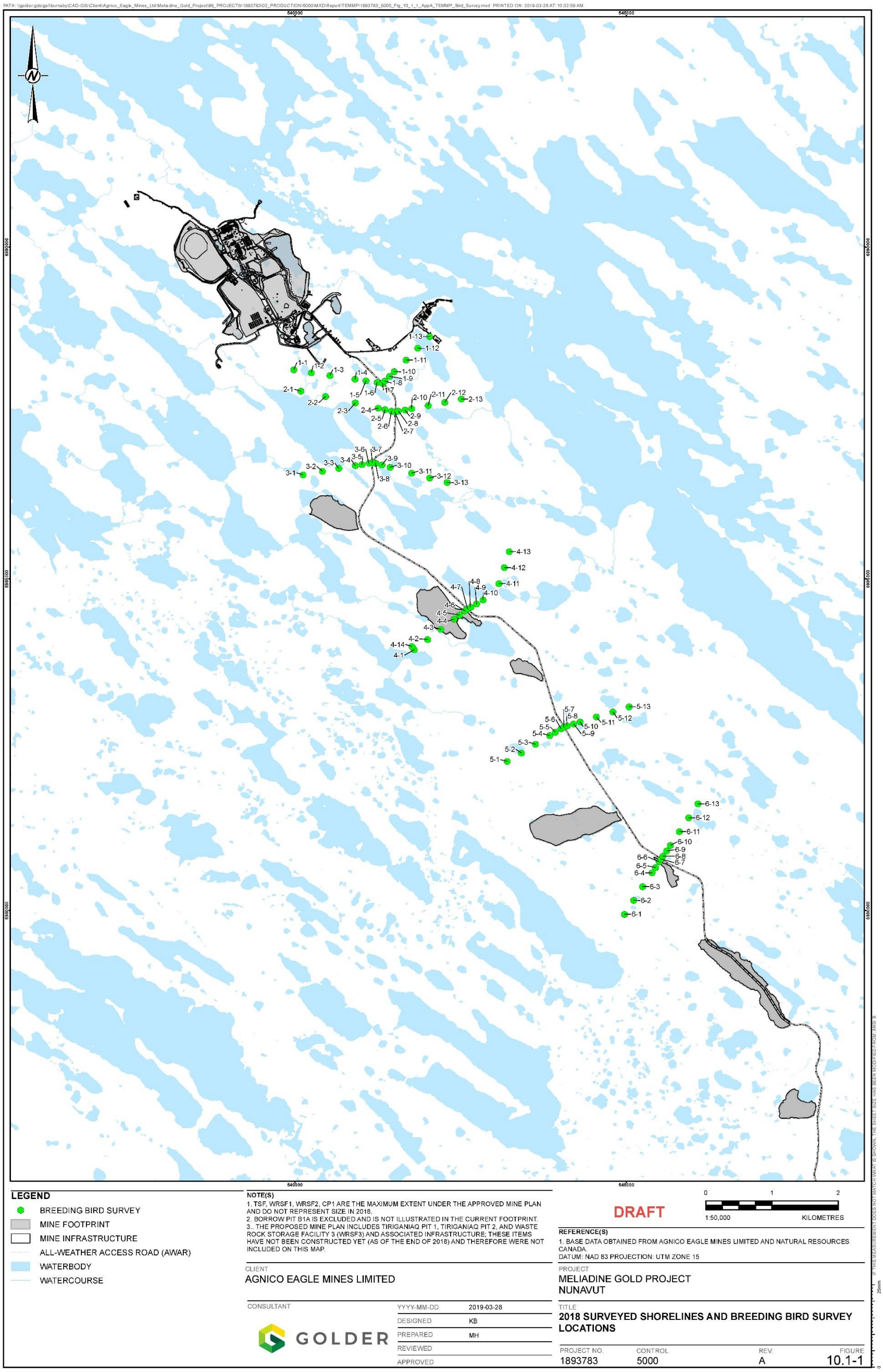


Table 10.1-1: Summary of Adult and EggsObserved during Shoreline Surveys, July 2018

Species	Adult	Eggs[(a)]	Total
Cackling Goose	2	2	4
Canada Goose	28	14	42
Horned Lark	4	1	5
Lapland Longspur	6	3	9
Least Sandpiper	4	2	6
Peregrine Falcon	2	1	3
Tundra Swan	2	1	3
Willow Ptarmigan	6	1	9
Grand Total	56	27	83

(a) Eggs were counted to observers best ability while minimizing disturbance to nests

10.2 Point Counts

In baseline studies, upland bird point count surveys were used to determine the composition and relative abundance of upland bird species and their habitat associations within the RSA (Agnico Eagle 2014). Upland bird point count surveys estimate population densities and species composition of bird communities (Robbins 1970; Kissling and Garton 2006). They provide habitat-specific density data and can be used to measure the effect of land-use practices on breeding bird populations.

10.2.1 Methods

Point count locations were determined to be within 1 km on either side of the AWAR (2 km in total) with the first point counts occurring at 50 m from the road on either side, with subsequent plots spaced 100 m from the preceding plot. Each transect consisted of 12 plots, and were completed with 6 transects in 2018 for a total of 72 point count surveys. Point counts were 5-minutes long and constrained to a radius distance of 100 m. The survey method is described in more detail in the TEMMP (Golder 2015).

10.2.2 Results

In total, just seven passerine (i.e. songbird) species were recorded on the point count surveys with a total of 177 individuals recorded (Table 10.2-1). The most abundant species was horned lark (*Eremophila alpestris*) with 68 total birds observed. The least abundant species was American robin (*Turdis migratorius*) with just 1 individual recorded. An additional 17 species were incidentally recorded during point count surveys, comprising the remaining 108 observations. The small number of observations was likely a result of late spring conditions and field staff being on site early.

Table 10.2-1: Summary table of point count survey results

Species	Total n = 72	Esker Complex n = 1	Gravel Pit n = 2	Heath/Bedrock n = 3	Heath/Boulders n = 17	Heath Tundra n = 22	Low Shrub n = 2	Sedge Wetland n = 7	Tussock/Hummock n = 18
American pipit	22	0	1	1	8	4	0	3	5
American robin	1	0	0	0	0	1	0	0	0
common redpoll	4	0	0	0	0	1	0	0	3
horned lark	68	0	1	4	23	20	3	8	9

Table 10.2-1: Summary table of point count survey results

Species	Total n = 72	Esker Complex n = 1	Gravel Pit n = 2	Heath/Bedrock n = 3	Heath/Boulders n = 17	Heath Tundra n = 22	Low Shrub n = 2	Sedge Wetland n = 7	Tussock/Hummock n = 18
Lapland longspur	53	2	0	1	10	18	1	7	14
savannah sparrow	27	2	0	2	10	4	1	0	8
white-crowned sparrow	2	0	0	0	1	0	0	0	1
Totals:	177	4	2	8	52	48	5	18	40

10.3 PRISM

Agnico Eagle contributed to the Environment and Climate Change Canada (ECCC) PRISM surveys in 2018 and will continue to do so every three years. These surveys are designed to document population numbers of Arctic breeding shorebirds and contribute to regional knowledge in an effort to set population targets and assist with management and conservation of these species (EC 2012). For each PRISM survey, plot locations are randomly chosen by ECCC. For the 2018 field program, a representative from ECCC joined Golder crews at the Project to conduct PRISM surveys in the area. This data will be submitted to ECCC for inclusion in their regional database.

10.3.1 Methods

Monitoring methods adhered to standard techniques for surveying shorebirds (CWS 2008). Ground-based rapid assessment surveys of 12 ha plots were completed from June 19 – 21, 2018. The field crew consisted of two Golder biologists, an ECCC biologist and two local assistants. Observers recorded the species encountered, estimated their breeding status, and recorded habitat conditions.

10.3.2 Results

A total of ten PRISM survey plots were surveyed with a total of eleven bird species observed. The most common bird species observed in the plots were Lapland longspur (*Calcarius lapponicus,*), and savannah sparrow (*Passerculus sandwichensis,*).

Table 10.3-1 Species Observed in 2018 PRISM Surveys

Species	Nests	Probable Nests	Pairs	Males	Females	Unknown Sex
Common redpoll						4
Dunlin		1				
Greater white-fronted goose		1				
Horned lark		2	2			1
Lapland longspur	6	1	4	13	4	
Least sandpiper				1		
Long-tailed duck			2	1		
Sandhill crane	1					2
Savannah sparrow		4	4	14	3	2
Semi-palmated plover		1				
Willow ptarmigan				2		
TOTAL	**7**	**10**	**12**	**31**	**7**	**9**

No species-at-risk were observed on survey plots. Breeding evidence of three species of shorebirds was found during the surveys, including dunlin (*Calidris alpina*), least sandpiper (*Calidris minutilla*), and semipalmated plover (*Charadrius semipalmatus*).

Due to the late spring in 2018, and the relatively early timing of the field work, no actively nesting songbirds were found during PRISM surveys; however, breeding evidence such as singing males and closely associating pairs provides evidence where birds are likely to nest. Only one nest was found overall, which was established by a pair of sandhill cranes (*Grus canadensis)*, and contained a single egg.

10.4 Accuracy of Impact Predictions

A summary of the impact predictions proposed in the TEMMP (Golder 2015) is provided in Table 2.0-1. The primary objective of the waterfowl and waterbird monitoring program is to determine the effects, if any, of sensory disturbance from mining activities, including access along the AWAR on breeding success or changes in distribution of mated pairs (Table 10.4-1).

Threshold triggers for additional mitigation or evaluation of mitigation will be determined through discussions with appropriate ECCC and GN DoE personnel. This thresholds may be difficult to initially establish due to low bird densities and high variability. However, thresholds will likely be based on habitat loss (i.e., 515 ha of aquatic habitat) with no additional habitat loss than FEIS predictions. After initial data collection (first 3 years of operations) and a range of natural variability is determined, breeding and productivity thresholds will be determined.

Table 10.4-1: Accuracy of Impact Predictions – Waterfowl, Waterbirds, Upland Birds and Shorebirds

Monitoring Indicator	Threshold	Exceeded in 2018?	Adaptive Management	Monitoring Method	TEMMP* Section
Habitat Loss and Degradation	515 ha of Aquatic Habitat	To be assessed after first 3 years of operations	Not Currently Identified	Shoreline Surveys, PRISM	4.10.2
Disturbance of Nesting Waterfowl	TBD once NRV is established through consultation with ECCC and GN	No	Not Currently Identified	Shoreline Surveys	4.10
Project-related Mortality	1 Individual Waterbird	No	Not Currently Identified	Wildlife Sightings Log, Site Surveillance Monitoring, AWAR Road Surveillance, Road Surveillance	4.10
Changes in Breeding Bird Populations	TBD once NRV is established through consultation with ECCC	No	Not Currently Identified	Point counts and transects	4.11

SLRA = Screening Level Risk Assessment; NRV = Natural Range of Variability; ECCC = Environment and Climate Change Canada; GN = Government of Nunavut Department of Environment; PRISM = Program for Regional and International Shorebird Monitoring; *TEMMP = Terrestrial Environment Management and Monitoring Plan (Golder 2015)

11.0 RECOMMENDATIONS

It is recommended that Agnico Eagle continue to monitor birds through shoreline surveys, breeding bird point counts and PRISM. The timing of the field programs occurred earlier 2018 to capture breeding activity and avoid overlap with the Qamanirjuaq herd migration through the area. Further discussions with ECCC and GN DoE is required to determine the locations and frequency of surveys.

Agnico Eagle has engaged the Arctic Raptors Research Program (http://www.arcticraptors.ca/) to develop and implement the raptor monitoring program (Franke 2012). The 2018 annual report of the Arctic Raptors Research Program is included in Appendix B.

11.1 Accuracy of Impact Predictions

Thresholds for the raptor monitoring program will be developed in conjunction with the Artic Raptor Research Program and GN DoE personnel. However, a threshold of no more than a 20% difference in occupancy and productivity between nest sites near Project infrastructure (e.g., 1 km) and nest sites far from Project infrastructure (e.g., > 1 km) is proposed. In addition, site-specific monitoring opportunities (e.g., cameras) will be discussed with the Arctic Raptor Research Program to determine potential mechanisms for differences in productivity, which can then be incorporated into adaptive management strategies.

12.0 SOIL AND VEGETATION MONITORING

The 2017 TEMMP Annual Report (Golder 2018) presented the baseline levels of metals in berry producing plants, sedges, lichen, and soil chemistry potentially affected by the Project. 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. Vegetation (i.e., berries, sedges, and lichens) and soil sampling will occur again in 2019, when Mine production is expected to start. Soil characteristics will be compared to baseline conditions to determine whether there is an accumulation of metals or change in nutrient composition. If there are indications of vegetation stress, poor vigour, or plant die-back, soil sampling will be implemented (as required), to determine whether changes in the growth media is influencing plant health and/or establishment.

Annual monitoring was not conducted in 2018. Monitoring programs will be completed at three-year intervals starting in 2019.

12.1 Invasive plant surveys

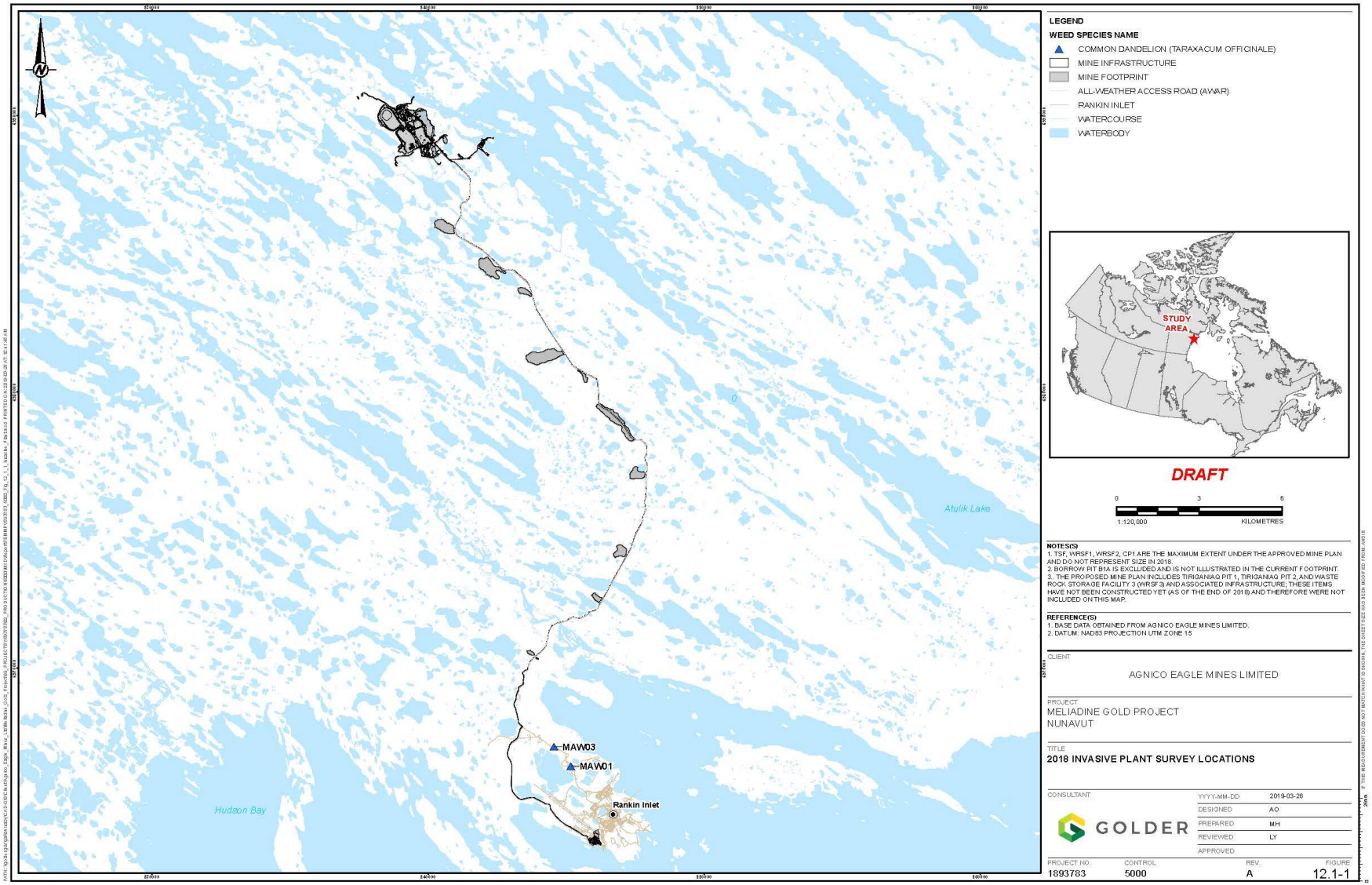
The spread of invasive weed species across the landscape is a concern for the Inuit. Construction equipment and operation activities can result in the introduction of, or spread of, invasive vegetation species. Thus, the Project certificate No 006 (Appendix A) includes Term and Conditions 36 and 37 to prevent and minimize the introduction of invasive 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 (Golder 2012).

This section includes the methods and results and mitigation measures to minimize the spread of invasive plant species as a result of Project construction. The next invasive monitoring surveys will occur in 2019, when Project Operations are expected to start. Subsequent surveys will be completed annually.

12.1.1 Methods

A desktop search for invasive plants in Nunavut was completed prior to field surveys. A list of potential non-native and invasive plants was obtained from the Canadian Endangered Species Conservation Council List (CESCC 2010). Invasive plant surveys were completed on July 24, 2018 by a Golder Terrestrial Ecologist. Surveys targeted areas with a high potential of occurrence such as along the AWAR, Project footprint, and ship loading areas. Ten different locations were assessed at each side of the AWAR (Figure 12.1-1). In addition, the Project accommodations footprint was circumnavigated, and the AEM ship loading area in Rankin Inlet will be surveyed. Where invasive plant species were observed, a GPS point and photograph was taken and the size of occurrence was recorded.

Figure 12.1-1: 2018 Invasive Plant Survey Locations



12.1.2 Results

Two occurrences of common dandelion (*Taraxacum officinale*), a listed species under the Non-Native and Invasive species in Nunavut (CESCC 2010) (Appendix A) were recorded along the AWAR.Common dandelion was not observed in the Project footprint or ship loading areas. Figure 10.1-1 shows the location along the AWAR were this invasive species occurred.

12.1.3 Mitigation

The early detection of 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., GPS coordinated and map), species identification and photographs of the species in question.

In addition, to the early detection of non-native invasive species the following mitigation measures have been implement by AEM during Project operation:

- 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;
- 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.

12.2 Accuracy of Impact Predictions

Invasive plant species were observed in disturbed area (i.e., along AWAR and around operations camp area). However, invasive plant encroachment was not observed in vegetation communities/habitat types. A summary of the impact predictions proposed in the TEMMP (Golder 2015) is provided in Table 2.0-1. Specific thresholds for vegetation and wildlife habitat monitoring are outlined in Table 12.2-1.

Table 12.2-1: Accuracy of impact Predictions - Vegetation

Monitoring Indicators	Threshold	Exceeded in 2018?	Adaptive Management	Monitoring Method	TEMMP* Section
Habitat Degradation by Contamination	No invasive plant species established	Yes	See Section 12.1.3	Invasive Plant Survey of AWAR and Project site	4.6
Habitat Reclamation following Project Closure	NA	No	Not Currently Identified	Ground Surveys, Vegetation Plots, Mapping	4.6

*TEMMP = Terrestrial Environment Management and Monitoring Plan (Golder 2015)

12.3 Recommendations

For the occurrences found during 2018 surveys, both individuals were hand pulled, and the plant material collected in bags to be disposed of at an offsite location. The CESCC (2010) (Appendix D) has developed posters that show Non-Native species and invasive species in Nunavut. These can easily be displayed at the Project site and incorporated into on-boarding materials. Chemical herbicide treatments are not recommended to be used at this point as the presence and extent of this invasive species is limited.

13.0 ENVIRONMENTAL VARIABLES

A summary of climate conditions collected on site in 2018 are presented in Table 12.3-1

Table 12.3-1: Climate Conditions Recorded in the Project Area

ENVIRONMENTAL VARIABLE	YEAR[(a)]
	2018
TEMPERATURE (°C)	
Mean Annual Temperature	-11.3
Max Annual Temperature	27.5
Min Annual Temperature	-46.8
PRECIPITATION	
Total Annual Rainfall (mm)	139.7
Total Annual Snowfall (mm)	111.8

(a) All values reported were collected via on site meteorological station, with the exception of snowfall which was collected by AE staff

The max annual temperature of 27.5°C was recorded on July 11, 2018 and the minimum annual temperature -46.8°C was recorded on February 19, 2018. Snowmelt began June 9, 2018 when the average daily air temperature exceeded 0°C. Environmental variables will continue to be monitored on an on-going basis.

Signature Page

Golder Associates Ltd.

Kelly Bourassa, BSc
Biologist

Corey De la Mare, PBiol
Principal, Senior Wildlife Biologist

KB/CDLM/crm

14.0 REFERENCES

Agnico Eagle (Agnico Eagle Mines Limited). 2014. Final Environmental Impact Statement (FEIS) – Meliadine Gold Project, Nunavut. Submitted to Nunavut Impact Review Board. April 2014.

Bergerud, A. T., Jakimchuk, R. D., and Carruthers, D. R. 1984. *The Buffalo of the North: Caribou (Rangifer tarandus) and Human Developments*. Arctic, 37:7-22.

Boulanger, J., K.G. Poole, A. Gunn, and J. Wierzchowski. 2012. Estimating the Zone of Influence of Industrial Developments on Wildlife: a Migratory Caribou and Diamond Mine Case Study. Wildlife Biology. 18:164-179.

Burt, P.M. 1997. Diavik Diamond Project Vegetation Baseline Studies - Plant Associations and Habitat Types and Plant Species List.

Campbell M. W., J. G. Shaw, C. A. Blyth. 2012 Kivaliq Ecological Land Classification Map Atlas: A Wildlife Perspective. Government of Nunavut. Department of the Environment. Technical Report Series = 1-2012 274pp.

Campbell, M.W., A. Kelly, B. Croft, J.G. Shaw, C.A. Blyth. 2014. Barren-ground Caribou in Nunavut and Northwest Territories – Map Atlas. Government of Nunavut, Department of Environment. Government of Northwest Territories, Department of Environment and Natural Resources. Technical Report in preparation.

Case, R., L. Buckland, and M. Williams. 1996. The Status and Management of the Bathurst Caribou Herd, Northwest Territories, Canada. Government of the Northwest Territories File Report 116:34-34. Yellowknife, NT.

CCME. 1999b. Canadian Environmental Quality Guidelines. Winnipeg, MB.

CESCC (Canadian Endangered Species Conservation Council List) 2010. Non-Native Species and Invasive Species in Nunavut.

CESCC. 2016. Wild species 2015: The general status of species in Canada. National General Status Working Group: 128 pp.

Coulton, D.W., J.A. Virgl, and C. English. 2013. Falcon Nest Occupancy and Hatch Success Near Two Diamond Mines in the Southern Arctic, Northwest Territories. Avian Conservation and Ecology 8:14, http://dx.doi.org/10.5751/ACE-00621-080214.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada). 2017. Status of Endangered Wildlife in Canada. Available at https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html. Accessed November 2017.

DDMI (Diavik Diamond Mines (2012) Inc.). 1998. Environmental Effects Report, Wildlife. Yellowknife, NT.

Dickinson. R & Feance R. 2006. Weeds of Canada. University of Alberta and Lone Pine Publishing. 434 pg.

EMAB (Environmental Monitoring Advisory Board). 2004. Comments by EMAB on the 2004 Wildlife Monitoring Report. 18 October 2004.

ENR (Department of Environment and Natural Resources). 2004. Comments by RWED on the 2004 Wildlife Monitoring Report. 14 June 2004.

ENR. 2017a. Bathurst caribou herd. Government of the Northwest Territories, Department of Environment and Natural Resources website. Accessed: January 2017.

ENR. 2017b. Ahiak, Beverly and Qamanirjuaq Herds. Government of the Northwest Territories, Department of Environment and Natural Resources website. Accessed January 2017.

ENR. 2017c. Barren-ground caribou – NWT Management Strategy. Government of the Northwest Territories, Department of Environment and Natural Resources website. Accessed January 2017.

ERM Rescan. 2014. Ekati and Diavik Diamond Mines: 2014 Final Lac de Gras Regional Grizzly Bear DNA Report. Prepared for Dominion Diamond Ekati Corporation and Diavik Diamond Mine (2012) Inc. by ERM Rescan Consultants Canada Ltd. Yellowknife, NWT.

Franke, A. 2012. Agnico-Eagle Raptor Project Proposal. Prepared by Dr. Alastair Franke for Stephane Robert, Manager Regulatory Affairs Nunavut, Agnico Eagle Mines Limited. November 2012.

Festa-Bianchet, M., J.C. Ray, S. Boutin, S.D. Côté and A. Gunn. 2011. Conservation of caribou (Rangifer tarandus) in Canada: an uncertain future. Canadian Journal of Zoology 89:419-434.

Gau, R. and R. Case. 1999. Evaluating Nutritional Condition of Grizzly Bears Via ^{15}N Signatures and Insulin-like Growth Factor-1. Ursus 13:285-291.

GNWT (Government of the Northwest Territories). 2011. Caribou Forever – Our Heritage, Our Responsibility: A Barren-ground Caribou Management Strategy for the Northwest Territories 2011-2015. Department of Environment and Natural Resources. Yellowknife, NT.

GNWT. 2013a. *Final Minutes from March 6th 2013 Grizzly Bear Workshop*. Department of Environment and Natural Resources. Yellowknife, NT.

GNWT. 2013b. *Monitoring Protocol: Wolverine DNA Hair Snagging*. Department of Environment and Natural Resources. Yellowknife, NT.

Golder.2012. SD 6-2 2009 Terrestrial Vegetation and Wildlife Baseline Synthesis Report-Meliadine Gold project, Nunavut

Golder (Golder Associates Ltd.). 2015. SD 6-4 Terrestrial Environment Management and Monitoring Plan (TEMMP) – Meliadine Gold Project, Nunavut. Prepared for Agnico Eagle Mines Limited. Rankin Inlet, NU.

Golder (Golder Associates Ltd.). 2011. *Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region*. Prepared for Diavik Diamond Mines Inc. Yellowknife, NT.

Golder. 2014. *Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region*. Prepared for Diavik Diamond Mines Inc. Yellowknife, NT.

Golder.2014. SD 6-4 Terrestrial Environment Management and Monitoring Plan-Meliadine Gold Project, Nunavut

Golder. 2017. *Analysis of Environmental Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region*. Prepared for Diavik Diamond Mines Inc. Yellowknife, NT.

Golder. 2018. 2017 Terrestrial Effects Monitoring and Mitigation Program Annual Report-Agnico Eagle – Meliadine Division. 1663489_667_RPT_Rev0

Gunn, A., J. Dragon and J. Nishi. 1997. *Bathurst Calving Ground Survey, 1996*. Department of Renewable Resources. File Report No. 119.

Gunn, A., J. Dragon and J. Boulanger. 2002. *Seasonal Movements of Satellite-collared Caribou from the Bathurst Herd*. Final report to the West Kitikmeot Slave Study Society. Yellowknife, NT.

Gunn, A., D. Russell and J. Eamer. 2011. *Northern caribou population trends in Canada.* Canadian Biodiversity: Ecosystem Status and Trends 201, Technical Thematic Report No. 10. Canadian Councils of Resource Ministers. Ottawa, ON, 77 pp.

Handley, J. 2010. *Diamond Mine Wildlife Monitoring Workshop Report*. Yellowknife, NT.

Hines, J.E. 2007. PRESENCE2- Software to Estimate Patch Occupancy and Related Parameters. USGS-PWRC. http://www.mbr-pwrc.usgs.gov/software/presence.html.

Jessen, T, Dieppstraten R, Musiani M, Massolo A, Galpern P, McDermid G. 2014. *Summary Report 2014: Joint Regional Grizzly Bear DNA Project, Snap Lake Mine and Gahcho Kué Project*. University of Calgary, AB, Canada.

Johnson, C.J., M.S. Boyce, R.L. Case, H.D. Cluff, R.J. Gau, A. Gunn and R. Mulders. 2005. *Cumulative Effects of Human Developments on Arctic Wildlife*. Wildlife Monographs 160:1-36.

Li, L. and J.W. Pomeroy. 1997. *Estimates of Threshold Wind Speeds for Snow Transport Using Meteorological Data*. Journal of Applied Meteorology 36:205-213.

Matthews, S., H. Epp and G. Smith. 2001. *Vegetation Classification for the West Kitikmeot/Slave Study Region*. Final Report to the West Kitikmeot/Slave Study Society. Yellowknife, NT.

McLoughlin, P.D., R.L. Case, R.J. Gau and F. Messier. 1999. *Annual and Seasonal Pattern of Barren-ground Grizzly Bears in the Central Northwest Territories.* Ursa 11:79-86.

McLoughlin, P.D., R.L. Case, R.J. Gau, H.D. Cluff, R. Mulders and F. Messier. 2002. *Hierarchical Habitat Selection by Barren-ground Grizzly Bears in the Central Northwest Territories*. Oecologia 132:102-108.

Messier, F., Huot, J., LeHenaff, D., and Luttich, S. 1988. *Demography of the George River Caribou Herd: Evidence of Population Regulation by Forage Exploitation and Range Expansion*. Arctic, 41:279-287.

Miller, F.L. and A. Gunn. 1979. *Reponses of Peary Caribou and Muskoxen to Helicopter Harassment*. Occasional Paper, Number 40, Canadian Wildlife Service.

Mulders, R. 2000. *Wolverine Ecology, Distribution, and Productivity in the Slave Geological Province*. Final Report to the West Kitikmeot/Slave Study Society. Yellowknife, NT.

Murphy, S.M., and J.A. Curatolo. 1987. *Activity Budgets and Movement Rates of Caribou Encountering Pipelines, Roads, and Traffic in Northern Alaska*. Canadian Journal of Zoology 65:2483-2490.

Naeth, M.A., and Wilkinson, S. 2006. Lichens as bioindicators of dust distribution and monitoring at Diavik Diamond Mine, Northwest Territories. Final Report. Submitted to Environmental Division. Diavik Diamond Mines Ltd. NWT.

NWT SAR (Northwest Territories Species At Risk). 2017. Available at: http://nwtspeciesatrisk.com/. Accessed January 2016.

Penner (Penner and Associates Ltd.). 1998. *Wildlife Baseline Report, Diavik Diamonds Project, Lac de Gras, Northwest Territories*. Prepared for Prepared for Diavik Diamond Mines Inc.

Rescan. 2013a. *Joint Regional Grizzly Bear DNA Proposal, 2012*. Developed by Rescan Environmental Services Ltd. In cooperation with the Government of the Northwest Territories Department of Environment and Natural Resources.

Rescan. 2013b. *Memorandum: Response to Regulator and Monitoring Agency Comments Regarding the Joint Regional Grizzly Bear DNA Monitoring Program*. Rescan Environmental Services Ltd. and Golder Associates Ltd.

Rescan. 2014. *Ekati and Diavik Diamond Mines 2014 Final Lac de Gras Regional Grizzly Bear DNA Report*. Rescan Environmental Services Ltd.

SARA (*Species at Risk Act*). 2017. Species at Risk Public Registry website. Available at http://www.sararegistry.gc.ca. Accessed November 2017.

The Canadian Environmental Assessment Act. 1999. *Comprehensive Study Report*, Diavik Diamonds Project.

Thomas, D.C. 1998. Fire-Caribou Relationships: (V) Winter Diet of the Beverly Herd in Northern Canada, 1980 to 1987. Technical Report Series No. 313. Canadian Wildlife Service, Edmonton, AB.

Wightman, C.S., and M.R. Fuller. 2005. *Spacing and physical selection patterns of Peregrine Falcons in central west Greenland*. Wilson Bulletin 117:226-236.

WLWB (Wek'eezhii Land and Water Board). 2015. WLWB Public Registry Online Review System. Available at: http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?Company=Diavik+Diamond+Mines+%28201 2%29+Inc.&doctype=4.+Renew al+-+Extension/. Accessed February 2016.

WLWB (Wek'eezhii Land and Water Board). 2016. WLWB Public Registry Online Review System. Available at: http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?Company=Diavik+Diamond+Mines+%28201 2%29+Inc.&doctype=4.+Renew al+-+Extension/. Accessed February 2016.

U.S. EPA. 2016b. Integrated Risk Information System. Available at: http://www.epa.gov/iris/index.html. Accessed April 2016.

Valkenburg, P., and Davis, J. L. 1986. *Calving distribution of Alaska's Steese-Fortymile caribou herd: a case of infidelity?* Rangifer Spec. Issue No. 1. pp. 315-323.

14.1 Personal communication

Gorton, D. 2019. Agnico Eagle Mines Limited. Email 1 February, 2019.

Theriault, M. 2019. Compliance councelor. Agnico Eagle Mines Limited. Email. 6 December, 2018.

APPENDIX A

Project Certificate (No. 006)

In the matter of the
Agreement Between the Inuit of the Nunavut Settlement Area
and Her Majesty the Queen in right of Canada, S.C., 1993, c. 29
Article 12, Part 5

And

In the matter of an application by
Agnico Eagle Mines Limited
for development of the
Meliadine Gold Mine Project Proposal
in the
Kivalliq Region of Nunavut

NIRB PROJECT CERTIFICATE [NO.: 006]

February 26, 2019

Schedule of Amendments to the Nunavut Impact Review Board's Meliadine Gold Mine Project Certificate No. 006

AMENDMENT No.	DATE OF AMENDMENT	TYPE OF AMENDMENT
001	February 26, 2018	Amendments and additions to Terms and Conditions of Project Certificate to reflect significant modifications to the Meliadine Gold Mine Project as proposed in the Saline Effluent Discharge to the Marine Environment proposal and amendments to reflect implementation of project monitoring and reporting requirements: • Updates to the Project Certificate to reflect changes to legislation and references to regulatory agencies; • Update to Term and Condition 25 to specify the required management plans • New Terms and Conditions 128-131 related to development of the pipeline and on-shore infrastructure, and HTO involvement in developing a specific management plan

1.0 BACKGROUND

Whereas:

A. Pursuant to the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (*Nunavut Agreement*), the Nunavut Impact Review Board (Board or NIRB) has completed a review of the potential ecosystemic and socio-economic effects of the Meliadine Gold Mine Project, NIRB No File. 11MN034 (the Project);

B. The Board has considered the list of commitments made by Agnico Eagle Mines Limited (Agnico Eagle or the Proponent) throughout the NIRB's review and during the NIRB Final Hearing for the Project and the Board has every expectation that the Proponent will fulfill the commitments made during the Final Hearing, within its Final Environmental Impact Statement and contained within supporting documentation submitted during the review of the Project, not just the commitments that are expressly included as terms and conditions in this Project Certificate;

C. The Board has determined, pursuant to Section 12.5.5 of Article 12 of the *Nunavut Agreement*, that, taking into account the implementation of the measures necessary to prevent or mitigate the potential adverse environmental and socio-economic effects associated with the Project and set out as terms and conditions in this Project Certificate, the Meliadine Gold Mine Project is not likely to cause significant adverse ecosystemic and socio-economic effects;

D. The Board has found, pursuant to Section 12.5.5 of Article 12 of the *Nunavut Agreement* and taking into account all matters relevant to its mandate including Section 12.2.5, that the Meliadine Gold Project will enhance and protect the existing and future well being of the residents and communities of the Nunavut Settlement Area;

E. The Minister of Aboriginal Affairs and Northern Development Canada has accepted the NIRB Final Hearing Report for the Meliadine Gold Mine Project (January 2015), and the recommended terms and conditions contained in the Report that are now included in the Project Certificate; and

F. Recognizing the importance of co-ordination, integration and avoiding duplication with other monitoring requirements in permits, licences and other authorizations, the project-specific monitoring program, provided as Appendix A to this Project Certificate, will be issued in final form after key regulatory authorizations, including land use permits, water licences and mineral leases, are issued.

Therefore, the Nunavut Impact Review Board pursuant to Section 12.5.12 of Article 12 of the *Nunavut Agreement*, and as applicable to the Saline Effluent Disposal Proposal, also pursuant to Section 12.8.2 of Article 12 of the *Nunavut Agreement*, s. 112 of the *Nunavut Project and Planning Assessment Act,* S.C. 2013, c 14, s.2 *(NuPPAA)*, issues this amended Project Certificate for the Meliadine Gold Mine Project to Agnico Eagle Mines Limited, subject to the terms and conditions contained herein.

2.0 PROJECT DESCRIPTION

The Meliadine Gold Mine Project (the Project) consists of mining at five gold deposits and processing of the ore at an on-site milling operation at a rate of 8,500 tonnes per day, as well as transportation of the gold bullion south for final refinement and sale. The Project includes the extended exploration, construction, operation, closure, and reclamation of both underground and open-pit mines and associated infrastructure for extraction, processing and transportation of gold. The mining of gold ore would occur at the five deposits through a phased approach, Tiriganiaq, Wesmeg, Pump, F Zone and Discovery, with Tiriganiaq being the only deposit where gold would be mined through both above ground and underground methods, with the other deposits being mined using open pit methods. There are three main Project areas: the Tiriganiaq mine site, the Discovery deposit and the Itivia Harbour. Phase 2 of all-weather access road (AWAR) would be an upgrade of the currently existing and previously approved Phase 1 of the AWAR which is approximately 24 kilometres (km) long and connects the Tiriganiaq exploration site to Rankin Inlet currently. As part of construction of Phase 2 of the AWAR, a spur road would be developed to connect the main road with the south end of Meliadine Lake to allow for public access to the Lake. Agnico Eagle has confirmed that Phase 2 of the AWAR would not be completed until it is ready to develop the Discovery deposit and would entail constructing a second road which would run parallel but separately from the public road, for mine traffic only.

Supplies and equipment required for construction and ongoing Project supply would be received during the open water season only, at the Itivia spud barge at Melvin Bay, near Rankin Inlet. The Itivia area would consist of eight one-million litre tanks for fuel and a laydown area to temporarily store materials received during the open water barging season. This area would be connected to the AWAR by a bypass road which would facilitate mine traffic avoiding the community of Rankin Inlet on route to the Project mine site.

In 2018 Agnico Eagle submitted the Saline Effluent Discharge proposal to the NIRB as required by the original Meliadine Final Hearing Report which directed that, should the preferred method of groundwater disposal change, further assessment would be required. Under the Saline Effluent Discharge proposal, Agnico Eagle sought to discharge saline effluent (salty or saline groundwater) from the Tiriganiaq Underground Mine into the marine environment at Melvin Bay near Rankin Inlet. Specifically, Agnico Eagle proposed to collect and truck the saline groundwater via the all-weather road from the mine site to a holding tank on the shore. The holding tank would be connected to an underwater pipeline and diffuser installed into Melvin Bay which would release the saline water into the ocean. Further, the Nunavut Water Board Type “A” Water Licence for the Project allows Agnico Eagle to manage the salty groundwater flowing into the underground workings by treating the water prior to discharge into collection ponds and Meliadine Lake. Even after the Saline Effluent Discharge proposal is approved to proceed, Agnico Eagle is expected to continue using the previously licensed water management practices but will add the option to discharge a portion of the salty groundwater into the ocean during the open water season, when all the required regulatory authorizations for this activity are in place.

3.0 IMPLEMENTATION

NIRB has the authority to reconsider the terms and conditions of the Project Certificate to ensure that the terms and conditions are achieving their purpose. Clearly the NIRB expects the Proponent to meet its obligations under this Certificate, however, the NIRB may revisit the Certificate if the NIRB determines that the terms and conditions are not achieving their purpose.

If the Kivalliq Inuit Association or other Designated Inuit Organization, or person or body that would normally have standing to seek this type of court determination, has concerns that any term or condition is not being implemented, these parties may seek a determination before the appropriate court regarding whether or not the terms and conditions in the project certificate have been implemented. This Project Certificate is implemented by authorizing agencies in accordance with the reviewability section of the *Nunavut Agreement* (Section 12.9.7):

> "A licence, permit, certificate or other governmental approval which implements or incorporates any term or condition of a NIRB project certificate may not be called into question in a court of law on the grounds that the issuing agency thereby fettered its discretion or otherwise acted without jurisdiction, when implementing any term or condition of a NIRB project certificate."

3.1 Overview of NIRB Monitoring Program

As set out in Sections 12.7.1 and 12.7.2 of Article 12 of the *Nunavut Agreement* and s. 135 of the *NuPPAA,* the NIRB has the jurisdiction to establish a project-specific monitoring program to: measure the ecosystemic and socioeconomic effects of a project; assess whether the project is in compliance with the prescribed project terms and conditions; share information with regulatory agencies to support the enforcement of land, water or resource use approvals and agreements; and to assess the accuracy of predictions contained in the environmental impact statements. Given the Board's application of the precautionary approach to several aspects of the assessment for this Project, in the Board's view project-specific monitoring will play a crucial role in addressing the uncertainty regarding project effects and enabling all parties to adapt mitigation measures on an ongoing basis to ensure the Project's negative effects are prevented or limited to the extent possible.

The role of the Board with respect to the establishment of monitoring programs is to focus the terms and conditions in relation to the Project. With respect to existing or future general regional and territorial monitoring programs that may include some of the same monitoring parameters/indicators as the project-specific monitoring program, the *Nunavut Agreement* and *NuPPAA* also directs the NIRB to avoid duplication but facilitate co-ordination and integration between the project-specific monitoring programs required by the NIRB and more general programs and initiatives such as the Nunavut General Monitoring Plan.[1] Where the requirements of regional or territorial programs are more extensive or substantively different than those established through the Project Certificate, at all times the Proponent must ensure compliance with the Project Certificate terms and conditions.

[1] See the discussion in Section 5.10.3 of the report and Sections 12.7.4 and 12.7.5 of the *Nunavut Agreement*.

In order to co-ordinate, integrate and avoid duplication with other monitoring programs, but also to ensure that the NIRB's project-specific monitoring program yields the information required to measure effects and adequately assess compliance with terms, conditions, regulatory instruments and agreements, the NIRB's monitoring program will continue to be developed through consultation with responsible authorities, the resource and land owners and the proponent as the remaining regulatory instruments for the Project are developed. Following the issuance of the Project Certificate by the NIRB, the framework for a project-specific monitoring program will be developed and will be provided in draft form as Appendix A to the Project Certificate. As noted in the Preamble, this framework cannot be issued in final form until key regulatory authorizations, including land use permits, water licences, mineral leases, etc. are issued so that the monitoring program supplements and supports but does not duplicate the monitoring requirements in regulatory and land use instruments. Prior to finalization, the Proponent will be required to comply with all aspects of the draft framework as directed by the NIRB.

3.2 General Principles of Interpretation Applicable to Terms and Conditions:

In order to view the project-specific terms and conditions set out within this Project Certificate in the appropriate context, the following general principles of interpretation apply to the Project Certificate in its entirety, with all terms and conditions being interpreted in accordance with:

a. The NIRB's Final Hearing Report (namely NIRB File No.: 11MN034, Final Hearing Report for the Meliadine Gold Project Proposal, October 10, 2014 available from the NIRB's registry) and Reconsideration Report and Recommendations for the Saline Effluent Discharge Proposal;

b. The rights, responsibilities, authorities and jurisdiction granted under the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in right of Canada* (*Nunavut Agreement*);

c. The limits and obligations imposed under laws of general application applicable to the Proponent or any party referred to in the term and condition, as those laws may be amended over time (e.g., privacy legislation, worker's health and safety, etc.);

d. The specific jurisdictional and policy limits applicable to authorizing agencies, Nunavut Tunngavik Incorporated, the Kivalliq Inuit Association, or other regulatory authority with jurisdiction in respect of the Project;

e. Where terms and conditions include specific references to items that must be taken into consideration or included in work plans, etc. these specific references are intended to establish minimum expectations but are not intended to limit the Proponent or prevent the Proponent from undertaking additional measures beyond those expressly prescribed in such terms and conditions; and

f. As noted in the Final Hearing Report, for those items where a more stringent version of the precautionary principle has been applied, it is the Board's expectation that the adaptive management strategies chosen will be highly responsive to early warning signs that risks may materialize, and that rather than waiting for impacts to be noted before mitigation measures are triggered, thresholds and triggers will be set to require responses long before adverse impacts are likely.

3.3 Format of Terms and Conditions:

Wherever possible, the NIRB has used the following format for the project-specific terms and conditions set out within this Project Certificate, so as to provide clear direction on the intended application, objectives and reporting requirements:

Category: Identifies the relevant environmental component or project activity to which the term and condition applies. Wherever possible categories have been labelled so as to directly associate back to the Final Environmental Impact Statement and Environmental Impact Statement Guidelines prepared for the Project.

Responsible Parties: Identifies the parties responsible for implementation of the term and condition. While this is generally the Proponent, at times other agencies have been implicated as appropriate.

Project Phase: Identifies the phase(s) of Project development to which the term and condition is applicable. Project phase may include any one or more of the following:

- Pre-Construction - includes site preparation and staging of materials and equipment in advance of construction
- Construction
- Operations
- Temporary Closure /Care and Maintenance
- Closure and Post-Closure Monitoring - includes abandonment, decommissioning and reclamation

Objective: Provides a short description of the impact or effect being mitigated. Where relevant, expectiations regarding the timing for when terms and conditions will be deemed to be satisifed (i.e., sunset clause), who has discretion for determining it is satisfied has been provided.

Term or Condition: Provides specific direction on the required action or follow up. In most instances the NIRB has endeavoured to use generalized wording to allow for maximum flexibility in achieving the stated objective, however more explicit direction has been provided where deemed necessary.

REVISED Term or Condition: Where, upon reconsideration, the Board has recommended an amendment to the Terms or Conditions in the Project Certificate and the Minister has accepted the Board's recommendation, the Board has included the Original Term and Condition, followed by the REVISED Term or Condition, with deletions to the Term or Condition identified by strike through text and additions to the text identified in bold and underlining. Upon issuance of an amendment to the Project Certificate, the Proponent is required to comply with the text of the REVISED Term or Condition.

NEW Term or Condition: Where, upon reconsideration, the Board has recommended that the Project Certificate be amended by adding a new Term and Condition and the Minister has accepted the Board's recommendation, the Board has added the Term or Condition to the relevant section, has identified the Term or Condition as NEW and has added an alphabetical listing to the existing numbered Term or Condition immediately preceding the NEW Term or Condition. Upon issuance of an amendment to the Project Certificate, the Proponent is also required to comply with any NEW Terms or Conditions added to the Project Certificate.

Reporting Requirements: Sets out any specific reporting parameters required to measure achievement of objectives or to demonstrate compliance, as well as the required frequency of reporting. Consideration will be given to coordination of Project Certificate reporting requirements with reporting requirements as established by other regulatory instruments associated with the Project.

It should be noted that, for some of the recommended terms and conditions, a non-binding **Commentary** section has also been added following the specific term and condition as an aid to interpretation. The Commentary section reflects clarification of the term and condition, recording the common understanding and interpretation resulting from discussions and guidance provided at the Project Certificate Workshop held by teleconference on February 23-24, 2015. The Commentary section is offered as a reference only and is not legally binding; in the event of a conflict between the wording in the Project Certificate and the clarification provided in the Commentary, the express wording of the Project Certificate prevails.

3.4 Flexibility

It is acknowledged that the NIRB's monitoring program will have varying requirements over the course of the Project lifecycle, and that monitoring requirements will apply from construction to eventual abandonment and reclamation. In areas where there may be a need for flexibility in relation to the terms and conditions of the Project Certificate or their application, the NIRB has endeavoured to reflect this in the associated language and/or acknowledge that objectives may be achieved through various means.

The NIRB retains the ability to give additional clarification or direction on an ongoing basis through its Monitoring Officer, with respect to compliance requirements for the Project. Upon request by the Proponent or other parties, the NIRB can provide additional clarification or direction regarding implementation of Project Certificate terms and conditions.

Where the objective of a Project Certificate term or condition can be achieved through more efficient alternate means, the Proponent is encouraged to consult with the NIRB (and other parties as required) to seek acceptance of proposed alternatives.

The NIRB has the authority to reconsider the terms and conditions of the Project Certificate to ensure that the terms and conditions are achieving their purpose. Clearly the NIRB expects the Proponent to meet its obligations under this Project Certificate, however, the NIRB may revisit the Project Certificate if the NIRB determines that the terms and conditions are not achieving their purpose. In the event that the monitoring program needs to be modified to better achieve its purpose, the Board, the Proponent, the Designated Inuit Organization or other interested parties may cause the Board, under Section 12.8.2 of the *Nunavut Agreement* to revisit the monitoring program, or any other terms and conditions in the Project Certificate.

3.5 Enforcement

As noted in Section 12.10.3, where the terms and conditions of the Project Certificate are implemented or incorporated by reference into permits, certificates, licences or other governmental approvals, the enforcement of the terms and conditions included in that authorization remains with the agency responsible for the authorization (i.e., Authorizing Agency). Under ss. 74(g) and 219 of the *NuPPAA*, the

Proponent is required to carry out the Project in accordance with the terms and conditions in this Project Certificate; failing to meet the requirements of the terms and conditions in this Project Certificate is an offence. In addition, under Part 8, Article 12 of the *Nunavut Agreement*, if the Board determines that these terms and conditions are not achieving their purpose for any reason, including instances of significant non-compliance, the NIRB may revisit the terms and conditions contained in the Project Certificate.

3.6 Proponent Commitments

The Board expects that Agnico Eagle Mines Ltd. will fulfill all commitments made during: both the original Final Hearing and the Hearing conducted in association with the Board's reconsideration of the Project Certificate associated with the assessment of the Saline Effluent Discharge into the Marine Environment proposal; within its Final Environmental Impact Statement (FEIS) and supporting documentation submitted during the Review; and commitments provided within the FEIS Addendum and associated documents as well, regardless of whether the commitments have been incorporated into the Terms and Conditions of this Project Certificate. The Board further notes that, as indicated in Agnico Eagle's Response to Final Written Submissions, filed in advance of the original Final Hearing and as noted by several intervenors during the Final Hearing, the Proponent had come to "agreement in principle" regarding many requests filed by agencies in final written submissions provided to the Board, and it is the NIRB's expectation that the Proponent will be in a position to demonstrate actions taken in finalizing these commitments in practice.

To support transparency and accountability associated with the Proponent's commitments, the Board encourages the Proponent to provide, in an annual report to the NIRB, a summary of the status of the Proponent's progress with respect to meeting any commitments which are intended to prevent or mitigate adverse ecosystemic or socio-economic effects of the Project and that are beyond the scope of ensuring compliance with Project Certificate terms and conditions.

4.0 PROJECT-SPECIFIC TERMS AND CONDITIONS

4.1 General

NIRB Monitoring Responsibilities

1. The NIRB will appoint Monitoring Officers as required to monitor the Project in accordance with the purpose of a monitoring program as set out in section 12.7.2 of the *Nunavut Agreement* for the full life of the Project, including closure and restoration. Subject to direction from the NIRB, the responsibilities of the NIRB Monitoring Officers will include:
    a. Providing direction to the Proponent, the Terrestrial and Marine Environment Working Groups, regulatory agencies, and the Kivalliq Socio-Economic Monitoring Committee to supply NIRB with reports and information respecting the Project's operations, impacts and the implementation of mitigative measures;
    b. Conducting a periodic evaluation of the monitoring program for the Project;
    c. Compiling a report on the adequacy of the monitoring program and on the ecosystemic and socio-economic impacts of the Project; and
    d. Where appropriate, recommending to the NIRB reconsideration of Project Certificate Terms and Conditions in accordance with section 12.8.2 of the *Nunavut Agreement*.
2. The NIRB will report annually (in English and Inuktitut) on the results of its Monitoring Program for the Project.
3. The NIRB will schedule periodic updates regarding its Monitoring Program for the communities most affected by the Project.
4. The NIRB Monitoring Officers will schedule periodic site inspections at the Project, coordinating with other regulatory agencies to the extent possible.

General Regulatory Requirements

5. The Proponent must obtain all required federal and territorial permits and other approvals, and shall comply with the requirements of such regulatory instruments.
6. The Proponent shall take prompt and appropriate action to remedy any occasion of non-compliance with environmental laws and regulations and/or regulatory instruments, and shall report any non-compliance as required by law immediately. A description of all instances of non-compliance and associated follow up is to be reported annually to the NIRB.
7. The Proponent shall meet with respective licensing authorities prior to the commencement of construction to discuss the posting of adequate performance bonding. Licensing authorities are encouraged to take every measure to require that sufficient security is posted before construction begins.

Monitoring Records

8. All monitoring information collected pursuant to the Project Certificate and various regulatory requirements for the Project shall contain the following information:

a. The name of the person(s) who performed the sampling or took the measurements including any relevant accreditations;

b. The date, time and place of sampling or measurement, and weather conditions;

c. The date of analysis;

d. The name of the person(s) who performed the analysis including any relevant accreditations;

e. A description of the analytical methods or techniques used; and

f. A discussion of the results of any analysis.

9. The Proponent shall make its monitoring results available, to the fullest extent possible, in English and Inuktitut.

10. The Proponent shall keep and maintain the records, including results, of all Project-related monitoring data and analysis for the life of the Project, including closure and post-closure monitoring.

11. The Proponent shall maintain the Final Environmental Impact Statement and the Environmental Effects Monitoring program developed for the Project, with predictions updated as new baseline data is collected. If the results of monitoring programs necessitate updates to effects predictions, the Proponent shall update the associated management programs and plans as required to address or reflect the updated assessment of effects.

12. The Proponent shall establish a Project-specific web portal or web page as a means of making all non-confidential monitoring and reporting information associated with the Project available to the general public. This does not limit what the Proponent may be required to submit to the NIRB or other regulatory authorities to meet reporting requirements.

On-going Engagement in Project Monitoring, Modelling, Management and Reporting

13. The Proponent is encouraged to provide on-going opportunities for consultation and comment on any substantive revisions to the Project-specific monitoring program, modelling, studies, management plans, management measures and reporting under the Project Certificate.

14. To the extent feasible, the NIRB will provide an opportunity for comment on any substantive revisions to the Project-specific monitoring, modelling, studies, management plans, management measures and reporting provided by the Proponent under the Project Certificate.

4.2 Terms and Conditions

Ecosystemic

Air Quality

Term and Condition No.	1
Category:	Air Quality – Updated Air Quality Monitoring Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To define plans for the monitoring of data and mechanisms for response with regard to potential air quality impacts arising from the Project
Term or Condition:	Prior to commencing construction activities, the Proponent shall update its Air Quality Monitoring Plan, and shall consider installing two real-time air monitoring stations in advance of mining operations. The updated plan shall include, but is not limited to, details regarding the following: a. Description of real-time air monitoring stations including proposed timing of installation, location, and any factors considered with regards to planning for the installation; b. Plans for the collection of total suspended dust samples year round, including sampling for metals content relevant to the Project; c. Description of snowpack surveys and dustfall collectors; d. Description of lichen surveys; e. Identification of near field, far field and reference sites that are located with consideration of ambient wind conditions; f. Baseline data collected prior to significant construction activity; and g. A description of the proposed annual reporting mechanism and response framework.
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction, with results submitted annually thereafter or as may otherwise be required.

Term and Condition No.	2
Category:	Air Quality – Emissions monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To provide feedback on Project-related specified emissions
Term or Condition:	The Proponent shall demonstrate through monitoring of air quality at the aboveground emissions points at the mine site and at the Tiriganiaq site that sulphur dioxide (SO_2) and nitrous dioxide (NO_2) emissions remain within predicted levels and, where applicable, within limits established by all applicable guidelines and regulations. In cases where exceedances

	occur, the Proponent shall provide an explanation for the exceedance, a description of planned mitigation, and shall conduct additional monitoring to evaluate the effectiveness of mitigative measures.
Reporting Requirements:	The Proponent shall report on the development and implementation of this Plan and associated monitoring results annually to the NIRB. The report must clearly identify the parameters being evaluated if the results are being compared to predicted levels set out in the Environmental Impact Statement or limits established by applicable guidelines and regulations.

Term and Condition No.	**3**
Category:	Air Quality – Dust management and monitoring plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To define plans for the monitoring of air quality data, specifically dust deposition arising from the all-weather access road
Term or Condition:	Prior to commencing construction activities the Proponent shall update its dust management and monitoring plan to address and/or include the following additional items: a. Align plan requirements with commitments made in the FEIS and during the Final Hearing to monitor dust along the all-weather access road and associated roads and trails. b. Verify commitments to the utilization of dust suppressants along the all-weather access road including and associated roads and trails, including a description of the type of suppressant to be utilized, the frequency and timing of applications to be made throughout the various seasons of road use. c. Outline the specific adaptive management measures to be considered should monitoring indicate that dust deposition is higher than predicted, specifically where traffic along the all-weather access road is greater than initially predicted.
Reporting Requirements:	The updated plan should be submitted to the NIRB for review and comment at least 60 days prior to commencement of construction activities.

Term and Condition No.	**4**
Category:	Air Quality – Incineration management plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To ensure incineration activities are designed in a manner that mitigates impacts to air quality
Term or Condition:	The Proponent shall develop and implement an Incineration Management Plan that takes into consideration the recommendations provided in Environment Canada's *Technical Document for Batch Waste Incineration* (2010).[2]

[2] Environment Canada, 2010. Technical Document for Batch Waste Incineration.

Reporting Requirements:	The plan should be submitted to the NIRB at least 60 days prior to the commencement of construction activities.

Commentary: *With the recognition that there may be a considerable gap between the commencement of general project related construction and the construction of the incinerator to be used by the Project, the timeline set out under the Reporting Requirements above is intended to require the submission of the Incineration Management Plan at least 60 days prior to the commencement of "construction activities" related to the construction of the incinerator, not general project construction activities.*

Term and Condition No.	**5**
Category:	Air Quality – Stack testing
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To mitigate impacts to air quality from incineration activities
Term or Condition:	The Proponent shall provide all stack testing conducted on temporary or permanent incinerators operated for the Project to the NIRB in the annual report for that year.
Reporting Requirements:	Stack test results are to be reported to the NIRB and to Environment Canada annually, or as may otherwise be required.

Term and Condition No.	**6**
Category:	Air quality – Landfill dust suppression
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure
Objective:	To address potential air quality concerns arising from dust generated at the landfill
Term or Condition:	The Proponent shall employ appropriate dust suppression measures when conducting activities in the landfill such as topping or capping.
Reporting Requirements:	Implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Climate and Meteorology (including Climate Change)

Term and Condition No.	**7**
Category:	Climate and Meteorology, Climate Change – Greenhouse gas emissions
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To provide feedback on Project-related emissions
Term or Condition:	The Proponent shall provide within its annual report to the NIRB, calculations of greenhouse gas emissions generated by activities at the Itivia port and other Project sources including mine-related road traffic and aircraft associated with the Project. Calculations shall take into

	consideration, fuel consumption as measured by the Proponent's purchase and use as well as the fuel use of its contractors and sub-contractors.
Reporting Requirements:	Implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**8**
Category:	Climate and Meteorology, Climate Change – Inuit participation
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To promote public awareness and engagement of affected groups
Term or Condition:	To actively engage Inuit in initiatives related to climate change, where it is feasible, the Proponent shall endeavour to include the participation of Inuit from affected communities when undertaking climate-change related studies and research.
Reporting Requirements:	A summary of consultation and how the information was used to inform planning for the Project shall be provided in the Proponent's annual report to the NIRB.

Term and Condition No.	**9**
Category:	Climate and Meteorology, Climate Change – Greenhouse Gas Emissions Reduction Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To develop a pro-active approach to limiting greenhouse gas emissions throughout the Project life
Term or Condition:	Prior to the commencement of operations, the Proponent shall develop a Greenhouse Gas Emissions (GHG) Reduction Plan which includes, but is not limited to: a. An estimate of the Project's GHG baseline emissions; b. A description of monitoring measures to be undertaken, including the methods, frequency, parameters, and a description of data analysis; and, c. A description of mitigative and adaptive strategies planned, and taken, toward reducing the Project-related emission of greenhouse gases over the Project's life.
Reporting Requirements:	The plan should be submitted to the NIRB at least 90 days prior to the commencement of operations, and unless otherwise determined within the Plan, the reporting of results requried by this Plan shall be provided in the Proponent's annual report to the NIRB.

Noise and Vibration

Term and Condition No.	**10**
Category:	Noise and Vibration – Noise and Vibration Abatement Plan

Responsible Parties:	The Proponent, Government of Nunavut, Environment Canada and Health Canada
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To minimize the impact of noise and vibration
Term or Condition:	The Proponent shall further develop and implement its noise abatement plan to protect people and wildlife from mine activity noise, including, blasting, drilling, equipment, vehicles and aircraft. The noise abatement plan will be developed in consultation the Government of Nunavut, Environment Canada and Health Canada as appropriate, and at a minimum is to include: a. Restrictions on blasting and drilling when migrating caribou, birds or local carnivores may be affected; b. The establishment of strict standards for noise levels; use of equipment and vehicles with the best noise attenuation devices; c. When practical, the use of fences or berms around noisy machinery or sites; d. Flight corridor restrictions over sensitive areas with known concentrations of wildlife and birds whenever possible; e. Requiring with the exception of take off and approach for landing, a minimum flight altitude of 300 metres above ground level when flights to and from the mine site are passing near sensitive wildlife and bird areas; and, f. The incorporation of the use of sound metres to monitor sound levels at locations in and around the mine site and local study area. The location and design of the sound metres shall be selected in consultation with EC and set up immediately upon issuance of the Project Certificate for the purpose of obtaining baseline data, and shall be maintained for data collection during and after operations.
Reporting Requirements:	The finalized noise abatement plan should be submitted to the NIRB at least 90 days prior to the commencement of construction, and any subsequent monitoring results required within the Plan shall be provided in the Proponent's annual report to the NIRB.

Term and Condition No.	**11**
Category:	Noise and Vibration – Monitoring at accommodations sites
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure monitoring
Objective:	To minimize the impacts of vibration on employees
Term or Condition:	The Proponent shall conduct noise and vibration monitoring at Project accommodations sites located at the Tiraginiaq mine site. Sampling shall

	be undertaken during the summer and winter months during all phases of Project development, with reporting of results and implementation of associated mitigation measures as necessary reported to the NIRB.
Reporting Requirements:	Monitoring results and implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Terrestrial Environment

Term and Condition No.	**12**
Category:	Terrestrial Environment – Permafrost and permafrost terrain mapping
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction
Objective:	To further understanding of baseline conditions and to inform design of Project facilities and mitigate impacts to permafrost
Term or Condition:	The Proponent shall conduct further permafrost mapping to document permafrost temperature, thickness of seasonal thaw and amount of ground ice in the Project development area, with such information to be available to inform the detailed design of Project infrastructure (i.e., dikes and tailings storage facility designs and talik predictions for lakes that are to be dewatered or used for saline water storage).
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition as well as the results of mapping to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**13**
Category:	Terrestrial Environment – Terrain and soils, geotechnical investigations
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure
Objective:	To assist with design of Project facilities and mitigate impacts to sensitive landforms
Term or Condition:	The Proponent shall undertake additional geotechnical investigations as required to identify sensitive landforms, modify engineering design for Project infrastructure (i.e., dikes, tailings storage facility, waste rock pile and landfill), and develop and implement preventative and/or mitigation and monitoring measures to minimize the impacts of the Project's activities and infrastructure on sensitive landforms. Plans for the investigations, mitigative and monitoring measures are to be included within an updated Environmental Protection Plan.
Reporting Requirements:	The updated plan is to be submitted to the NIRB within 90 days of the issuance of a Project Certificate. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	14
Category:	Terrestrial Environment – Dike and tailings storage facility design
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction
Objective:	To ensure Project design features consider thermal analysis and stability
Term or Condition:	The Proponent is encouraged to conduct more detailed thermal analysis to support detailed design of the dikes and the tailings storage facility, including seepage and stability analysis, and shall incorporate the results of the analysis into Project design. Details of the thermal analyses undertaken are to be provided to the NIRB.
Reporting Requirements:	Details are to be provided to the NIRB at least 60 days prior to the commencement of construction, and the results of any required additional reporting shall be submitted to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	15
Category:	Terrestrial Environment – Tailings storage facility design and management
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure Project infrastructure integrity is considered and maintained post-closure
Term or Condition:	The Proponent shall assess the potential environmental effects of a post-closure failure of the geomembrane of the Tailings Storage Facility while tailings are in a thawed state. This assessment shall include, at a minimum: a. A description of the potential environmental effects of such a failure; b. Identification of the monitoring measures employed to detect environmental changes that could result; c. Identification of proposed mitigation measures to address any changes identified during monitoring; and d. Updated Risk Management Plan and Closure and Reclamation Plan reflecting changes which result from the post-closure failure assessment. A summary of the results from this assessment and implications to project infrastructure and operational plans shall be provided to the NIRB.
Reporting Requirements:	A summary of the assessment and updated plans should be submitted to the NIRB 6 months following issuance of the Project Certificate and the results of any required additional reporting shall be submitted to the NIRB through the Proponent's annual monitoring report.

Commentary: *The NIRB recognizes that as the initial submission of updated plans will be within 6 months of the issuance of the Project Certificate, it is expected that the level of detail of the Proponent's initial submission will be largely conceptual and will be supplemented and updated over time.*

Term and Condition No.	**16**
Category:	Terrestrial Environment – Erosion Management Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure appropriate measures for preventing destabilization and erosion of shorelines, stream edges and ensure that diversion channels are maintained
Term or Condition:	The Proponent shall finalize and implement a comprehensive erosion management plan to prevent or minimize the effects of destabilization and erosion resulting from Project activities.
Reporting Requirements:	Finalization of plan, implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**17**
Category:	Terrestrial Environment – Permafrost integrity
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure that impacts to permafrost and permafrost terrain are minimized through all phases of the Project
Term or Condition:	The Proponent shall monitor the effects of the Project on permafrost conditions relative to Project infrastructure, including along the all-weather access road and associated roads, waste rock stockpile, trails and quarries. Through its monitoring the Proponent must demonstrate that permafrost integrity is maintained with implementation of appropriate preventative measures should permafrost degredation be observed.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**18**
Category:	Terrestrial Environment – As-built drawings and final design plans
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To ensure the NIRB and public have information available on the Project components to assist in monitoring

Term or Condition:	The Proponent shall provide the NIRB with copies of as-built drawings and final design plans for Project infrastructure as they are developed/finalized to assist with the Board's ongoing monitoring efforts.
Reporting Requirements:	The Proponent shall submit copies of the drawings and final designs as they are completed as well as provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**19**
Category:	Terrestrial Environment – Tailings and waste rock monitoring program
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure, Post-Closure
Objective:	To ensure the integrity of Project infrastructure is maintained, and to establish rigorous safeguards to prevent structural failure
Term or Condition:	The Proponent shall develop and implement a monitoring program for its Tailings Storage Facility and Waste Rock Storage Facility (including dikes). The monitoring progam is to include, but shall not be limited to: a. Plans for monitoring the thermal condition and stability of storage facilities (including deformation of the cover) and dikes, includingthe use of thermistor cables, temperature loggers, and core sampling technology as required to monitor dike stability and tailings freezeback efficiency, including for example, factors such as ice content and stability; and, b. Measures proposed to ensure the safe containment and structural integrity of Project infrastructure, and to prevent contamination of waterbodies. Details of the monitoring program shall provided to the NIRB.
Reporting Requirements:	Details of the monitoring program should be submitted to the NIRB at least 90 days prior to the establishment of either facility, with subsequent plan revisions or updates submitted annually thereafter. Results of any required reporting shall be submitted to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**20**
Category:	Terrestrial Environment – Closure and Reclamation Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure/Care and Maintenance, and Closure
Objective:	To assist in the re-vegetation of reclaimed areas
Term or Condition:	The Proponent shall explore the the feasibility and practicality of topsoil/organic matter salvage as part of phased approach to Project development, with updates to its Closure and Reclamation Plan to reflect any changes based on this investigation. The Closure and Reclamation Plan

	should be updated on an on-going basis as more information becomes available from similar reclamation projects, including experience with implementing closure and reclamation plans at the Meadowbank mine site, as applicable.
Reporting Requirements:	The updated plan is to be submitted to the NIRB within 6 months of the issuance of the Project Certificate. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**21**
Category:	Terrestrial Environment – Waste Management Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure permafrost integrity is maintained and that soil contamination is minimized
Term or Condition:	The Proponent shall update its Waste Management Plan to include details which explain how the design employed for Project landfills is expected to protect the integrity of the local environment, including permafrost integrity, and water quality for adjacent waterbodies. The Proponent shall demonstrate its consideration for the use of liners at waste management facilities, where feasible.
Reporting Requirements:	The updated plan is to be submitted to the NIRB at least 90 days prior to operation of Project landfills. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Geology (including Geochemistry)

Term and Condition No.	**22**
Category:	Geology (including Geochemistry) – Mine Waste Management Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure
Objective:	To inform parties on the adaptive management progress made relating to mine waste management
Term or Condition:	The Proponent shall report annually to the NIRB on the adaptations it has had made to the Mine Waste Management Plan and practices based on results obtained through monitoring.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	23
Category:	Geology (including Geochemistry) – Mine Waste Management Plan, Discovery Deposit
Responsible Parties:	The Proponent, Natural Resources Canada
Project Phase:	Construction, Operations
Objective:	To mitigate impacts of Acid Rock Generation and Metal Leaching
Term or Condition:	Prior to the commencement of excavation at the Discovery deposit, the Proponent, in consultation with Natural Resources Canada, shall update its Mine Waste Management Plan to assess the potential for acid rock drainage and to identify any monitoring and mitigation measures that may be required in this development area.
Reporting Requirements:	Details of the Plan should be submitted at least 90 days prior to construction at the Discovery deposit, with subsequent plan revisions submitted annually thereafter; if accompanying the Proponent's annual report to the NIRB the document must be separated so as to be directly retrievable via the NIRB's public registry. Results of any required reporting shall be submitted to the NIRB through the Proponent's annual monitoring report.

Hydrogeology and Groundwater Quantity and Quality

Term and Condition No.	24
Category:	Hydrogeology and Groundwater – Hydraulic data
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations
Objective:	To collect and analyze additional baseline data to use as baseline to monitor for groundwater quality
Term or Condition:	The Proponent shall, reflecting any direction from the Nunavut Water Board during water licensing, collect new hydraulic data (e.g., from new monitoring wells) in key areas during the pre-development, construction and operation phases to better define vertical and horizontal ground flow in the project development area.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

REVISED Term and Condition No.	25
Category:	Hydrogeology and Groundwater – Groundwater Management Plan
Responsible Parties REVISED:	The Proponent, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
Project Phase:	Pre-construction, construction, Operations, temporary closure/care and maintenance, closure, post closure monitoring.

Objective:	To manage saline groundwater and minimize the impacts to permafrost, soil, surface water, vegetation and wildlife
Term or Condition REVISED:	**The Proponent shall submit a detailed Groundwater Management Plan to the NIRB which includes mitigation measures designed to address the potential for higher-than-predicted volumes of saline water inflows into the underground mine, treatment and disposal methods, and details of its plan to monitor saline water at site. The plan must identify uncertainties pertaining to predictions for groundwater quality and quantity and inform adaptive management strategies for the site. CIRNAC should be consulted with respect to the contents of the Plan and any required mitigation measures.**
Reporting Requirements:	An updated plan shall be submitted to the NIRB within 90 days of receipt of the amended Project Certificate. The Proponent shall provide a summary discussion of its implementation of this Term and Condition, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**26**
Category:	Hydrogeology and Groundwater – Pit refill rates
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, construction, Operations, temporary closure/care and maintenance, closure, post closure monitoring
Objective:	To assess the flow of groundwater into the lake
Term or Condition:	The Proponent shall carry out continued analyses over time to confirm and update, accordingly, the approximate fill time for the mine pits as identified in the FEIS.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Hydrology (including Surface Water Quantity) and Water and Sediment Quality

Term and Condition No.	**27**
Category:	Hydrology and Sediment Quality – Aquatics Effects Monitoring Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, construction, Operations, temporary closure/care and maintenance, closure, post closure monitoring
Objective:	To mitigate potential impacts to surface waters
Term or Condition:	The Proponent shall update its Aquatic Effects Monitoring Plan (AEMP) to include, at a minimum: a. Details regarding the monitoring of non-point sources of discharge, selection of appropriate reference sites, measures to ensure the collection of adequate baseline data at Meliadine Lake prior to and during construction activities, including information on chemical

	loading in the snowpack, and the mechanisms proposed to monitor for and treat runoff and sediment; b. A description of measures to be undertaken as relate to dustfall monitoring, designed in accordance with the following: i. To establish Phase 1 all-weather access road baseline data and a description of plans for data collection during Project operations for comparison; ii. To facilitate comparison with existing guidelines; iii. To assess the seasonal deposition (rates, quantities) and chemical composition of dust entering aquatic systems along representative distance transects of the all-weather access road and Rankin Inlet by-pass road; c. A description of water quality monitoring to be conducted at Little Meliadine Lake; and d. Details regarding comparisons of results to be run against predicted values and the analysis of data to be undertaken on an annual basis, or as may be required.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**28**
Category:	Hydrology and Sediment Quality – Sediment and Erosion Management Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To develop appropriate sediment and erosion controls to prevent impacts to surface waters and sediment quality
Term or Condition:	The Proponent shall develop and implement a sediment and erosion management plan to prevent or minimize the effects of destabilization and erosion that may occur due to Project activities. The plan should also detail sediment control plans to prevent and/or mitigate sediment loading into surface water within the Project area.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of the plan, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**29**
Category:	Hydrology and Sediment Quality – Water infrastructure monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, temporary closure/care and maintenance, closure, post closure monitoring.
Objective:	To mitigate impacts to natural water flow

Term or Condition:	The Proponent shall develop and implement adequate monitoring and maintenance procedures to ensure that the culverts and other conduits that may be prone to blockage do not significantly hinder or alter the natural flow of water from areas associated with the proposed mine. In addition, the Proponent shall monitor, document and report the withdrawal rates for water removed and utilized for all domestic and industrial purposes.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring or adaptive management strategies, to the NIRB through the Proponent's annual monitoring report.

Freshwater Aquatic Environment

Term and Condition No.	**30**
Category:	Freshwater Aquatic Environment – Aquatic Effects Monitoring Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To monitor and mitigate potential effects to the freshwater aquatic environment
Term or Condition:	The Proponent shall update its Aquatic Effects Monitoring Plan (AEMP) to include, at a minimum: a. Provide details for additional reference lakes to be included within its sampling and monitoring programs; b. Updates to include sedimentation within relevant monitoring programs; and c. Results from additional testing for mercury in fish tissue, and include test results in updated baseline data.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**31**
Category:	Freshwater Aquatic Environment – Setbacks
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate impacts of runoff/sedimentation into freshwater aquatic habitat.
Term or Condition:	The Proponent shall maintain an appropriate setback distance between project quarries and fish-bearing or permanent water bodies as required to prevent acid rock drainage or metal leaching into such water bodies.
Reporting Requirements:	Implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	32
Category:	Freshwater Aquatic Environment – Site Drainage and Silt Control Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate impacts of the Project on natural drainage and minimize sedimentation
Term or Condition:	Prior to the commencement of construction, the Proponent shall submit to the NIRB, a Site Drainage and Silt Control Plan.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	33
Category:	Freshwater Aquatic Environment – Blasting
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate impacts of explosives use on fish and fish habitat
Term or Condition:	The Proponent shall meet or exceed the guidelines set by Fisheries and Oceans Canada for blasting thresholds and implement practical and effective measures to ensure that residue and by-products of blasting do not negatively affect fish and fish habitat.
Reporting Requirements:	Implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Corrected Term and Condition No.	34
Category:	Freshwater Aquatic Environment – Watercourses
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To prevent blockages or restrictions to fish passages
Term or Condition:	Unless otherwise approved by regulatory authorities, the Proponent shall ensure that all Project infrastructure in watercourses is designed and constructed in such a manner that it does not obstruct unduly prevent or limit the natural movement of water in fish bearing streams and rivers.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Vegetation

Term and Condition No.	35
Category:	Vegetation – Site footprint
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impacts of the Project on vegetation
Term or Condition:	The Proponent shall ensure that Project components and activities are planned and conducted in such a way as to minimize the Project footprint; this should include input from potentially affected communities where applicable.
Reporting Requirements:	A summary of consultation and how the information was used to inform planning for the Project shall be provided in the Proponent's annual report to the NIRB.

Term and Condition No.	36
Category:	Vegetation – Invasive species
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction
Objective:	To prevent the introduction of invasive species
Term or Condition:	The Proponent shall ensure that equipment and supplies brought to Project sites are clean and free of soils that could contain plant seeds not naturally occurring in the area. Vehicle tires and treads in particular must be inspected, and cleaned if required, prior to transport into Nunavut for use in Project areas.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	37
Category:	Vegetation – Monitoring for invasive species
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize introduction of invasive species
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	38
Category:	Vegetation – Updated baseline and ongoing monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To assess the impact of the Project on berry-producing plants
Term or Condition:	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.
Reporting Requirements:	Monitoring results and implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	39
Category:	Vegetation – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To monitor metal levels in vegetation
Term or Condition:	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.
Reporting Requirements:	Details for the program are to be submitted to the NIRB within 6 months of the issuance of the the Project Certificate. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	40
Category:	Vegetation – Adaptive management
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate impacts to vegetation abundance, diversity and health
Term or Condition:	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 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.

Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**41**
Category:	Vegetation – Reclamation and re-vegetation
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To maximize revegetation in reclaimed areas
Term or Condition:	Prior to the commencement of operations, the Proponent shall develop a progressive re-vegetation program for disturbed areas that are no longer required for operations, such program to incorporate measures for the use of test plots, reseeding and replanting of native plants as necessary. It is further recommended that this program be directly associated with the management plans for erosion control established for the Project and incorporate lessons learned at Meadowbank.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**42**
Category:	Vegetation – Closure and Reclamation Plan
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To maintain an up to date re-vegetation plan for the Project
Term or Condition:	The Proponent shall include re-vegetation strategies in its Closure and Reclamation Plan that support progressive reclamation and that promote natural revegetation and recovery of disturbed areas compatible with the surrounding natural environment and incorporate lessons learned at Meadowbank
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Terrestrial Wildlife and Wildlife Habitat

Term and Condition No.	**43**
Category:	Terrestrial Wildlife and Wildlife Habitat – General
Responsible Parties:	The Proponent and other parties as appropriate
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure appropriate and responsive adaptive management

Term or Condition:	The Proponent shall continue to develop and implement Project-specific monitoring for the terrestrial environment through its Terrestrial Environment Management and Monitoring Plan (TEMMP), and will demonstrate appropriate refinements to design, incorporation of analytical methods and elaboration of methodologies. The TEMMP shall contain clear thresholds to allow for the assessment of long-term trends and cumulative effects where project interactions are identified. Coordination and cooperation will be required where data collection, analysis and interpretation, or responsibility for mitigation and management requires the efforts of multiple parties (e.g., government, Kivalliq Inuit Association, communities).
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**44**
Category:	Terrestrial Wildlife and Wildlife Habitat – Caribou monitoring
Responsible Parties:	The Proponent, Government of Nunavut
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To further define details of monitoring programs
Term or Condition:	In consultation with the Government of Nunavut (GN) and other relevant parties, 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 exisiting and planned regional monitoring initiatives associated with terrestrial wildlife and wildlife habitat 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.
Reporting Requirements:	Results of discussions, implementation of measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**45**
Category:	Terrestrial Wildlife and Wildlife Habitat – General monitoring
Responsible Parties:	The Proponent and other parties as appropriate
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To promote coordination of monitoring efforts
Term or Condition:	The Proponent shall demonstrate consideration for cooperating with exisiting 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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring, adaptive management strategies, consultation, and contribution efforts undertaken, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**46**
Category:	Terrestrial Wildlife and Wildlife Habitat – Harvest study
Responsible Parties:	The Proponent, Government of Nunavut, Hunters and Trappers Organizations, other parties as appropriate
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure harvest study considers appropriate Project-specific factors
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring, adaptive management strategies, and contribution efforts undertaken) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**47**
Category:	Terrestrial Wildlife and Wildlife Habitat – Monitoring
Responsible Parties:	The Proponent, Government of Nunavut
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To promote coordination of monitoring efforts
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including any updates to the Plan, to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**48**
Category:	Terrestrial Wildlife and Wildlife Habitat – Management of road access
Responsible Parties:	The Proponent, Government of Nunavut, Kivalliq Inuit Association, Kivalliq Wildlife Board, and local HTOs
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure mitigation and monitoring consider increases to harvesting from improved access
Term or Condition:	In consultation with the Government of Nunavut, the Kivalliq Inuit Association, the Kivalliq Wildlife Board and local Hunters and Trappers Organizations, the Proponent shall develop appropriate monitoring and mitigation measures relating to the harvesting of caribou and improved harvesting access granted by the all-weather access road. These measures shall be included within a Road Access Management Agreement that must be in place prior to construction of phase 2 of the all-weather access road. The Road Management Agreement shall include the following specific measures: ▪ During periods when large aggregations of caribou (greater than 50 individuals) are detected within 1 km of the all-weather access road (AWAR), the road will be closed to public access via car and truck by means of a barrier at the southern gate. Public access using all-terrain vehicles (ATVs) will be allowed. ▪ During periods when large aggregations of caribou (greater than 50 individuals) are observed within 1 km of the AWAR, the road will be closed to public access via barriers at bridges on the AWAR to prevent all vehicle access, including ATVs. This will allow ATVs to enter areas previously accessible along existing trails while not facilitating access via bridges constructed specifically for the Project. ▪ Following consultation with the Nunavut Wildlife Management Board, as required under the *Nunavut Wildlife Act*, it is recommended that a no-shooting zone (1 km wide) on either side of the road should be established as a condition of public access to the AWAR and compliance with this Agnico Eagle policy should be monitored and reported by the Proponent. ▪ Dedicated 'road monitors' should patrol the road to ensure compliance with the provisions of the Road Management Plan (SD 2-9) relating to public safety and wildlife. Monitoring should be

	increased during periods of road closure when large aggregations of caribou are present. ▪ All incidents of hunting involving shooting along or across the AWAR should be reported by the Proponent to the GN. ▪ During periods when large aggregations of caribou are detected near the Project, harvest monitoring intensity should be increased to ensure that levels of caribou harvesting are properly documented.
Reporting Requirements:	Road Access Management Agreement to be submitted to the NIRB at least 60 days prior to the commencement of increased traffic related to the marine outflow activities, with implementation of these measures and monitoring results as well as any subsequent updates to the Plan, reported and discussed in the Proponent's annual report to the NIRB.

Commentary: T*he reference in Bullet 3 above to a no-shooting zone as a condition of public access to the AWAR is a reference to a policy of the Proponent and is not a reference to policy requirements of the Nunavut Wildlife Management Board or Nunavut Wildlife Act.*

Term and Condition No.	**49**
Category:	Terrestrial Wildlife and Wildlife Habitat – Research licensing
Responsible Parties:	The Proponent, Nunavut Research Institute
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To facilitate licensing review
Term or Condition:	The Proponent is encouraged to consult with the Nunavut Research Institute (NRI) on the research permitting process as it relates to the *Nunavut Scientists Act*. The Proponent is encouraged to share monitoring and research study design with the NRI four (4) months prior to the anticipated commencement of research activities to facilitate licensing review.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Commentary: *The NIRB recognizes that the Proponent would only consult with and share monitoring and research study design with the NRI for those research activities undertaken by the Proponent under the Project Certificate that would trigger the requirement for a scientific research licence under the Nunavut Scientists Act.*

Term and Condition No.	**50**
Category:	Terrestrial Wildlife and Wildlife Habitat – Wildlife habitat
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure progressive reclamation of disturbed wildlife habitat

Term or Condition:	The Proponent shall develop a strategy for the recovery of terrestrial wildlife habitat in a progressive manner that is consistent with the *Nunavut Wildlife Act*.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**51**
Category:	Terrestrial Wildlife and Wildlife Habitat – Territorial Park
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize disturbance from helicopter overflights
Term or Condition:	The Proponent shall not conduct routine helicopter flights over, or land in, Iqalugaarjuup Nunanga Territorial Park. The Proponent will communicate this commitment to all helicopter companies contracted by it to undertake work at the Meliadine Project site prior to the start of such contracted work. Emergency flights, specifically medical evacuation flights and/or search and rescue overflights are excepted from adherence to this requirement.
Reporting Requirements:	Information regarding the Proponent's consultation, coordination and other contribution efforts undertaken in fulfillment of this term and condition shall be provided in the Proponent's annual report to the NIRB.

Term and Condition No.	**52**
Category:	Terrestrial Wildlife and Wildlife Habitat – Muskoxen monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To promote coordination of monitoring efforts
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**53**
Category:	Terrestrial Wildlife and Wildlife Habitat – Furbearer surveying
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize disturbance to furbearers from Project activities

Term or Condition:	Prior to construction of Project infrastructure 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.
Reporting Requirements:	Survey results shall be submitted to the NIRB at least 60 days prior to the commencement of traffic associated with the transport of saline water on the all-weather access road. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**54**
Category:	Terrestrial Wildlife and Wildlife Habitat – Movement of wildlife
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure Project infrastructure does not prevent or unduly limit the movement of wildlife
Term or Condition:	The Proponent shall ensure that road safety barriers or berms associated with Project infrastructure, all-weather access road and associated roads/trails 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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**55**
Category:	Terrestrial Wildlife and Wildlife Habitat – Wildlife mortality
Responsible Parties:	The Proponent, Government of Nunavut, Designated Inuit Organization
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure clear thresholds exist for Project-related mortality of wildlife species, adequate adaptive management measures and compensation agreements are in place
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	56
Category:	Terrestrial Wildlife and Wildlife Habitat – Reporting
Responsible Parties:	The Proponent
Project Phase:	Construction, Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate and monitor for impacts to wildlife
Term or Condition:	The Proponent shall report annually to the NIRB regarding its terrestrial environment monitoring efforts, with inclusion of the following information: a. Description of all updates to terrestrial ecosystem baseline data; b. A description of the involvement of Inuit in its monitoring programs; 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; d. Results of the annual monitoring program, including field methodologies and statistical approaches used to support conclusions drawn; and e. An assessment and presentation of annual environmental conditions including timing of snowmelt, green-up, as well as standard weather summaries.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring, adaptive management strategies, consultation, and contribution efforts undertaken) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	57
Category:	Terrestrial Wildlife and Wildlife Habitat – Reporting
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure /Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate and monitor for impacts to wildlife
Term or Condition:	Within its annual report to the NIRB, the Proponent shall incorporate a review section which includes: a. An examination for trends in the measured natural variability of Valued Ecosystem Components in the region relative to the baseline reporting; b. A detailed analysis of wildlife responses to operations with emphasis on wildlife behaviour, mortalities and displacements (if

	any), and responses to operations of the all-weather access road and associated access roads/trails; c. A demonstration and description of how the monitoring results, including the all-weather access road and associated access roads/trails contribute to cumulative effects of the project; and d. Any proposed changes to the monitoring survey methodologies, statistical approaches or proposed adaptive management stemming from the results of the monitoring program.
Reporting Requirements:	The Proponent shall provide its discussion of these factors to the NIRB through the Proponent's annual monitoring report.

Birds and Bird Habitat

Term and Condition No.	**58**
Category:	Birds and Bird Habitat – Awareness
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To prevent/minimize impacts on birds and bird habitat
Term or Condition:	The Proponent shall ensure all employees working at Project sites receive awareness training regarding the importance of avoiding known nests and nesting areas and avoiding large concentrations of foraging and moulting birds.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**59**
Category:	Birds and Bird Habitat – Species at Risk
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize impacts on Species at Risk
Term or Condition:	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.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**60**
Category:	Birds and Bird Habitat – Species at Risk
Responsible Parties:	The Proponent

Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize impacts to Species at Risk
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**61**
Category:	Birds and Bird Habitat – Construction/clearing activities
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations
Objective:	To minimize disturbance to birds during the breeding season
Term or Condition:	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).
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**62**
Category:	Birds and Bird Habitat – Construction/clearing activities
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impacts on birds during the breeding season
Term or Condition:	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.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	63
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent, Environment Canada
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of marine shipping on birds and bird habitat
Term or Condition:	Any incidents of bird mortalities associated with lighting infrastructure, construction activities, and Project vessel operations are to be recorded and reported to Environment Canada (Canadian Wildlife Services). The Proponent shall work with the Canadian Wildlife Services to determine appropriate recording and reporting format and timing.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	64
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure appropriate monitoring measures are in place to address the potential impacts of marine fuel spills
Term or Condition:	The Proponent shall develop a framework for monitoring of marine bird species and their habitat in the event of a major marine fuel spill. Specific details regarding the scope of follow-up monitoring may be further refined if and when such an event were to occur.
Reporting Requirements:	The framework should be submitted to the NIRB at least 90 days prior to conducting any Project-related shipping. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	65
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of marine shipping on birds and bird habitat
Term or Condition:	The Proponent shall maintain reduced speeds to sufficiently ensure that wakes are equal or less than the mean natural seasonal wave height to prevent wake action from negatively impacting migratory bird nests in low lying shoreline habitat.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	66
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of marine shipping on birds and bird habitat
Term or Condition:	The Proponent shall ensure all Project vessels are checked for bird strikes after a suspected event and include details of its protocol to do so, as well as results, within its updated Terrestrial Environment Mitigation and Monitoring Plan.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	67
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of marine shipping on birds and bird habitat
Term or Condition:	The Proponent shall submit an updated Oil Pollution Prevention Plan including measures to avoid adverse effects to species at risk and migratory birds from spills, as well as details regarding monitoring of effects of a spill on species at risk and migratory birds.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	68
Category:	Birds and Bird Habitat – Marine considerations
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of marine shipping on birds and bird habitat
Term or Condition:	The Proponent shall demonstrate consideration for the potential cumulative effects of other development projects and shipping activities (including community resupply) when assessing their cumulative effects on marine birds in the Hudson Strait, in its annual report.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Corrected Term and Condition No.	**69**
Category:	Birds and Bird Habitat – Flight altitude requirements
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of aircraft on birds and bird habitat
Term or Condition:	Subject to safety requirements, the Proponent shall require all Project related aircraft to maintain a cruising altitude of at least: a. 650 m during point to point travel when in areas likely to have migratory birds b. 1100 m vertical and 1500 m horizontal distance from observed concentrations of migratory birds c. 1100 m over the area identified as a key site for moulting snow geese during the moulting period (July-August), and if maintaining this altitude is not possible, maintain a lateral distance of at least 1500 m from key sites for moulting snow geese.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**70**
Category:	Birds and Bird Habitat – Flight altitude requirements
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of aircraft on bird and bird habitat
Term or Condition:	The Proponent shall ensure that pilots are informed of minimum cruising altitude guidelines and that a daily log or record of flight paths and cruising altitudes of aircraft within all Project areas is maintained and made available for regulatory authorities such as Transport Canada to monitor adherence and to follow up on complaints.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**71**
Category:	Birds and Bird Habitat – Monitoring
Responsible Parties:	The Proponent, Kivalliq Inuit Association, Kivalliq HTOs and communities
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To develop appropriate mitigation measures and monitoring plans related to birds

Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**72**
Category:	Birds and Bird Habitat – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact to sensitive bird species
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**73**
Category:	Birds and Bird Habitat – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To assess the extent of terrestrial habitat loss
Term or Condition:	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.
Reporting Requirements:	Monitoring results and implementation of these measures shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**74**
Category:	Birds and Bird Habitat – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring

Objective:	To minimize the impact of Project activities on water birds
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**75**
Category:	Birds and Bird Habitat – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To minimize the impact of predatory species on nesting birds
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Marine Environment

Term and Condition No.	**76**
Category:	Marine Environment – General
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure plans and Project design reflect the need to protect the ecosystemic integrity of the marine environment
Term or Condition:	The Proponent shall update all relevant plans including, but not limited to: the Shipping Management Plan, Wildlife Mitigation and Monitoring Plan, and Adaptive Management Plan, in order to address concerns and identify potential impacts of the Project and proposed mitigation measures designed to protect the integrity of the marine environment. The Shipping Management Plan shall also incorporate updates for all Project-related shipping.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition, including the results of monitoring or adaptive management strategies, and any updates to plans to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	77
Category:	Marine Environment – Spill prevention
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure appropriate response capacity for potential spill events
Term or Condition:	The Proponent shall ensure that it maintains the necessary equipment and trained personnel to respond to all sizes of potential spills associated with the Project in a self-sufficient manner.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	78
Category:	Marine Environment – Spill prevention
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure accurate and adequate spill response and emergency preparedness
Term or Condition:	Prior to the shipping of Project supplies, the Proponent shall conduct fuel spill dispersion modeling that will, at a minimum, consider: a. Modeling of oil spills in the following areas: i. Pinch points, including: Hudson Strait, Melvin Bay area including Itivia Harbour and Panorama Island; ii. Shallow water and shorelines; and, iii. Areas that have been identified as having high flows and/or high concentrations of marine mammals, marine fish or seabirds; b. Open water and ice-covered conditions; c. Spill volumes up to and including loss of a full tanker cargo; and, d. Differences in the quantity and properties of each type of bulk fuel transported by vessels when they are at, or in transit to, the port of Rankin Inlet.
Reporting Requirements:	Results of the spill dispersion modeling should be submitted to the NIRB at least 90 days prior to the commencement of construction. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Commentary: *Modelling considerations related to item (b) should be inclusive of seasonal ice variability, i.e. ice formation and break up.*

Marine Wildlife

Term and Condition No.	79
Category:	Marine Wildlife – Updated baseline
Responsible Parties:	The Proponent, other parties as appropriate
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure updated and accurate marine baseline data is available prior to Project-related shipping
Term or Condition:	Prior to any Project-related shipping, the Proponent will update its marine baseline information to ensure that it includes the most recent information on marine wildlife abundance and distribution, carefully considers seasonal distribution patterns of marine wildlife, and incorporates western scientific and Inuit Qaujimajatuqangit knowledge sources. The updated marine baseline should be made available to appropriate authorities for feedback, then incorporated into the Proponent's Shipping Management Plan (SMP), with continued updates on a regular basis as new information becomes available.
Reporting Requirements:	Updated baseline should be provided to the NIRB and appropriate authorities prior to the commencement of Project-related shipping. The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	80
Category:	Marine Wildlife – Marine baseline
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure updated and accurate marine baseline data is available
Term or Condition:	The Proponent shall assess its available baseline information for Melvin Bay and for the area surrounding the fuel transhipment anchorage to ensure that both are adequate for the detection of Project-related impacts, particularly related to contaminants.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	81
Category:	Marine Wildlife – Wildlife plans
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure relevant plans incorporate mitigation and monitoring programming for marine wildlife

Term or Condition:	Prior to any Project-associated shipping, the Proponent shall revise and update the Terrestrial Environment Management Plan (TEMMP) and/or the Shipping Management Plan (SMP) to include following information: a. a plan for involvement of local hunters in wildlife baseline studies and monitoring program; b. a plan for coordinating wildlife studies/monitoring activities with other organizations, institutions, government departments and/or individual researchers conducting wildlife studies in the regional study area; and c. measures to be applied to avoid or reduce the disturbance, harassment, injury or mortality of marine mammals due to shipping activities.
Reporting Requirements:	Updates to the relevant plan(s) should be provided to the NIRB a minimum of 120 days prior to the commencement of Project-related shipping. Implementation of these measures, updates to the Plan, consultation records, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**82**
Category:	Marine Wildlife – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure monitoring of marine wildlife during Project-related ship voyages
Term or Condition:	The Proponent shall require all contracted shipping companies to provide full-time marine wildlife monitoring using trained observers and established data collection and recording protocols. Monitoring plans should include provisions for all *Species At Risk Act* (SARA) and for the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed species (birds and mammals).
Reporting Requirements:	Updated monitoring plans should be provided to the NIRB a minimum of 120 days prior to the commencement of Project-related shipping. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Commentary: *The Proponent is encouraged to consult with the parties involved with marine wildlife management to develop standardized marine wildlife data collection and recording protocols.*

Term and Condition No.	**83**
Category:	Marine Wildlife – Marine mammal interactions
Responsible Parties:	The Proponent

Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To prevent impacts to marine mammals associated with Project shipping
Term or Condition:	The Proponent shall ensure that, subject to vessel and human safety considerations, all Project shipping adhere to the following mitigation procedures while in the vicinity of marine mammals (including polar bear) and birds: a. Marine mammals will be given right of way; b. Ships will when possible, maintain a straight course and constant speed, avoiding erratic behavior; and c. When marine mammals appear to be trapped or disturbed by vessel movements, the vessel will implement appropriate measures to mitigate disturbance, including stoppage of movement until wildlife have moved away from the immediate area.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Term and Condition No.	**84**
Category:	Marine Wildlife – Route planning
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To mitigate potential impacts terrestrial walrus haulouts
Term or Condition:	Prior to any Project-related shipping, the Proponent will prepare a map of terrestrial walrus haulouts (uglit) in the Project area, and use this information for route planning, fuel spill modeling, and sensitive area identification. The map should include all available sources of information on uglit locations, including scientific knowledge and Inuit Qaujimajatuqangit and shall be updated by the Proponent whenever new information becomes available.
Reporting Requirements:	Mapping and associated details should be provided to the NIRB a minimum of 180 days prior to the commencement of Project-related shipping. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**85**
Category:	Marine Wildlife – Monitoring
Responsible Parties:	The Proponent
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To monitor potential impacts to walruses

Term or Condition:	The Proponent shall consider ways to monitor disturbance to walruses at terrestrial haulout sites, including but not limited to remote monitoring (e.g., time-lapse cameras) and community-based monitoring or Inuit Qaujimajatuqangit surveys.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**86**
Category:	Marine Wildlife – Cumulative effects
Responsible Parties:	The Proponent, other parties as appropriate
Project Phase:	Pre-construction, Construction, Operations, Temporary Closure/Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To promote coordinated understanding and mitigation of potential cumulative effects
Term or Condition:	The Proponent is encouraged to liase with relevant stakeholders, regulatory agencies and/or forums (e.g. the Marine Environmental Working Group associated with the Mary River Project), that might allow for participation in relevant research and management initiatives and increasing understanding and mitigation of potential cumulative effects associated with the Project's shipping activities through the Hudson Strait.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB.

Socio-Economic Terms and Conditions

Economic Development, Contracting, and Business Opportunities

Term and Condition No.	**87**
Category:	Economic Development, Contracting and Business Opportunities – Socio-Economic Monitoring, Kivalliq Socio-Economic Monitoring Committee
Responsible Parties:	The Proponent, members of the KSEMC
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Description of the general monitoring framework to be developed in consultation with the Kivalliq Socio-Economic Monitoring Committee.
Term or Condition:	The Proponent is strongly encouraged to participate in the work of the Kivalliq Socio-Economic Monitoring Committee along with other agencies and the communities of the Kivalliq region, and to identify areas of mutual interest and priority for inclusion into a collaborative monitoring framework that includes socio-economic priorities related to the Project, communities, and the Kivalliq region as a whole.

Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this Term and Condition (including the results of monitoring) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**88**
Category:	Economic Development, Contracting and Business Opportunities – Socio-Economic Monitoring
Responsible Parties:	The Proponent, KIA, GN, AANDC also known as Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Kivalliq communities
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Description of a socio-economic monitoring working group to oversee project-specific monitoring program
Term or Condition:	The Proponent is encouraged to work in collaboration with other socio-economic stakeholders including for example, the KIA, GN, AANDC, and communities of the Kivalliq region, to establish a socio-economic working group for the Project to develop and oversee the Meliadine Socio-economic Monitoring Program. The working group should develop a Terms of Reference which outlines each member's roles and responsibilities with regards to, where applicable, project-specific socio-economic monitoring throughout the life of the Project. The Terms of Reference are to be provided to the NIRB upon completion, and within one year of issuance of the Project Certificate.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB. All updates to the Terms of Reference should be submitted to the NIRB during annual socio-economic reporting.

Term and Condition No.	**89**
Category:	Economic Development, Contracting and Business Opportunities – Socio-Economic Monitoring
Responsible Parties:	The Proponent, KSEMC, KIA, GN, AANDC also known as Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Kivalliq communities
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Details regarding the establishment of Project-specific socio-economic monitoring program.
Term or Condition:	The Proponent shall develop the Meliadine Socio-economic Monitoring Program to monitor the predicted impacts outlined in the FEIS as well as regional concerns identified by the Kivalliq Socio-economic Monitoring Committee (SEMC). Where possible, the Proponent is encouraged to work in collaboration with all other socio-economic stakeholders such as the KIA, GN, AANDC and the communities of the Kivalliq region in developing this program, which should include a process for adaptive management and mitigation in the event unanticipated impacts are identified. Details of the

	Meliadine Socio-economic Monitoring Program are to be provided to the NIRB upon finalization, and within one year of issuance of the Project Certificate.
Reporting Requirements:	Details of the Meliadine Socio-economic Monitoring Program should be submitted to the NIRB within one (1) year of issuance of the amended Project Certificate. The Proponent shall produce annual Meliadine socio-economic monitoring reports throughout the life of the Project that are submitted to the NIRB and shared with the wider Socio-Economic Monitoring Committee.

Term and Condition No.	**90**
Category:	Economic Development, Contracting and Business Opportunities – Closure planning and monitoring
Responsible Parties:	The Proponent, KSEMC
Project Phase:	Pre-Construction, Construction
Objective:	To capture and provide analysis of Project-specific and regional data during Project closure(s), and to clarify mitigation measures related to closure
Term or Condition:	Prior to the commencement of operations, the Proponent is required to undertake an analysis of the risk of temporary mine closure, giving consideration to how communities in the Kivalliq region may be affected by temporary and permanent closure of the mine, including economic, social and cultural effects. The results of this analysis are to be provided to the NIRB upon completion.
Reporting Requirements:	This initial results of the Proponent's analysis should be provided to the NIRB within nine (9) months of the issuance of the amended Project Certificate. Any updates to the analyses should be provided to the NIRB as completed by the Proponent and include plans or details in respect of informing the regional socio-economic committee of these results.

Term and Condition No.	**91**
Category:	Economic Development, Contracting and Business Opportunities – Closure planning and monitoring
Responsible Parties:	The Proponent, KSEMC
Project Phase:	Pre-Construction, Construction
Objective:	To capture and provide analysis of Project-specific and regional data during Project closure(s), and to clarify mitigation measures related to closure
Term or Condition:	Within 3 months of the NIRB's acceptance of the Proponent's analysis of the risk of temporary mine closure referenced above, the proponent is expected to update its Socio-Economic Management Plan or to include within a newly developed plan or framework, a description of its plan to collect and analyze Project-specific and regional data at closure and post-closure phases, as well as its defined measures to help mitigate impacts which may result from Project closure(s), both temporary and final.
Reporting Requirements:	The required updates to the Socio-Economic Monitoring Program (and the Socio-Economic Management Plan included within the Program) should be

	provided to the NIRB within three (3) months of the completion of the analysis or updates to the analysis of the risk of temporary mine closure in the term and condition noted above. The Proponent shall reference any updates to its Socio-Economic Monitoring Program and associated management plan in the annual Meliadine socio-economic monitoring reports that are submitted to the NIRB and shared with the wider Socio-economic Monitoring Committee throughout the life of the Project.

Employment

Term and Condition No.	**92**
Category:	Employment – Employment schedule
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	In the interest of producing accurate labour market information and reliable economic and employment forecasting for the current and future labour force, it is important to have up-to-date estimates of the types of employment available through the Project, and what skills are required for these jobs.
Term or Condition:	The Proponent shall submit a detailed staff schedule to the NIRB and to the Government of Nunavut in the first 6 months following the issuance of a Project Certificate. The schedule should, at a minimum, provide a description of: a. Title of positions required by department and division; b. Quantity of positions available by Project phase and year; c. Transferable skills, both certified and uncertified which may be required for, or gained during, employment within each position; and, d. The National Occupational Classification (NOC) code for each individual position. The Proponent is encouraged to consult the Government of Nunavut during development of the schedule. A new schedule should be submitted following any significant deviation from original predictions.
Reporting Requirements:	Within 6 months of Project Certificate issuance and as required thereafter.

Term and Condition No.	**93**
Category:	Employment – Registration of trades workers
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring

Objective:	To ensure that the Government of Nunavut has accurate information to assist it in its role as overseer of the apprenticeship program in Nunavut and in its provision of access to training initiatives and programs.
Term or Condition:	The Proponent is encouraged to register all trades occupations, journeypersons and apprentices working with the Project and to register any trades occupations listed in its forecast, as well as to provide the Government of Nunavut with information regarding the number of registered apprentices and journeypersons from other jurisdictions employed at the Project during each year of the Project's life.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB and shared with the wider regional socio-economic monitoring committee throughout the life of the Project.

Term and Condition No.	**94**
Category:	Employment – Labour force analysis
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To update information provided within the FEIS and monitor Project impacts on labour force characteristics throughout the life of the Project.
Term or Condition:	The Proponent shall update its labour force analysis utilizing current or the most recent baseline information as may be available from the Nunavut Bureau of Statistics or Statistics Canada. The updated labour force analysis is to be provided to the NIRB within 6 months of the Project Certificate being issued. The Proponent is encouraged to work collaboratively with other stakeholders to monitor any impacts the Project may have on the labour force characteristics of the Kivalliq region during all project phases.
Reporting Requirements:	The Proponent should summarize the results of these efforts in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-Economic Monitoring Committee throughout the life of the Project.

Education and Training

Term and Condition No.	**95**
Category:	Education and Training – Transferable skills and training
Responsible Parties:	The Proponent, Kivalliq Inuit Association, Government of Nunavut, Municipal Training Organization
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Offering training which results in certification that is valid for employment at other sites or in other fields contributes to the long-term employability of Nunavummiut.
Term or Condition:	The Proponent is encouraged to work with training organizations and/or government departments offering mine-related or other training in order

	to provide additional opportunities for residents and employees to gain meaningful and transferable skills and certifications.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB. Updates to the list should be included in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-Economic Monitoring Committee throughout the life of the Project.

Term and Condition No.	**96**
Category:	Education and Training – Transferable skills and training
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction
Objective:	Offering training which results in certifications that are valid for employment at more than one site or in different fields contributes to the long-term employability of Nunavummiut.
Term or Condition:	Prior to construction, the Proponent shall develop an easily referenced listing of formal certificates and licences that may be acquired via on-site training or training during Proejct employment. The listing shall indicate which of these certifications and licences would be transferable to a similar job site within Nunavut, and should be updated on an annual basis, and is to be provided to the NIRB upon completion and as may be revised.
Reporting Requirements:	The initial listing should be provided to the NIRB at least 60 days prior to the start of construction, and annually thereafter or as may otherwise be required.

Term and Condition No.	**97**
Category:	Education and Training – Monitoring impacts of closure
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To further the understanding of the impacts that Project closure may have on education and training
Term or Condition:	The Proponent's project-specific socio-economic monitoring program should be updated to address the potential impacts to education and training which may arise from temporary, final and/or post-closure phases.
Reporting Requirements:	Information regarding the Proponent's fulfillment of this term and condition shall be included in the Proponent's annual report to the NIRB and shared with the wider regional socio-economic monitoring committee throughout the life of the Project.

Term and Condition No.	**98**
Category:	Education and Training – Monitoring impacts to education system
Responsible Parties:	The Proponent, KSEMC

Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To further the understanding of potential impacts from pressures to the education system in the Kivalliq region and individual communities throughout the life of the Project.
Term or Condition:	The Proponent is encouraged to work with the members identified as potential stakeholders in the socio-economic monitoring working group and with the Kivalliq Socio-Economic Monitoring Committee to review and monitor education utilization rate trends on an on-going basis to understand if the Project can be determined to be having an impact on the education system of the Kivalliq region and/or on any communities in particular.
Reporting Requirements:	The summary of this information should be included in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-economic Monitoring Committee throughout the life of the Project.

Population Demographics

Term and Condition No.	**99**
Category:	Population Demographics – Monitoring demographic changes
Responsible Parties:	The Proponent, KSEMC
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Monitoring demographic changes affecting the Kivalliq communities is important to understanding trends which may be correlated with the Meliadine Project or other activities in the region.
Term or Condition:	The Kivalliq Socio-Economic Monitoring Committee and its membership are encouraged to engage in the monitoring of demographic changes including the movement of people into and out of the Kivalliq communities and the territory as a whole. This information may be used in conjunction with monitoring data obtained by the Proponent from recent hires and/or out-going employees in order to assess the potential effects of the Project on migration.
Reporting Requirements:	The summary of this information should be included in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-economic Monitoring Committee throughout the life of the Project.

Term and Condition No.	**100**
Category:	Population Demographics – Survey of Nunavummiut employees
Responsible Parties:	The Proponent, KSEMC, GN
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring

Objective:	Monitoring changes in the circumstances of Nunavummiut employees may provide important information which could be used to evaluate predictions made and the potential impacts to Kivalliq communities.
Term or Condition:	The Proponent is encouraged to work with the Kivalliq Socio-Economic Monitoring Committee to design and implement a voluntary survey to be offered to its Nunavummiut employees on an annual basis in order to identify changes of address, housing status (i.e. public/social, privately owned/rented, government, etc.), and migration intentions, while respecting confidentiality of all persons involved. The survey should be designed in collaboration with the Government of Nunavut, the Nunavut Housing Corporation and other relevant stakeholders. Non-confidential results of the survey are to be reported to the Government of Nunavut and the NIRB.
Reporting Requirements:	The summary of this information should be included in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-economic Monitoring Committee throughout the life of the Project.

Term and Condition No.	**101**
Category:	Population Demographics – Employee origin
Responsible Parties:	The Proponent
Project Phase:	Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Project-specific information regarding employee origin is important to comparing predictions of labour availability and employment opportunities with actual levels of employment from various demographic segments over different geographic areas.
Term or Condition:	The Proponent shall include with its annual reporting to the NIRB a summary of employee origin information as follows: a. The number of Inuit and non-Inuit employees hired from each of the Kivalliq communities, specifying the number from each; b. The number of Inuit and non-Inuit employees hired from each of the Kitikmeot and Qikiqtani regions, specifying the number from each; c. The number of Inuit and non-Inuit employees hired from a southern location or other province/territory outside of Nunavut, specifying the locations and the number from each; and d. The number of non-Canadian foreign employees hired, specifying the locations and number from each foreign point of hire.
Reporting Requirements:	The summary of this information should be included in the annual Meliadine socio-economic monitoring reports submitted to the NIRB and shared with the wider Socio-economic Monitoring Committee throughout the life of the Project.

Traditional Activity and Knowledge

Term and Condition No.	102
Category:	Traditional Activity and Knowledge – Meliadine Lake community boat launch
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Appropriate planning for and consideration of, mitigation in design features and further monitoring of usage is an important component of the public boat launch as proposed in order to ensure public and worker safety.
Term or Condition:	Prior to commencing construction of the Discovery spur road to pass Meliadine Lake, the Proponent shall provide to the NIRB, details regarding the design features for the Meliadine Lake community boat launch, including traffic turnoffs from the all-weather access road, relevant signage, parking areas, considerations for public safety around the boat launch, plans for garbage removal and treatment of other refuse including buildings and equipment which may be stored at the site, as well as plans to monitor and/or maintain the site, including frequency and timing. These details, once finalized, shall also be incorporated, as updates, to various mitigation, monitoring and/or management plans as applicable.
Reporting Requirements:	Initial details to be provided prior to commencement of construction of the Discovery spur road. The Proponent shall provide a summary discussion of its implementation of this term and condition, monitoring results, implementation of adaptive management strategies, and updates to relevant plans to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	103
Category:	Traditional Activity and Knowledge – Community input to monitoring
Responsible Parties:	The Proponent, KIA, KHTO, KSEMC
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Incorporating community input into monitoring plans, programs and mitigation measures is important to ensuring they consider traditional knowledge and activities.
Term or Condition:	The Proponent is encouraged to consult with the Kangiqliniq Hunters and Trappers Organization and the Kivalliq Socio-Economic Monitoring Committee and to make all reasonable efforts to engage Elders and community members of the Kivalliq communities in order to have community level input into updates to its monitoring plans, programs and mitigative measures. This type of engagement will ensure that these programs and measures have been informed by traditional activities, cultural resources, and land use as such may be implicated or impacted by ongoing Project activities. All plans are to include a feedback mechanism for consulting with residents of the Kivalliq, including the provision of

	results from the Proponent's wildlife monitoring programs to each community. The Proponent shall submit updated plans to the NIRB within 30 days of their revision and/or finalization.
Reporting Requirements:	Updated plans shall be submitted to the NIRB 30 days prior to their revision/finalization. Further, the Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring, adaptive management strategies, consultation, and contribution efforts undertaken) to the NIRB through the Proponent's annual monitoring report. Plans should explain specifically how the information will be shared with the wider regional socio-economic monitoring committee throughout the life of the Project.

Non-Traditional Land Use and Resource Use

Term and Condition No.	**104**
Category:	Non-Traditional Land Use and Resource Use – Consultation with outfitters and guides
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	It is important that the Proponent have an accurate understanding of land use patterns near Project activities in order to properly assess safety precautions that may be needed to protect human and environmental health, as well as to understand where these uses may be impacted by Project activities.
Term or Condition:	The Proponent is encouraged to consult with outfitting and guiding businesses that operate in the LSA and RSA regarding use of the area, specifically as it relates to hunting, fishing and guiding within proximity of the AWAR. Results of this consultation should be incorporated into updated plans where applicable.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including results of monitoring, adaptive management strategies, consultation, and contribution efforts) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	**105**
Category:	Non-Traditional Land Use and Resource Use – Hunter harvest survey
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Where possible, relevant information obtained from non-traditional land uses such as outfitting and guiding may help in improving the robustness of the hunter harvest survey to be carried out by the Proponent.
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including results of monitoring, adaptive management strategies, consultation, and contribution efforts) to the NIRB through the Proponent's annual monitoring report and shared with the wider regional Socio-Economic Monitoring Committee throughout the life of the Project.

Cultural, Archaeological and Paleontological Resources

Term and Condition No.	**106**
Category:	Cultural, Archaeological and Paleontological Resources – Inspection reporting
Responsible Parties:	The Proponent, GN
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	It is important that the Proponent and the GN determine a mutually agreeable schedule for the Proponent's reporting of inspection results, as this information may be needed for adjustments to mitigation and/or monitoring measures and programs.
Term or Condition:	The Proponent shall, in consultation with the Government of Nunavut's Territorial Archaeologist, determine a reporting frequency for the provision of inspection reports to the Government of Nunavut regarding the status of the Meliadine River Bridge, the Char River Bridge, and the M5 Bridge Crossing during the spring freshet period (mid-May to June) and during the remainder of the ice-free period to freeze-up (July to October).
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	**107**
Category:	Cultural, Archaeological and Paleontological Resources – Mitigation of ice buildup
Responsible Parties:	The Proponent, GN
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	It is important that a plan be developed to address ice buildup at various Project bridge crossings in order to ensure the protection of archaeological resources.
Term or Condition:	The Proponent shall consult with the Government of Nunavut – Department of Culture and Heritage in developing a mitigation plan to address ice buildup at the Meliadine River Bridge, the Char River Bridge, and the Bridge Crossing at M5. The Proponent shall submit this mitigation plan to the NIRB once finalized.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Individual and Community Wellness

Term and Condition No.	108
Category:	Individual and Community Wellness – Counseling and treatment programs
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To make available, necessary treatment and counseling services for employee and family well-being.
Term or Condition:	The Proponent is encouraged to consider providing access to counseling and treatment programs for substance and gambling addictions, and programs which address domestic, parenting, and marital issues that could affect employees and/or their families.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	109
Category:	Individual and Community Wellness – Indirect impacts to health and well-being
Responsible Parties:	The Proponent, KSEMC
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To understand the indirect impacts of the Project upon health and well-being
Term or Condition:	The Proponent is encouraged to work with the Kivalliq Socio-Economic Monitoring Committee to monitor potential indirect effects of the Project, including indicators such as the prevalence of substance abuse, gambling issues, family violence, marital problems, rates of sexually transmitted infections and other communicable diseases and others as deemed appropriate.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	110
Category:	Individual and Community Wellness – Employee cohesion
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To encourage the on-site cohesion and wellbeing of employees through cultural awareness and wellness programs
Term or Condition:	The Proponent shall provide the NIRB with a description of wellness and cultural diversity/acceptance programming made available to employees and family or community members and shall report the following information with respect to each program to the NIRB annually: a. Language of instruction;

	b. Uptake by employees and/or family members where relevant, noting Inuit and non-Inuit participation rates; c. Completion rates for enrolled participants, noting Inuit and non-Inuit rates; and d. Issues as may relate to program content which may have been noted or present either on site or in the community and which affect Project employment or employee wellness.
Reporting Requirements:	Summaries of all cross-cultural training initiatives should be provided in the annual Meliadine Socio-Economic Monitoring Report.

Term and Condition No.	**111**
Category:	Individual and Community Wellness – Employee training opportunities
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To understand how the Proponent's employee training programs are delivered and received, including uptake and completion rates by Inuit and non-Inuit staff.
Term or Condition:	In its annual reporting to the NIRB, the Proponent is strongly encouraged to provide detailed descriptions of all employee programs and training including: a. Descriptions of the goals of each program offered; b. Language of instruction; c. Schedules and location(s) of when each program was offered; a. Uptake by employees and/or family members where relevant, noting Inuit and non-Inuit participation rates; and, b. Completion rates for enrolled participants, noting Inuit and non-Inuit rates.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	**112**
Category:	Individual and Community Wellness – Access to housing
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To investigate ways that economic development and self-reliance may improve access to housing by employees.
Term or Condition:	The Proponent is encouraged to investigate measures and programs designed to assist Project employees with pursuing home ownership or accessing affordable housing options.
Reporting Requirements:	Provided the sharing of such information is consistent with and not limited by the terms and conditions of any applicable Inuit Impact Benefit Agreement, these efforts should be reported to the NIRB within the annual Meliadine Socio-Economic Monitoring Report.

Community Infrastructure

Term and Condition No.	113
Category:	Community Infrastructure – Access to public housing
Responsible Parties:	The Proponent, KSEMC, GN-Nunavut Housing Corporation
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To inform the territory with respect to current housing rates, needs, and intentions to migrate may provide the GN with insight as to where additional resources may need to be devoted, based on trends that can be identified.
Term or Condition:	The Proponent is encouraged to collaborate with the Kivalliq Socio-Economic Monitoring Committee and the Government of Nunavut – Nunavut Housing Corporation, to design and implement a voluntary employee survey to be completed on an annual basis in order to to identify any changes of address, detailed occupancy status (i.e., public/social, privately owned/rented, government, number of people sharing the resident space, etc.), housing preferences, migration intentions, and reasons for migration while respecting confidentiality of all person involved. Non-confidential results of the survey are to be reported to the Government of Nunavut and the Nunavut Impact Review Board.
Reporting Requirements:	The frequency and content of the survey should be determined by the collaborating parties, but content may include changes to address, housing status (i.e., public/social, privately owned/rented, government, etc.) and migration intentions of Project employees. Non-confidential results of the survey should be reported to the GN and other members of the Socio-economic Monitoring Committee and summary information of these results should be reported to the NIRB within the annual Meliadine Socio-Economic Monitoring Report.

Term and Condition No.	114
Category:	Community Infrastructure – Financial literacy and planning programs
Responsible Parties:	The Proponent, GN-Nunavut Housing Corporation
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure accurate and helpful information is passed to Project employees relating to financial literacy and housing/homeownership.
Term or Condition:	The Proponent is encouraged to collaborate with the Government of Nunavut – Nunavut Housing Corporation prior to the development and inception of its programs relating to financial literacy and planning to ensure that relevant and accurate information about housing and home ownership is available and considered for inclusion.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	115
Category:	Community Infrastructure – Impacts to health services
Responsible Parties:	The Proponent, Government of Nunavut
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	It is important to understand potential Project-specific impacts to the local health services, as well as to ensure a clear procedure is developed for Project employee medical referrals.
Term or Condition:	The Proponent is encouraged to work collaboratively with the Government of Nunavut Department of Health to monitor the impacts of the Meliadine Gold Project on health services within the LSA communities and specifically, Rankin Inlet.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Public and Worker Health and Safety

Term and Condition No.	116
Category:	Public and Worker Health and Safety – Air quality monitoring
Responsible Parties:	The Proponent, Government of Nunavut
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	Adequate analysis of particulate matter is required in order to understand the potential impacts to human health.
Term or Condition:	The Proponent shall update the air quality monitoring aspect of its environmental and health risk monitoring program to include the following parameters for particulate matter: a. An analysis of the metals content of the dust collected in passive monitoring; and b. Discrete samples to be collected on a frequency to be determined in collaboration with the Government of Nunavut, from the camp, and analyzed for acrolein and aldehyde. Results are to be incorporated into the Proponent's annual reporting for submission to the NIRB.
Reporting Requirements:	If required, updated information regarding mitigation measures or management plans should be provided to the NIRB at least 90 days following issuance of the amended Project Certificate, and subsequent modifications to these plans should be identified and included in the Proponent's annual report to the NIRB.

Other Terms and Conditions

Accidents and Malfunctions

Term and Condition No.	117
Category:	Accidents and Malfunctions – All-weather access road
Responsible Parties:	The Proponent, Kivalliq Inuit Association, Hamlet of Rankin Inlet, community members
Project Phase:	Pre-Construction
Objective:	To ensure overall safety through design and operation of the road, in accordance with relevant legislation and regulatory requirements
Term or Condition:	Prior to construction Phase 2 of the all-weather access road and the Rankin Inlet bypass road, the Proponent shall consult applicable laws in Canada and Nunavut as well as meet with all regulatory agencies and the public as it finalizes its road operations plans.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring, adaptive management strategies, and consultation) to the NIRB through the Proponent's annual monitoring report.

Commentary: *The reference to meeting with "all regulatory agencies" is intended to be all "relevant" regulatory agencies with a mandate in relation to the all-weather access road.*

Term and Condition No.	118
Category:	Accidents and Malfunctions – All-weather access road
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure adequate monitoring of wildlife presence informs road management and operations
Term or Condition:	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.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including results of monitoring, adaptive management strategies, consultation, and contribution efforts) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	119
Category:	Accidents and Malfunctions – All-weather access road
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring

Objective:	To mitigate potential interactions of caribou with traffic along the AWAR
Term or Condition:	The Proponent shall include within its updated Terrestrial Wildlife Management and Monitoring Plan, a commitment to establishing deterrents along the 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.).
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction. Implementation of these measures, updates to the Plan, and monitoring results shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	**120**
Category:	Accidents and Malfunctions – Marine shipping
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure protection of the marine environment
Term or Condition:	The Proponent shall contract only Transport Canada certified shippers to carry cargo for the Project, and will ensure shippers are aware of the requirements of the Shipping Management Plan, the Risk Management and Emergency Response Plan and the Oil Pollution Emergency Plan (OPEP).
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition to the NIRB through the Proponent's annual monitoring report.

Commentary: *As clarified by Transport Canada, Transport Canada certifies "vessels" or "ships" and not the "shippers" themselves. The Term and Condition should be implemented with the recognition that the Proponent intends to use Canadian-flagged ships or vessels only.*

Term and Condition No.	**121**
Category:	Accidents and Malfunctions – Marine shipping
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure protection of the marine environment
Term or Condition:	The Proponent shall monitor the ingress/egress of Project related ships at Rankin Inlet and report any accidents or spills immediately to the regulatory agencies as required by law and to NIRB's Monitoring Officer.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	122
Category:	Accidents and Malfunctions – Marine shipping
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure protection of the marine environment
Term or Condition:	The Proponent shall ensure that best practices are used at all times during ship to shore and other marine-based fuel transfer events, including implementing measures specifically designed to prevent leaks and spills resulting from ice forming on the hoses during fuel transfers.
Reporting Requirements:	The Proponent shall provide a summary discussion of its implementation of this term and condition (including the results of monitoring or adaptive management strategies) to the NIRB through the Proponent's annual monitoring report.

Term and Condition No.	123
Category:	Accidents and Malfunctions – Marine shipping
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure protection of the marine environment
Term or Condition:	The Proponent shall ensure that the necessary spill response equipment and training is available prior to commencing project shipping.
Reporting Requirements:	Evidence of meeting the requirements of this term and condition shall be submitted as part of the Proponent's annual reporting to the NIRB.

Term and Condition No.	124
Category:	Accidents and Malfunctions – Spill preparedness
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure protection of local water resources
Term or Condition:	Prior to construction, the Proponent shall update its Spill Contingency Plan specific to a major spill event occurring on the bypass road and within proximity to (and including potential spills into) Nipissar Lake.
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	125
Category:	Accidents and Malfunctions – All-weather access road
Responsible Parties:	The Proponent

Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure rules for use of the road are clearly communicated in the interest of providing for the health and safety of all users of the AWAR
Term or Condition:	The Proponent shall implement all such measures necessary to protect public and mine traffic on all Project roads. The measures undertaken shall include, but are not limited to: a. Prior to expansion of the AWAR, the Proponent shall update its Roads Management Plan to include a detailed consultation plan specifying the methods the Proponent will use to provide the Kivalliq Inuit Association, members of the Hunters and Trappers Organizations in the area, residents of Rankin Inlet and the Hamlet of Rankin Inlet with information regarding the safety requirements of AWAR use. The updated Plan is to be submitted to the Nunavut Impact Review Board, Kivalliq Inuit Association, Kangiqliniq Hunters and Trappers Organization, and the Government of Nunavut; b. Prior to the opening of the AWAR to the public, and annually thereafter, advertise and hold at least one community meeting in the Hamlet of Rankin Inlet and Chesterfield Inlet to explain to the community the rules for use of the road; c. Prior to the opening of the AWAR to the public, the Proponent shall address enforcement of health and safety rules for the operation of the road (i.e., no shooting zone) and implement necessary communications with the public (i.e., signage and public meetings), which includes, but is not limited to: i. Maintaining manned and unmanned gates as proposed along the all-weather access road; ii. The posting of signs in English and Inuktitut along the road at appropriate intervals (i.e., 10 km and bridge crossings); and iii. Place notices at least quarterly on the radio and television to explain to the community the rules for use of the road; d. Once the AWAR expansion is completed and the road is opened to the public, the Proponent shall conduct a vehicle survey four times annually (once during the weekdays during the winter season, once during the week end days during the winter season, once during the weekdays during the summer season and once during the week end days during the summer season) to record the number and types of mine vehicles and the number and type of public vehicles using the AWAR over a 12 hour period (8:00 am to 8:00 pm). The vehicle survey data shall be collated as indicated above and provided in the Proponent's Annual Report;

	e. Prior to the development of the Discovery deposit, the Proponent shall update its Road Management Plan for the planned operation of the twinned road which could include additional rules, Project infrastructure, or other measures designed to maintain safety for employees and the public; and f. Report all accidents or other safety incidents on the road, to the Government of Nunavut, Kivalliq Inuit Association, the Hamlet of Rankin Inlet and the NIRB immediately.
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction of Phase 2 of the AWAR. As noted in the Board's decision on the Saline Effluent Discharge to the Marine Environment proposal, updated plans shall be submitted to the NIRB prior to undertaking transport of saline groundwater from the Meliadine site to the temporary storage tank near Rankin Inlet. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Commentary: *The reference under the Reporting Requirements to "90 days prior to the start of construction" is not intended to be tied to general project construction, but rather is intended to be linked to 90 days prior to the construction associated with the expansion of the AWAR (referred to as "Phase 2 of the AWAR development" in the Proponent's Final Environmental Impact Statement).*

Alternatives Analysis

Term and Condition No.	**126**
Category:	Alternatives Analysis – All-weather access road
Responsible Parties:	The Proponent
Project Phase:	Pre-Construction
Objective:	To ensure clear and consistent communication of safety requirements and road use limitations to inform members of the public
Term or Condition:	Prior to expansion of the AWAR, the Proponent shall prepare and add to the finalized Roads Management Plan (SD 2-9), a detailed consultation plan specifying the methods the Proponent will use to provide the Kivalliq Inuit Association, members of the Hunters and Trappers Organizations in the area, residents of Rankin Inlet and the Hamlet of Rankin Inlet with information regarding the safety requirements and any limitations on public AWAR use (i.e. the "rules of the road") and to ensure that this information continues to be clearly communicated on an on-going basis while the public has access to the AWAR.
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Term and Condition No.	127
Category:	Alternatives Analysis – Marine shipping
Responsible Parties:	The Proponent, Kivalliq Inuit Association, Kivalliq HTOs
Project Phase:	Pre-Construction, Construction, Operations, Temporary Closure / Care and Maintenance, Closure and Post-Closure Monitoring
Objective:	To ensure adaptive management measures are available to address impacts to marine mammals
Term or Condition:	The Proponent shall, in coordination and consultation with the Kivalliq Inuit Association and the Hunters and Trappers Organizations of the Kivalliq communities, provide updates to its Shipping Management Plan to identify adaptive management measures that will be employed if effects monitoring identifies potential for effects on marine mammal populations along the shipping route.
Reporting Requirements:	The updated plan should be submitted to the NIRB at least 90 days prior to the start of construction. Implementation of these measures and monitoring results as well as any subsequent updates to the Plan, shall be reported and discussed in the Proponent's annual report to the NIRB.

Saline Effluent Disposal New Terms and Conditions

NEW Term and Condition No.	128
Category:	Marine Environment
Responsible Parties:	The Proponent, Fisheries and Oceans Canada (DFO), Environment and Climate Change Canada (ECCC), Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
Project Phase:	Operations, Care and Maintenance, Closure
Objective:	To assess the environmental impact of the Project on the seabed and marine environment if the effluent discharge pipeline is abandoned in place or removed.
Term or Condition:	The Proponent shall provide the NIRB with a detailed design for the system that includes the location of the pipeline in relation to the saline effluent storage tank at Itivia, the location of submerged collars supporting the pipeline and the design of the diffuser.
Reporting Requirements:	To be provided to the Nunavut Impact Review Board at least 90 days prior to construction of the effluent pipeline and diffuser system.

NEW Term and Condition No.	129
Category:	Marine Environment
Responsible Parties:	The Proponent and Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)
Project Phase:	Operations, care and maintenance, and closure

Objective:	To assess the environmental impact of the Project on the seabed and marine environment if the effluent discharge pipeline is abandoned in place or removed.
Term or Condition:	The Proponent shall conduct and submit to the Board a hazard and operability assessment of the pipeline and marine outfall system as part of the land authorization process.
Reporting Requirements:	To be provided to the Nunavut Impact Review Board at least 90 days prior to operation of the effluent pipeline and diffuser system.

NEW Term and Condition No.	**130**
Category:	Marine Environment
Responsible Parties:	The Proponent, Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), Environment and Climate Change Canada (ECCC), and Fisheries and Oceans Canada (DFO)
Project Phase:	Operations, care and maintenance, and closure
Objective:	To assess the environmental impact of the Project on the seabed and marine environment if the effluent discharge pipeline is abandoned in place or removed.
Term or Condition:	The Proponent shall remove the subsea pipeline and diffuser in Melvin Bay when the pipeline is no longer in use unless it can be demonstrated to the satisfaction of the Nunavut Impact Review Board that this infrastructure will provide a net positive environmental effect to the local ecosystem.
Reporting Requirements:	Information necessary to support an application for removal of the subsea pipeline and diffuser must be provided to the Nunavut Impact Review Board for consideration at least 12 months prior to planned removal.

NEW Term and Condition No.	**131**
Category:	Marine Environment
Responsible Parties:	The Proponent
Project Phase:	Operations, care and maintenance, and closure
Objective:	To prevent adverse impacts to community travel and use of local marine areas.
Term or Condition:	The Proponent shall ensure its Marine Environment Management Plan addresses a procedure for engagement with the Kangiqliniq Hunters and Trappers Organization (HTO) to confirm the commencement and ending of the open water season for marine effluent discharge each year. The Proponent shall also engage with the HTO and the community of Rankin Inlet when developing a program for monitoring saline effluent temperature going into the subsea pipeline, ice thickness on Melvin Bay in the vicinity of the discharge and determining appropriate communication and safety protocols applicable for travel by community members through Itivia and Melvin Bay.

Reporting Requirements:	A summary of actions taken are to be included in the Proponent's annual reporting to the NIRB.

APPENDIX A – MONITORING PROGRAM

[To be developed]

APPENDIX B

Arctic Raptor Research Program, 2018

KIVALLIQ PEREGRINE FALCON MONITIRORING: 2017 REPORT TO GOVERNMENT OF NUNAVUT

Introduction

The peregrine falcon (*Falco peregrinus*) is one of the most intensively studied raptor species in the world (for example, Olsen and Olsen 1989, Ratcliffe 1993, Rosenfield et al. 1995, Quinn and Kokorev 2000, Ganusevich et al. 2004, Anctil et al. 2013a). In North America, interest was focused on this species due to well-established population declines associated with contamination from organochlorine pesticides (for example, Enderson et al. 1968, Peakall and Kiff 1979, Peakall et al. 1983, Risebrough and Peakall 1988, Ellis et al. 1989, Court et al. 1990, Franke et al. 2010). Wide-scale population declines in North America were first summarized at the 1965 Madison Peregrine Falcon Conference (Hickey 1969), and were found to be extensive in the United States (virtually total extirpation in the east and severe declines in the west) and throughout southern parts of Canada east of the Rocky Mountains. Of the 3 sub-species that exist in the North America, the American peregrine falcon (*F. p. anatum*) and Arctic peregrine (*F. p. tundrius*) were listed as "endangered" in the United States pursuant to the Endangered Species Act (ESA 1973, as amended) in 1970; the Peale's peregrine (*F. p. pealei*) was never listed in the United States. In Canada, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed the American peregrine as "endangered", the Arctic peregrine as "threatened", and the Peale's peregrine as "special concern" pursuant to the Species at Risk Act (SARA 2002, as amended) in 1978. Historically, the northern portion (boreal, sub-arctic and arctic) of the peregrine falcon population was thought to be large, and potentially accounted for as much as 80% of the total population in North America (Kiff 1988). However, the spatial extent over which surveys can realistically occur constrains data collection over geographic spatial scales (Cade 2013). Northern-breeding American and Arctic peregrines are highly migratory (Yates et al. 1988, Schmutz et al. 1991, Fuller et al. 1998). In the United States, the Arctic peregrine and American peregrine were removed from the list of endangered species in 1994 (USFWS 1998) and in 1999 (USFWS 1999a), respectively. In Canada, the Arctic peregrine and American peregrine were evaluated together (rather than as separate sub-species) and down-listed by COSEWIC to Special Concern in 2007, and were legally listed as such on Schedule 1 of the Species at Risk Act in 2012.

There is one long-term study on Peregrine Falcons in Rankin Inlet, Nunavut. Population monitoring at Rankin Inlet was initially motivated by the need to understand the processes responsible for reproductive failure, and with the exception of one year (2001), has been conducted annually since 1980. Much of the information on the ecology and toxicology of Arctic peregrine falcons has resulted from the research conducted on this population (Court 1986, Court et al. 1988a, Court et al. 1988b, Bradley 1989, Court et al. 1989, Court et al. 1990, Bradley and Oliphant 1991, Johnstone et al. 1996, Bradley et al. 1997, Johnstone 1998, Franke et al. 2010, Franke et al. 2011b, Anctil and Franke 2013, Anctil et al. 2013a, Franke et al. 2013, L'Hérault et al. 2013, Franke et al. 2016, Lamarre et al. 2017). The objective of this work is part of a commitment to provide annual updates to the Government of Nunavut with regard to monitoring of the population of peregrine falcons breeding near Rankin Inlet, Nunavut.

Background

The Rankin Inlet Peregrine Falcon study population was discovered in the late 1970s, but its size and density was not appreciated until intensive surveys were conducted in 1980-81. Critical nesting habitat and an abundance of marine and terrestrial prey make the area ideal for Peregrine Falcons and other nesting predatory birds. The entire area is accessible by snowmobile, ATV, and boat, allowing a systematic search of nesting territories for banded and unbanded adult birds. Acccess to nesting sites for collecting productivity data and banding of young poses few problems.

A variety of research partners and the Government of Nunavut have been involved in the project since 1981. Up to 1996, graduate students from the Universities of Alberta and Saskatchewan conducted and managed the project and the government provided field equipment and logistical support. Research projects included detailed studies of life history, pesticide contamination, diet, and a series of investigations based on individually identified (banded) birds. These studies, and on-going monitoring by the government, have produced one of the longest continuous data sets on reproductive success and contaminant burdens for nesting Peregrine Falcons anywhere in the world. These data allow for an assessment of trends in pesticide residues from peregrines and their primary prey species over three decades. These data, combined with detailed information on Peregrine Falcon reproductive performance, have been referenced numerous times in research journals and status reports that provide management actions for falcons

throughout North America. Additionally, data collected at Rankin Inlet has allowed immediate assessment of factors that may impact falcon populations throughout Nunavut. As such, the falcon population at Rankin Inlet is widely recognized as one of the best "indicator" populations of Peregrine Falcons in North America. The unique, detailed, long-term data set includes demographic attributes such as the annual number of occupied territories, the number of pairs to produce young, and the total number of young fledged. Both the University of Alberta and the University of Saskatchewan were involved closely with graduate students until 1996. No monitoring was conducted in 2001. However, with funding from the Government of Nunavut (GN DoE), Department of Environment, monitoring of the population resumed in earnest in 2002 and 2003.

The GN DoE contributes approximately $20,000.00 per year to the project (or approximately 10% of the overall annual budget required to fund the project). The remaining funding is raised from external sources, primarily ArcticNet, Mitacs, Peregrine Fund, Agnico Eagle Mine, Baffinland Iron Mine, Northern Scientific Training Program, and NSERC.

Study area

The study population of Peregrine Falcons is encompassed within a 1000 km^2 study area (Figure 1) near the hamlet of Rankin Inlet, Nunavut, Canada. At its peak, the density of breeding Peregrine Falcons at Rankin Inlet included 26 territorial pairs at one pair per 17 square km, a density that is among the highest for the species in the world and the highest recorded in the tundra biome. Though relatively southern for Peregrine Falcons in Canadian Arctic, (62°49'N 92°05'W), environmental conditions are as, or more, severe than any encountered in the range of the species. Passerines and small mammals comprise the bulk of the diet and lemming consumption (at least 30% of the diet biomass in any given year) increases significantly during peak abundance; more pairs attempt to breed and more young are produced during peak lemming abundance (Court et al. l988a, l988b, Bradley and Oliphant 1991). Terminology used in describing nesting activities of Peregrine Falcons and a general description of vegetation, climate, and geology of the study area are reported elsewhere (Court 1986, Court et al. l988a, l988b, 1989).

Methods

Survey Methods

Accurate determination of site occupancy and productivity is challenging if effort is limited to a single, short-term survey, particularly if the survey is conducted late in the breeding season (e.g. at a period of time typically associated with brooding or chick rearing). For this reason, between 1982 and 2017, a full census of the entire study area was conducted a minimum of twice annually. Beginning in May of each year, as Peregrine Falcons arrived from their wintering grounds, territories were surveyed by snow machine to determine the presence or absence of territorial, breeding-aged, adults. All unoccupied sites were checked until occupancy by Peregrine Falcons was confirmed or the breeding season was sufficiently advanced to conclude that the site was vacant.

In cases where sites were occupied by individuals previously fitted with unique alphanumeric color-coded leg bands, bands were read using a Questar Field Model telescope, hand held digital camera or Reconyx trail camera. If territories were occupied by unmarked individuals, effort was made to trap and mark these birds with an alphanumeric color band on one leg and a US Fish and Wildlife band on the other. In addition, we measured un-flattened wing chord, body weight, tail length, tarsus width and length, for each bird; a subjective measure of body condition, sharpness of keel, was also recorded.

After breakup of the sea-ice, territories were surveyed by boat to determine occupancy and productivity at each site; inland sites were accessed by all-terrain vehicle for the same purpose. During summer, banded adult Peregrine Falcons were identified by either trapping or visually by telescope. Unmarked individuals were trapped and banded where possible. Once nestlings reached a minimum of 25 days of age (first week of August), they too were banded. Young were considered to be successfully raised after reaching banding age, and yearly productivity is therefore defined as the number of young produced per occupied territory (Steenhof and Newton 2007, Steenhof et al. 2017).

Statistical analysis

Data exploration was carried out following the protocol described in (Zuur et al. 2010). Specifically, histograms and kernel density plots to inspect raw occupancy and productivity values

for normality. In addition, the Shapiro-Wilk test (w) for normality was used to assess whether p-values were >0.05, and w = 1 (Shapiro and Wilk 1965). Boxplots were used to detect outliers; extreme values were removed only when they were considered to be outside of the range of natural variation.

General additive models (GAM) were used to estimate annual trends for each occupancy and productivity area. Each GAM was defined as follows:

$$Y_i = \partial + f(Year_i) + \varepsilon_i \quad (1)$$

where Y_i represents the i^{th} observation of the demographic of interest (occupancy or reproductive success), ∂ is the intercept, $f(Year_i)$ is the smoothing function, and ε_i represents a vector that contains the prediction residuals. Each GAM was estimated using the `mgcv` package in R (R Development Core Team 2017) where the amount of smoothing (effective degrees of freedom) was estimated using cross validation (Wood 2016). After fitting each GAM was validated using histograms and kernel density plots to inspect the residuals for normality. In addition, we applied the Shapiro-Wilk test (w) for normality to assess whether p-values were >0.05, and w = 1. Homogeneity of variance was assessed by plotting residual values against fitted values, and inspecting each plot to ensure that points were uniformly distributed.

Results

Model results (Figure 2, Table 1) indicated that occupancy has remained stable throughout the monitoring period. Productivity appears to have declined over the same period. Potential mechanisms for these patterns have been investigated in standalone studies (Franke et al. 2010, Franke et al. 2011a, Anctil et al. 2013b, Franke et al. 2013, Franke et al. 2016, Lamarre et al. 2017)

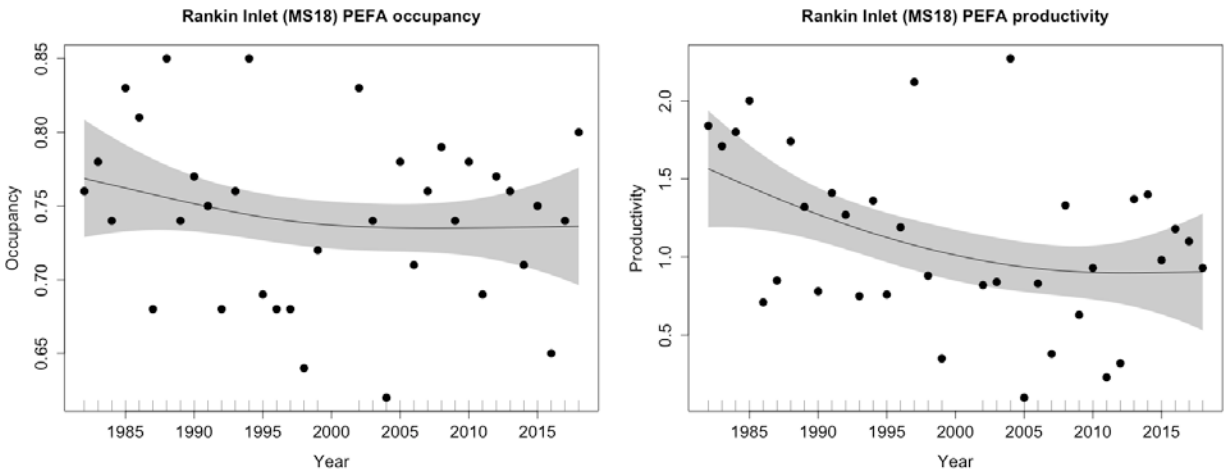


Figure 1. General additive model results for occupancy and productivity for peregrine falcons monitored near Rankin Inlet, Nunavut from 1982 – 2017.

Table 1. Model structure and smoothing terms for peregrine falcon occupancy and productivity at Rankin Inlet, NU. The intercept estimates the grand mean, we do not report a p-value as the intercept is expected to be significantly different from zero *a priori.* Effective degrees of freedom (edf) were estimated by generalized cross-validation, where higher values indicate less smoothing and lower values indicate more smoothing; significant p-values indicate improved model fit (%D, deviance explained) compared to a linear model. Non-significant *p*-values indicate highly variable data.

	Coefficient		smoothing terms				
Model	Intercept	SE	edf	p-value	D (%)	GCV	n
occupancy ~ s(year)	0.74	0.010	1.48	0.44	6.38	0.004	35
productivity ~ s(year)	1.01	0.085	1.67	0.043	19.7	0.27	35

Discussion and management considerations:

In Canada, the conservation status of the peregrine falcon has been down-graded to Special Concern (COSEWIC 2007), and in the United States, the species has been removed from the Federal list of threatened and endangered species (USFW 1999) resulting in legal harvest of wild-caught migratory Peregrine Falcons (which were used regularly for the practice of falconry (Ward and Berry 1972) from 1938 until 1970. Millsap and Allen (2006) recommended that falconry harvest rates for juvenile raptors not exceed one-half of the estimated maximum sustainable yield (MSY) up to a maximum of 5%, depending on species-specific estimates of

capacity to sustain harvest; the authors reported that passage Peregrine Falcons could withstand a harvest rate at MSY of 0.16 of annual production. The USFWS recently increased the harvest quota of passage peregrine falcons from 36 hatch year birds to 144 hatch year birds per year. On-going monitoring of the Rankin Inlet peregrine falcons population contributes to the national management plan goal to "maintain a self-sustaining population of the peregrine falcon anatum/tundrius throughout its Canadian range for the next 10 years" (Canada 2017). In addition, ongoing monitoring of this population fulfills one of Canada's obligation to the Arctic Council's Biodiversity Working Group pan-Arctic biodiversity monitoring plan to detect and report on long-term changes in Arctic biodiversity (Christensen et al. 2018). The plan recognizes a suite of focal ecosystem components (FECs) and multiple FEC attributes that are considered to be suitable indicators for ongoing ecological monitoring at the scale of the circumpolar Arctic. The Terrestrial Ecosystem Working Group (TEWG) of the Circumpolar Biodiversity Monitoring Programme (CBMP) identified the peregrine falcon (*Falco peregrinus*) and the gyrfalcon (*F. rusticolus)* as focal ecosystem components (Christensen et al. 2013), in part due to their role as top predators within Arctic food webs.

Literature cited

Anctil, A., and A. Franke. 2013. Intraspecific adoption and double nest switching in peregrine falcons (*Falco peregrinus*). Arctic **66**:222-225.

Anctil, A., A. Franke, and J. Bêty. 2013a. Heavy rainfall increases nestling mortality of an arctic top predator: experimental evidence and long-term trend in Peregrine Falcons. Oecologia:1-11.

Anctil, A., A. Franke, and J. Bêty. 2013b. Heavy rainfall increases nestling mortality of an arctic top predator: experimental evidence and long-term trend in Peregrine Falcons. Oecologia **74**:1033-1043.

Bradley, M. 1989. Factors affecting the reproductive success of peregrine falcons in rankin inlet, nwt. Univ. Saskatchewan, Saskatoon, Canada.

Bradley, M., R. Johnstone, G. Court, and T. Duncan. 1997. Influence of weather on breeding success of Peregrine Falcons in the Arctic. Auk **114**:786-791.

Bradley, M., and L. W. Oliphant. 1991. The diet of peregrine falcons in rankin inlet, northwest-territories - an unusually high proportion of mammalian prey. Condor **93**:193-197.

Cade, T. J. 2013. The Peregrine Falcon: past and present. Pages 529-546 *in* H. J. Webster and D. Frank, editors. North American falconry and hunting hawks. Western Sporting, Sheridan, WY U.S.A.

Canada, E. a. C. C. 2017. Management Plan for the Peregrine Falcon *anatum/tundrius (Falco peregrinus anatum/tundrius*) in Canada. Species at Risk Act Management Plan Series. , Ottawa.

Christensen, T., S. Longan, T. Barry, C. Price, and K. F. Lárusson. 2018. Circumpolar Biodiversity Monitoring Program Strategic Plan 2018-2021. CAFF Monitoring Series Report No. 29. Conservation of Arctic Flora and Fauna, Akureyri, Iceland.

Christensen, T., J. Payne, M. Doyle, G. Ibarguchi, J. Taylor, N. M. Schmidt, M. Gill, M. Svoboda, M. Aronsson, C. Behe, C. Buddle, C. Cuyler, A. M. Fosaa, A. D. Fox, S. Heidmarsson, P. H. Krogh, J. Madsen, D. McLennan, J. Nymand, C. Rosa, J. Salmela, R. Shuchman, M. Soloviev, and M. Wedege. 2013. The Arctic Terrestrial Biodiversity Monitoring Plan. CAFF Monitoring Series Report Nr. 7. CAFF International Secretariat, Akureyri, Iceland.

Court, G. S. 1986. Some aspects of the reproductive biology of tundra Peregrine Falcons. Master's Thesis. Univ. of Alberta, Edmonton.

Court, G. S., D. M. Bradley, C. C. Gates, and D. A. Boag. 1988a. The population biology of Peregrine Falcons in the Keewatin district of the Northwest Territories, Canada. Pages 729-739 *in* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White, editors. Peregrine Falcon populations: their management and recovery. The Peregrine Fund, Inc., Boise, ID.

Court, G. S., D. M. Bradley, C. C. Gates, and D. A. Boag. 1989. Turnover and recruitment in a tundra population of Peregrine Falcons *falco-peregrinus*. Ibis **131**:487-496.

Court, G. S., C. C. Gates, and D. A. Boag. 1988b. Natural-history of the Peregrine Falcon in the Keewatin district of the northwest-territories. Arctic **41**:17-30.

Court, G. S., C. C. Gates, D. A. Boag, J. D. Macneil, D. M. Bradley, A. C. Fesser, J. R. Patterson, G. B. Stenhouse, and L. W. Oliphant. 1990. A toxicological assessment of Peregrine Falcons *falco peregrinus tundrius* breeding in the Keewatin district of the Northwest Territories, Canada. Canadian Field-Naturalist **104**:255-272.

Ellis, D. H., L. R. Deweese, T. G. Grubb, L. F. Kiff, D. G. Smith, W. M. Jarman, and D. B. Peakall. 1989. Pesticide residues in Arizona Peregrine Falcon eggs and prey. Bulletin of Environmental Contamination and Toxicology **42**:57-64.

Enderson, J. H., D. G. Roseneau, and L. G. Swartz. 1968. Nesting performance and pesticide residues in Alaskan and Yukon peregrines in 1967. Auk **85**:683-691.

Franke, A., P. Galipeau, and L. Nikolaiczuk. 2013. Brood reduction by infanticide in Peregrine Falcons. Arctic **66**:226-229.

Franke, A., V. Lamarre, and E. Hedlin. 2016. Rapid nestling mortality in arctic peregrine falcons due to the biting effects of black flies. Arctic **69**:281-285.

Franke, A., M. Setterington, G. Court, and D. Birkholz. 2010. Long-term trends of persistent organochlorine pollutants, occupancy and reproductive success in Peregrine Falcons (*Falco peregrinus tundrius*) breeding near Rankin Inlet, Nunavut, Canada. Arctic **63**:442-450.

Franke, A., J.-F. Therrien, S. Descamps, and J. Bêty. 2011a. Climatic conditions during outward migration affect apparent survival of an arctic top predator, the peregrine falcon *Falco peregrinus*. Journal of Avian Biology **42**:544-551.

Franke, A., J. F. Therrien, S. Descamps, and J. Bety. 2011b. Climatic conditions during outward migration affect apparent survival of an arctic top predator, the peregrine falcon *falco peregrinus*. Journal of Avian Biology **42**:544-551.

Fuller, M. R., W. S. Seegar, and L. S. Schueck. 1998. Routes and travel rates of migrating Peregrine Falcons *Falco peregrinus* and Swainson's Hawks *Buteo swainsoni* in the western hemisphere. Journal of Avian Biology **29**:433-440.

Ganusevich, S. A., T. L. Maechtle, W. S. Seegar, M. A. Yates, M. J. McGrady, M. Fuller, L. Schueck, J. Dayton, and C. J. Henny. 2004. Autumn migration and wintering areas of Peregrine Falcons Falco peregrinus nesting on the Kola Peninsula, northern Russia. Ibis **146**:291-297.

Hickey, J. J. 1969. Peregrine Falcon populations: their biology and decline. University of Wisconsin Press, Madison, WI U.S.A.

Johnstone, R. M. 1998. Aspects of the population biology of tundra peregrine falcons (*falco peregrinus tundrius*). Ph.D. thesis. Univ. of Saskatchewan, Saskatoon.

Johnstone, R. M., G. S. Court, A. C. Fesser, D. M. Bradley, L. W. Oliphant, and J. D. Macneil. 1996. Long-term trends and sources of organochlorine contamination in Canadian tundra Peregrine Falcons, *Falco peregrinus tundrius*. Environmental Pollution **93**:109-120.

Kiff, L. F. 1988. Changes in the status of the Peregrine in North America: an overview. Pages 123-139 *in* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White, editors. Peregrine Falcon populations: their management and recovery. The Peregrine Fund, Boise, ID.

L'Hérault, V., A. Franke, N. Lecomte, A. Alogut, and J. Bêty. 2013. Landscape heterogeneity drives intra-population niche variation and reproduction in an arctic top predator. Ecology and Evolution **3**:2867-2879.

Lamarre, V., A. Franke, P. Legagneux, O. Love, and J. Bety. 2017. Linking pre-laying energy allocation and timing of breeding in a migratory arctic raptor. Oecoligia:1-14.

Olsen, P. D., and J. Olsen. 1989. Breeding of the Peregrine Falcon *Falco peregrinus*. 3. Weather, nest quality and breeding success. Emu **89**:6-14.

Peakall, D. B., and L. F. Kiff. 1979. Eggshell thinning and DDE residue levels among Peregrine Falcons *Falco peregrinus* - global perspectives. Ibis **121**:200-203.

Peakall, D. B., T. S. Lew, A. M. Springer, W. Walker, R. W. Risebrough, J. G. Monk, W. M. Jarman, B. J. Walton, L. M. Reynolds, R. W. Fyfe, and L. F. Kiff. 1983. Determination of the DDE and PCB contents of Peregrine Falcon eggs - a comparison of whole egg measurements and estimates derived from eggshell membranes. Archives of Environmental Contamination and Toxicology **12**:523-528.

Quinn, J. L., and Y. Kokorev. 2000. Direct and indirect estimates of Peregrine Falcon population size in northern Eurasia. Auk **117**:455-464.

R Development Core Team. 2017. R: A language and environment for statistical computing. R Foundation for Statistical Programming, Vienna, Austria.

Ratcliffe, D. 1993. The Peregrine Falcon. 2nd edn. edition. T. and A. D. Poyser, Carlton, England.

Risebrough, R. W., and D. B. Peakall. 1988. The relative importance of several organochlorines in the decline of Peregrine Falcon populations. Pages 449-462 *in* T. J. Cade, J. H. Enderson, C. G. Thelander, and C. M. White, editors. Peregrine falcon populations: their management and recovery., Boise, ID USA.

Rosenfield, R. N., J. W. Schneider, J. M. Papp, and W. S. Seegar. 1995. Prey of Peregrine Falcons breeding in west Greenland. The Condor **97**:763-770.

Schmutz, J. K., R. W. Fyfe, U. Banasch, and H. Armbruster. 1991. Routes and timing of migration of falcons banded in Canada. Wilson Bulletin **103**:44-58.

Shapiro, S. S., and M. B. Wilk. 1965. An analysis of variance test for normality. Biometrika **52**:591-&.

Steenhof, K., M. N. Kochert, C. L. McIntyre, and J. L. Brown. 2017. Coming to terms about describing golden eagle reproduction. Journal of Raptor Research **51**:378-390.

Steenhof, K., and I. Newton. 2007. Assessing nesting success and productivity. Pages 181-192 *in* D. M. Bird and K. L. Bildstein, editors. Raptor research and management techniques. Hancock House, Blaine, WA U.S.A. .

Wood, S. 2016. Generalized Additive Mixed Models using 'mgcv' and 'lme4'. Comprehensive R Archive Network.

Yates, M. A., K. E. Riddle, and F. P. Ward. 1988. Recoveries of Peregrine Falcons migrating through the eastern and central United States. Pages 471 - 484 *in* T. J. Cade, Enderson, J.H, White, C.M., editor. Peregrine Falcon Populations; Their Management and Recovery. The Peregrine Fund, Boise, Idaho.

Zuur, A. F., E. N. Ieno, and C. S. Elphick. 2010. A protocol for data exploration to avoid common statistical problems. Methods in Ecology and Evolution **1**:3-14.

APPENDIX C

Photographs of Non-Native Plant Occurrences

Photo 1. Photo of common Dandelion (*Taraxacum officinale*) AWAR

APPENDIX D

CESCC – Non-Native & 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.***


Scott 2011

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: Accidently 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.


Sölt 2005

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.

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

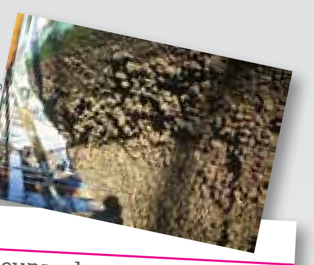
*Species photo references available upon request. Images are not to scale.

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


MacGregor, 2009

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

* 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.


DeeDee 2011

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.

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

*Species photo references available upon request. Images are not to scale.

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:

Janelle Kennedy
Sr. Science Advisor (Aquatic)
Department of Environment,
Fisheries and Sealing Division
Box 1000 Station 1310, Iqaluit, Nunavut, X0A 0H0
Tel: (867) 975-7706, Fax: (867) 975-7754
Email: jkennedy1@gov.nu.ca

Matthew Fredlund
Legislation and Management Wildlife Technicain
Department of Environment, Wildlife Divison
Iglulik, Nunavut
Tel: (867) 934-2178
Email: mfredlund@gov.nu.ca

Kimberly Howland
Research Scientist, Arctic Stock Assessment
Fisheries and Oceans Canada
501 University Crescent, Winnipeg,
Manitoba R3T 2N6
Tel: (204)-984-4227, Fax: (204)-984-2403
Email: kimberly.howland@dfo-mpo.gc.ca

This project was undertaken with the financial support of:
Environment Canada / Environnement Canada

golder.com