



Meliadine Project

Wildlife Existing Conditions Report, 2021

September 2021

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Acronyms and Abbreviations

Agnico Eagle	Agnico Eagle Mines Ltd.
AWAR	All weather access road
BQCMB	Beverly Qamanirjuaq Caribou Management Board
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
ERM	ERM Consultants Canada Ltd.
FEIS	Final Environmental Impact Statement
GN	Government of Nunavut
IQ	Inuit Qaujimagatuqangit (Inuit Traditional Knowledge)
km	Kilometre
m	Metre
NIRB	Nunavut Impact Review Board
NTKP	Naonaiyaotit Traditional Knowledge Project
NU	Nunavut
NWT	Northwest Territories
The Project	The Meliadine Mine

1. INTRODUCTION

Agnico Eagle's Meliadine Mine (the Project) is located in the Kivalliq region of Nunavut, approximately 25 km north of Rankin Inlet. Agnico Eagle submitted a Final Environmental Impact Statement (FEIS) and the Project was approved by the Nunavut Impact Review Board (NIRB) in 2015. To date, a portion of the NIRB-approved footprint has been constructed. A proposed Meliadine Extension includes construction of a windfarm and airstrip, and an extension of the Tiriganiaq deposit by developing the Tiriganiaq-Wolf mining area. The wind turbines and airstrip are proposed primarily along eskers within 4 km of existing project infrastructure, connected by an all-weather road (see Figure A-1 in Appendix A).

Agnico Eagle retained ERM to conduct a survey to determine wildlife usage, by caribou and denning mammals such as bears, wolves and foxes of the Project area outside of the Approved-footprint area.

Potential sites for wind turbines and a possible location for the airstrip have been identified. Field assessments indicate that the habitat is composed of upland heath tundra, eskers, perched beaches formed from isostatic rebound and other gravel deposits. Based on existing information and studies completed for the Meliadine Mine, caribou from the Qamanirjuaq herd are known to pass through the Project area, and the proposed extension area, annually during the post-calving season in June and July.

Since the habitat in the Meliadine Extension area includes several eskers and wildlife use of eskers, field studies by ERM in 2021 focused on habitat use by mammals of these land types. The two primary users of eskers are caribou, for movement, and carnivores, for movement and denning. The 2021 field surveys had two main objectives:

- determine where caribou trails (an indicator of multi-year caribou movement pathways) occur; and
- evaluate carnivore denning habitat on eskers identified as potential locations for wind turbines.

The methods and results of the 2021 field surveys are summarized in this report.

2. CARIBOU TRAILS

2.1 Background

The Qamanirjuaq caribou herd is a large caribou herd numbering approximately over 200,000 animals in 2017, down from over 300,000 animals reported in 2008 (COSEWIC 2016). The herd range is centered in south-eastern Nunavut. The herd range stretches approximately 1,000 km from Chesterfield Inlet in the north to northern Manitoba in the south, and from Hudson Bay on the east to eastern Northwest Territories (NWT) and north-eastern Saskatchewan in the west (BQCMB 2020a).

The herd generally winters below the treeline in northern Manitoba, Saskatchewan and the adjoining areas of NWT and Nunavut. Spring migration is north along the coast of Hudson Bay, past the communities of Arviat, Whale Cove and Rankin Inlet to a broad calving ground generally centered on Qamanirjuaq Lake (BQCMB 2020a).

Following calving, the caribou form into large groups of hundreds to thousands of caribou and radiate out from the calving grounds, including east towards the coast. During June and July, groups of animals from this herd interact with the hamlet of Rankin Inlet, the Meliadine Mine and the all-weather access road (AWAR) connecting the two.

To date, knowledge of caribou movement in the area has consisted of a combination of Inuit Qaujimagatuqangit (IQ), satellite collar data from the Government of Nunavut (GN), and surveys completed by Agnico Eagle mine site.

To supplement existing understanding of caribou movements, and provide site-specific information, field surveys were conducted to examine historic/current movement trails within the proposed Meliadine wind turbines and airstrip area and the surrounding area up to 5 km.

2.2 Methods

Surveys were conducted in August 2021 throughout the proposed Meliadine Extension area up to ~5 km (the survey area). A field crew of two completed the surveys: an ERM wildlife biologist lead the surveys, accompanied by an Agnico Eagle member of the Permitting team.

Trails are typically bundles of parallel tracks and were most clearly visible in lowland areas where the ground is softer. Trails on eskers or heath tundra are only visible when the area is heavily trafficked. Surveys for caribou trails were completed from the helicopter by following notable caribou trails and recording a track with a handheld GPS device until the trail could no longer be clearly identified in the landscape. Waypoints were recorded at the beginning and end of each trail segment to help with identifying the tracks.

Caribou routes were defined as collections of individual caribou trails. Routes were grouped into three classes: A, B, or C.

- Class A: routes with a wide swath of parallel trails where tundra vegetation was limited or non-existent in the trough of the trails (e.g., photo B-1 in Appendix B). This indicates that the route is used heavily year-to-year, preventing vegetation regrowth.
- Class B: routes with many parallel trails, but with vegetation still growing in the trough of the trail (e.g., photos B-2 and B-3 in Appendix B).
- Class C: routes with single or only a few (2-3) parallel tracks, or those that were only faintly visible through the vegetation (e.g., photo B-4 in Appendix B). Due to the abundance of Class C routes throughout the survey area, these were *not* included in the scope of this survey.

The surveyors also noted crossing locations on Meliadine Lake where trails emerged from the lake perpendicular to the shore. Only notable crossing locations with well-defined trails were recorded.

Major “pinch points” were also identified. These were narrow land bridges between lakes where many trails converged and fanned out on either side. The area surveyed contained many narrow land bridges with the potential to become pinch points, but pinch points were only recorded when a large number of trails coincided with the location.

2.3 Results

Surveyors conducted a complete survey for caribou trails area, and an additional survey of the surrounding area to a total of ~146 km². The proposed areas for wind turbine and airstrip, defined as all wind turbine/airstrip features plus a 1 km buffer, was ~24 km².

In total, 89 caribou routes were recorded and mapped (Figure A-1 in Appendix A). Most of these routes were recorded along the shores of lakes and were consistently oriented in a northwest to southeast direction, consistent with movement patterns of the Qamanirjuaq herd in the post-calving season (BQCMB 2020a). IQ from community elders suggests that caribou may prefer to travel along lake shores in the post-calving season for the nutritious grassy vegetation and because the wind from the lakes helps mitigate insect harassment (NTKP 2016).

Over a quarter of the mapped routes (28%) were “class A” caribou routes, and the remaining routes were all “class B” routes (72%). “Class C” routes were both diffuse and extensive and could be observed around the shore of nearly every lake and lowland point in the area.

In general, the surveys recorded a concentration of “class A” routes in a band extending north and south of the west arm of Meliadine Lake. The trails along the west shore of the west arm of Meliadine Lake were particularly worn in, suggesting this is a major route for caribou each year. This finding is also consistent with the satellite collar data, which suggests there is a major route on the west side of Meliadine Lake tracking northwest from km 24-27 of the AWAR. These findings are consistent with IQ from community elders, which suggests that the area around km 27 is an important crossing location on the AWAR.

2.3.1 Summary and Discussion

The proposed areas for the wind turbines and airstrip, and Tiriganiaq-Wolf mining are located between the west arm of Meliadine Lake and the existing mine site. In August 2021, surveyors identified 6 “class A” caribou routes (31%), and 13 “class B” routes (69%). The proposed airstrip area overlaps with several of the class A routes on the north side of the west arm of Meliadine Lake. By comparison, the area around the wind turbines had fewer obvious caribou trails, a finding generally corroborated by satellite collar data over the years. The caribou routes identified outside of the wind turbines and airstrip area occurred at a similar density and frequency as those inside the airstrip area.

Eighteen major pinch points were identified during surveys, including five within the proposed wind turbines and airstrip area. Five locations were identified that appeared to be important crossing locations over Meliadine Lake, including three on the west arm of Meliadine Lake. These three crossing locations connect to trails that eventually lead to the proposed wind turbine and airstrip area.

Collar data collected during the last five years provides a snapshot of recent caribou movement patterns. These data show caribou traveling during the post-calving, generally south-east on the north side of Meliadine Lake, then turning at the coast, crossing the AWAR between km 24-27 and passing south of the mine site. The trail mapping reported here suggests that this movement pattern across the AWAR route and along the west arm of Meliadine Lake may be a historic route as well, given that it likely takes many years to develop trails.

3. CARNIVORE DENS

3.1 Background

The eskers in the proposed Meliadine Extension area were evaluated as possible denning habitat for grizzly bears, wolves, wolverines, and foxes. Carnivore dens are protected in Nunavut under the *Wildlife Act* (2003) and construction activities must take place outside of a 1 km buffer around any active maternal or winter carnivore dens.

The grizzly bear denning period occurs between October 15 and May 7 (McLoughlin et al. 2002). Dens are generally an excavated hole in the ground, on a moderate to steep slope, often on eskers. Where conditions are optimal, more than one den site may be found in a relatively small area (e.g., within approximately 1 to 2 ha; McLoughlin et al. 2002). Grizzly bears may use the same area year after year as hibernation sites. Grizzly bears are listed as Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC; Government of Canada 2020) and on Schedule 1 of the *Species at Risk Act* (2002). They are also considered Vulnerable in Nunavut by the National General Status Working Group (CESCC 2015).

It should be noted that while Arctic foxes are regularly observed in the Project area, wolves and polar bears have only been observed occasionally passing through, and grizzly bears and wolverines or their signs have not been observed since at least 2008, when baseline terrestrial studies were conducted (Golder 2012).

3.2 Methods

Field surveys focused on eskers in the types of areas where carnivores and grizzly bears typically den. Therefore, these surveys focused on the potential for interactions between wind turbines and eskers and were conducted with the objectives of:

- Rating the potential quality of eskers as denning habitat; and
- Recording any past grizzly bear dens or current wolf or fox dens.

Surveys for dens were completed on the ground by walking the perimeter of each potential wind turbine to assess the area. Aerial surveys were also completed throughout the area within 1 km of the windfarm and airstrip. From these aerial surveys, additional survey locations were identified and then surveyed on foot. For each survey site a waypoint was recorded on the Garmin GPS unit.

Eskers that have a steep slope, extending above the water table, with fine grained material and dense vegetation that can tie the soil together were given a higher rating than flat eskers, with coarse material and no vegetation.

Using a Survey123 form on a tablet, the following data were collected at each notable habitat feature or wind tower site:

- Representative photos of the area.
- Any holes/dens present and the type of den: bear, wolf, fox, ground squirrel, other.
- Site characteristics:
 - Feature shape: high (≥ 5 m tall), low (<5 m), or piles of gravel.
 - Material: cobble, gravel, sand, soil, mixed (details in comments).
 - Vegetation communities present in descending order of dominance (e.g., low shrub (<1 m), tall shrub (≥ 1 m), lichen, grass).

■ Denning suitability:

- 1 – High: Esker is 5-10 m tall and well above water table. Esker is composed of soil, not loose sand or cobbles, dense band of shrubs (>10 m² in extent) are present that are at least 1 m tall and robust enough to have a strong root system that the carnivore can dig under.
- 2 – Moderately high: Esker, riverbank or perched beach is less than 5 m tall, but is likely above water table. Esker is composed of soil or soil/sand mix, not loose sand or cobbles. Small groups of shrubs (<10 m² in extent) are at least 1 m tall.
- 3 – Moderate: Esker or feature is less than 5 m tall, likely above water table. Esker is composed of a mix of soil, sand and cobbles – generally loose. Individual, disparate shrubs.
- 4 – Low: Esker is sand/gravel and less than 2 m tall, no shrubs or very little shrubs but heath tundra is present.
- 5 – Nil: Esker is sand/gravel and less than 2 m tall, no vegetation.

3.3 Results

3.3.1 Results of Den Searches

No bear, wolf, or wolverine dens were located within the survey area after an extensive aerial and ground-based survey.

3.3.2 Results of Den Habitat Suitability Surveys

Surveys were conducted to evaluate the potential denning habitat on eskers as well as record past and present dens between August 12 and 15, 2021 during daylight hours (08:00 to 18:00) in clear weather. Eleven potential wind turbine sites and 11 other notable esker features were surveyed during the trip (Table 3.3-1 and Figure A-2 in Appendix A).

Table 3.3-1: Carnivore Den Habitat Suitability Ratings for Each Habitat Feature Surveyed at Meliadine, August 2021

Location Name	Latitude	Longitude	Date Surveyed	Bear Den Habitat Suitability
WT01	63.04329	-92.2472	8/14/2021	5 – Nil
WT02	63.0451	-92.2567	8/14/2021	5 – Nil
WT03	63.04623	-92.2685	8/14/2021	2 – Moderately High
WT04	63.04911	-92.2806	8/14/2021	2 – Moderately High
WT05	63.05088	-92.2883	8/14/2021	4 – Low
WT06	63.04134	-92.2673	8/14/2021	4 – Low
WT07	63.04513	-92.294	8/14/2021	4 – Low
WT08	63.03905	-92.2854	8/14/2021	2 – Moderately High
WT09	63.04869	-92.3036	8/14/2021	3 – Moderate
WT10	63.05345	-92.3137	8/14/2021	3 – Moderate
WT11	63.04876	-92.3143	8/14/2021	2 – Moderately High
D01	63.02328	-92.3967	8/14/2021	3 – Moderate
D02	63.03265	-92.2713	8/14/2021	3 – Moderate

Location Name	Latitude	Longitude	Date Surveyed	Bear Den Habitat Suitability
D03	63.03375	-92.2778	8/14/2021	3 – Moderate
D04	63.03615	-92.2822	8/14/2021	3 – Moderate
D05	63.04933	-92.3095	8/14/2021	2 – Moderately High
D06	63.05554	-92.3458	8/14/2021	2 – Moderately High
D07	63.02182	-92.3075	8/14/2021	4 – Low
D08	63.02508	-92.3154	8/14/2021	2 – Moderately High
D09	63.0397	-92.3825	8/14/2021	3 – Moderate
D10	63.05128	-92.4803	8/14/2021	4 – Low
D11	63.03701	-92.44	8/14/2021	2 – Moderately High
D12	63.01984	-92.366	8/14/2021	4 – Low

3.3.3 Summary and Discussion

No bear, wolf, or wolverine dens were located within the survey area after an extensive aerial survey. This is consistent with observation data from the area which suggests these species are rarely or never observed. Two active fox dens were located more than 1 km from the nearest proposed wind turbine (Photo B-7 in Appendix B).

Each site included a variety of micro-sites of varying quality as denning habitat. Habitat quality was identified as the highest possible rating across micro-sites in the site area. This conservative approach was designed to ensure that habitat values were not being underestimated.

Of the 25 sites surveyed, seven were classified as moderately high suitability for grizzly bear winter denning; however there were no observed grizzly bears or confirmed bear dens at any of the sites. Of the 11 potential wind turbine sites, four locations had moderately high bear den habitat suitability (WT03, WT04, WT08, WT11; see photos B-5 and B-6 in Appendix B). The remaining 10 wind turbine sites were considered moderate to nil suitability for grizzly bear denning habitat. No site was rated as a high suitability, due mostly to the lack of continuous shrub cover and the relatively low eskers in this survey area.

Of the potential wind turbine locations surveyed, 28% were located on eskers with a high shape (≥ 5 m tall), and 50% had patches of single shrubs. Soil was present in the substrate in 43% of the sites surveyed. Arctic ground squirrel colonies were located at 6 of the 11 wind tower sites, all at locations with at least moderate suitability for grizzly bears. No wildlife activity was observed during the surveys near the potential wind tower areas, aside from ground squirrels.

4. REFERENCES

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APPENDIX A FIGURES

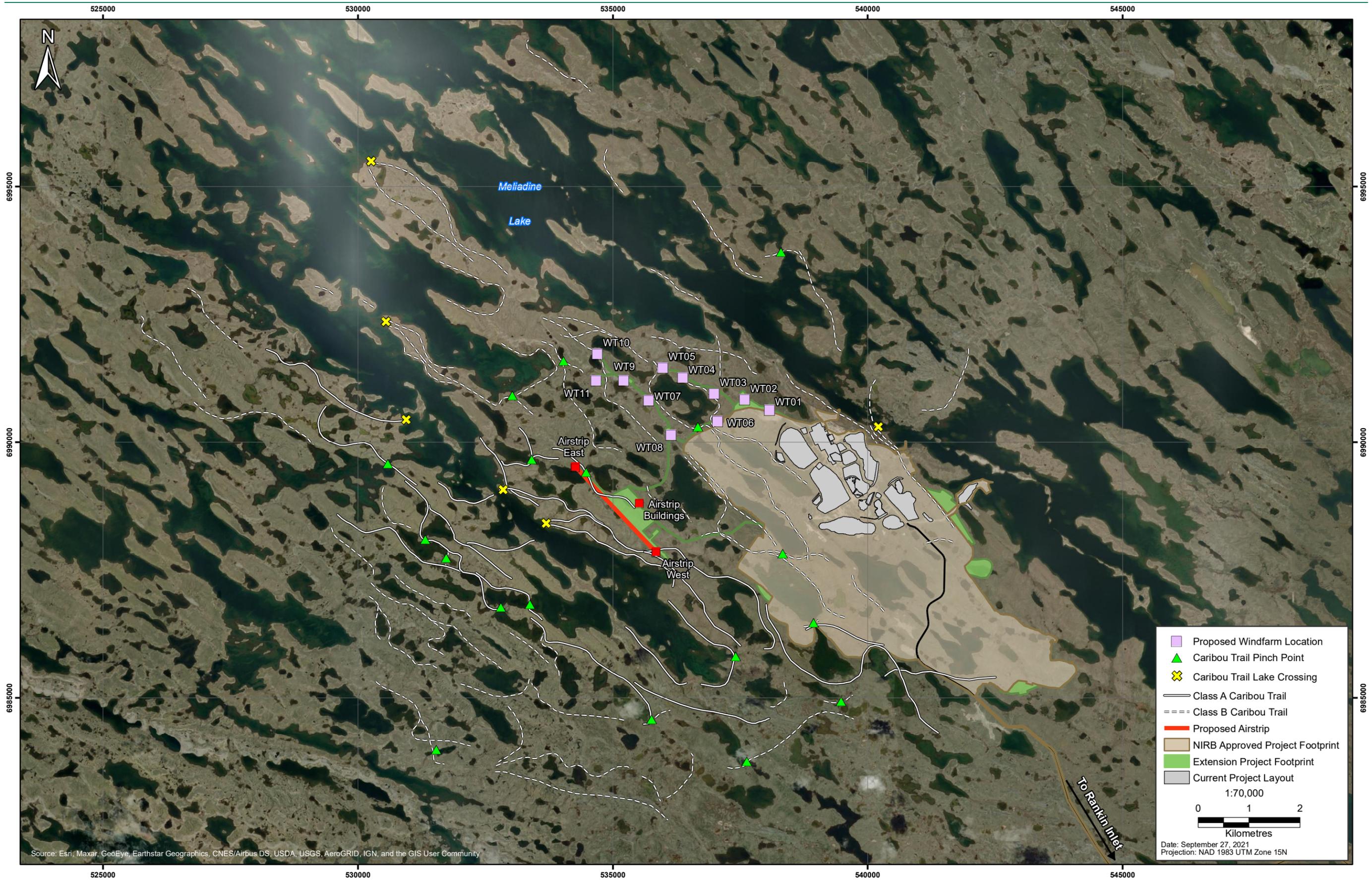


Figure A-1: Caribou Trails in the Survey Area and Surrounding Area, Surveyed August 12-15, 2021

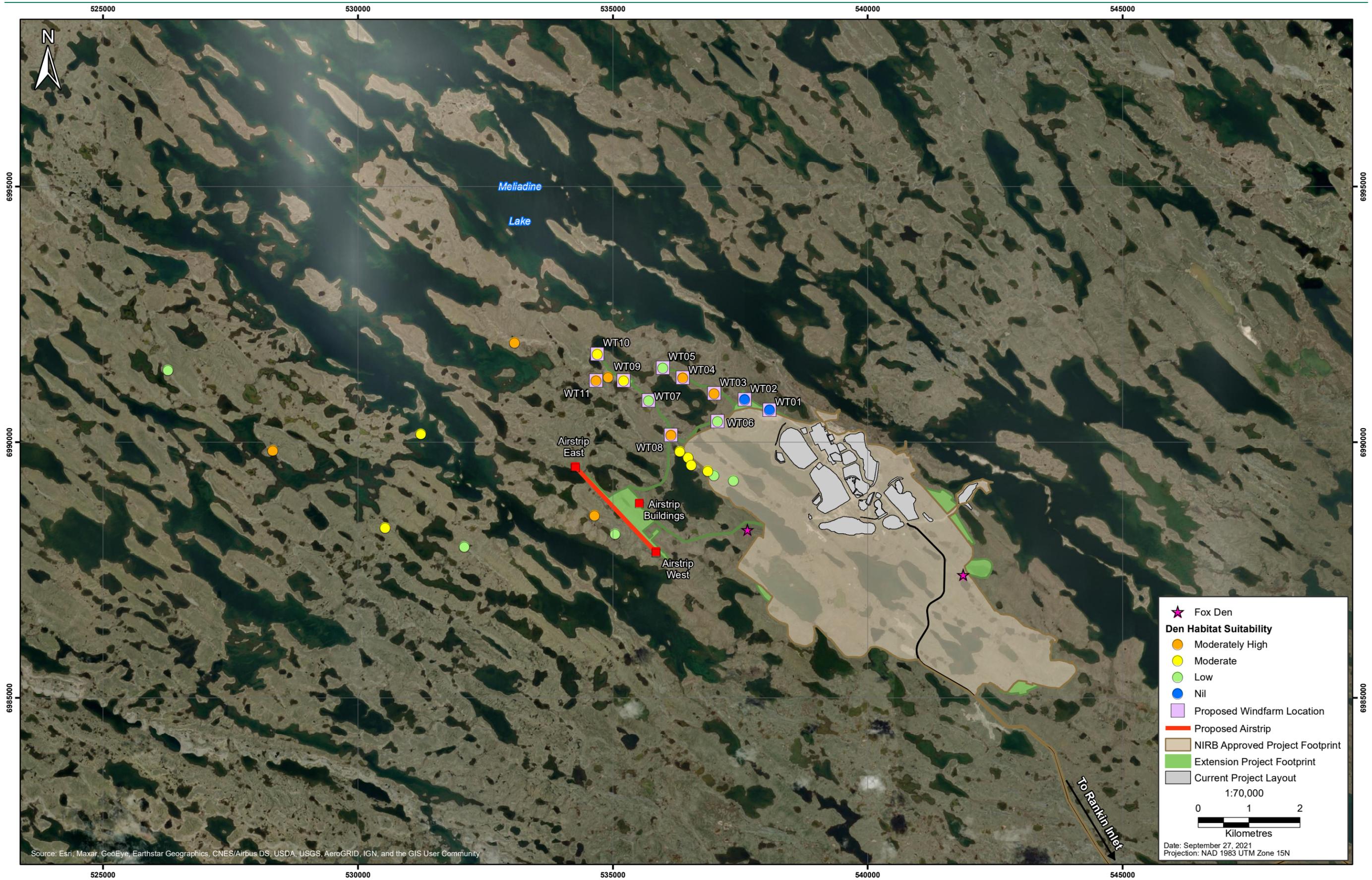


Figure A-2: Locations of Den Surveys in the Survey Area and Surrounding Area, Surveyed August 12-15, 2021

APPENDIX B PHOTOGRAPHS

Appendix B: Photographs



Photo B-1: Example of a “class A” route of caribou trails observed west of Meliadine lake on August 14, 2021. Note the large number of parallel tracks and sections of exposed soil in the central trails. Photo taken from helicopter at ~50 m elevation above the ground.



Photo B-2: Example of a “class B” route of caribou trails observed in the Survey Area on August 14, 2021. Note the large number of parallel tracks but lack of exposed soil. Photo taken from helicopter at ~50 m elevation above the ground.



Photo B-3: Example of a “class B” route of caribou trails as they appear from the helicopter at an elevation of ~100 m above the ground, August 14 2021.



Photo B-4: Example of “class C” caribou trails as they appear from the helicopter at an elevation of ~50 m above the ground, August 14 2021.



Photo B-5: Site WT08 with moderately-high suitability for bear denning habitat (high esker shape, single to continuous shrub vegetation, soil substrate), August 14 2021.



Photo B-6: Probable lemming or ground squirrel burrow at WT14, August 14 2021.



*Photo B-7: Active fox den complex with many entrances, observed from helicopter at ~50 m elevation above the ground, August 15 2021.
Note also class B caribou route visible on tundra behind den.*

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