



Appendix

GN-01: Helicopter Traffic	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Helicopter Traffic
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Baffinland Iron Mines Inc. (BIMC), (2019). Baffinland Iron Mines 2018 Annual Report to the Nunavut Impact Review Board. • Environmental Dynamics Inc. (2018). Mary River Terrestrial Environmental Annual Monitoring Report • Government of Nunavut (GN). (2017). Final written submission for Agnico Eagle Mines' environmental impact statement for the proposed Whale Tail Pit project. • Nunavut Impact Review Board (NIRB). (2017) Final hearing report, Agnico Eagle Mines Ltd. Whale Tail project. NIRB File No. 16MN056. • Sabina (2020). Back River Project 2019 Annual Report. March 2020. • Nunavut Impact Review Board (2019), Whale Tail Expansion Project Proposal Final Hearing Transcripts.
IDENTIFICATION OF ISSUE	
<p>The 2019 Wildlife Monitoring Summary Report does not provide information on helicopter traffic for the approved Project and associated exploration activities despite a previous commitment made to the GN by the Proponent to do so.</p> <p>Helicopters are a potential source of disturbance for caribou and other wildlife. The intensity and distribution helicopter traffic should be monitored and reported in-order for reviewers to properly understand the disturbance footprint of the Project and associated exploration activities. Data on helicopter traffic should also be made available for wildlife effects monitoring studies.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	

During the NIRB's review of the Whale Tail Project, the GN noted concerns about the potential for helicopters to disturb wildlife such as caribou (GN 2017, Comment GN-10). Similar concerns were expressed by community members from Baker Lake (e.g. Whale Tail Final Hearing Transcripts, 2019, page 561)

In response to these concerns, one of the commitments made by the Proponent to the Government of Nunavut (GN) during the NIRB's review of the Project was:

"The Proponent shall revise the Project's TEMP to include a program to monitor and report helicopter traffic associated with the Whale Tail project (including existing Meadowbank infrastructure) and all associated exploration activities so that the spatial scale and intensity of this activity can be documented. This should include the collection and analysis of GPS track logs for all helicopter flights contracted by the Proponent." (NIRB 2017, Appendix B, Commitment #20)

The commitment to monitor and report helicopter traffic was made by the Proponent in 2017. Since issuance of the project certificate, in March 2018, the Terrestrial Ecosystem Management Plan (TEMP) has been revised three times (versions 5, 6 and 7); along with a proposed draft version 8 created by the Proponent that is not supported by the GN. Despite this, the latest version still does not reflect this commitment. The GN has worked with the Proponent via the Terrestrial Advisory Group (TAG) and has repeatedly requested that this commitment be incorporated into the TEMP in accordance with term and condition #28 of the Project Certificate (NIRB Project Certificate 008). Term and Condition 28 states:

"The Proponent shall maintain a Terrestrial Ecosystem Management Plan (TEMP) throughout all phases of the Project. The Plan shall include detailed monitoring, mitigation, and adaptive management measures for wildlife, with consideration for each Project activity predicted to affect wildlife, and with inclusion of specific triggers for mitigation and adaptive management intervention. The TEMP shall demonstrate consideration for all relevant commitments made by the Proponent throughout the Nunavut Impact Review Board's review of the Project."

It is the GN's view that there has been ample time to fulfill the commitment to revise the TEMP and to provide the helicopter traffic monitoring results within Annual Wildlife Monitoring Reports. The failure to do so constitutes non-compliance with term and condition 28 of the Project certificate (008). The GN points out that several other projects in Nunavut have made similar commitments to report helicopter traffic and have fulfilled these commitments successfully and promptly (e.g. BIMC 2019; Sabina 2020). The GN also notes the Proponent's suggestion in the 2019 Wildlife Monitoring Summary Report that 3 days of helicopter traffic associated with the deployment of caribou satellite collars in the spring of 2018 may have affected the migration of caribou through the Project's regional study area (AEM 2020, Section 17). Although the report does not provide any evidence to substantiate this assertion, it illustrates the Proponent's view that helicopter traffic is potentially a significant source of disturbance to wildlife; a fact that is at odds with the company's reluctance to fulfill monitoring and reporting requirements for helicopters.

RECOMMENDATION(S)

The GN offers the following recommendations with respect to this issue:

1. That the Board direct the Proponent to immediately revise the Project's TEMP to reflect commitments made throughout the Nunavut Impact Review Board's review of the Project, as per term and condition 28 of the Project Certificate.
2. That the Board direct the Proponent to revise the 2019 Wildlife Monitoring Summary Report by adding information on helicopter traffic that includes the following elements:
 - 2.1. Tables documenting the frequency of helicopter flights associated with the Whale Tail project (including existing Meadowbank infrastructure) and all associated exploration activities. Table should present flight frequencies according to the seasons defined for caribou in the TEMP v. 7.
 - 2.2. Maps showing the GPS tracks of all helicopter flights reported in the afore-mentioned tables. Maps to be presented according to the seasons defined for caribou in the TEMP v. 7.
 - 2.3. Tables and maps showing the seasonal frequency and distribution of flights with cruising altitudes under 300 m; the mandatory minimum specified in the TEMP for avoidance of caribou (AEM 2019, Table 6).

GN-02: Caribou Movement Effects	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Effects on Caribou Movements
Terms and Conditions	29
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Limited. (2019). Meadowbank Gold Project 2018 Annual Report, Appendix 45 (Meadowbank and Whale Tail 2018 Wildlife Monitoring Summary Report) • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report.
IDENTIFICATION OF ISSUE	
<p>The 2018 Wildlife Monitoring Summary Report (AEM 2019) concluded that the Environmental Impact Statement predictions and the monitoring threshold for sensory disturbance of caribou were exceeded in 2018 (AEM 2019, Appendix 45, Tables 3.12 and 6.1). Migrating caribou appeared to exhibit significant deflection and delayed crossing in response to Project roads (AEM 2019, Appendix 45, Figures 6.7 and 6.8, Sections 6.6 and 6.7).</p> <p>The 2019 Wildlife Monitoring Summary Report (AEM, 2020) provides further commentary on caribou movements in 2018 concluding that a GN-led satellite collaring field program conducted in the spring of 2018, using a helicopter, may have affected the movements of caribou through the Project's regional study area and could account for the apparent disruption of migratory movements across Project's roads that was observed in 2018. However, the report does not provide any evidence to substantiate this conclusion.</p> <p>Drawing important conclusions regarding environmental effects without presenting evidence is a concerning trait that leads to unnecessary confusion and disinformation amongst reviewers, regulators and the public at large. Conclusions presented in annual monitoring reports should be based on data, analyses and fact-based interpretations of results only.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Section 17 of the 2019 Wildlife Monitoring Summary Report states that:</p> <p>“Overall, very high caribou numbers were recorded along project roads during surveys in 2019 with numbers in April higher than in any other previous year. Mitigation measures (e.g., convoying, reduced speed limits, limiting vehicle volumes, and road closures) for Caribou along the roads appeared to facilitate passage of Caribou across</p>	

the roads as compared to what was observed in 2018. Of note, is that Caribou movements in 2018 may have been affected by a satellite-collaring program in late April and early May.”

The conclusion that a satellite collaring program may have affected caribou movements is not supported by any data, analyses or other information presented in the report. This conclusion appears to be based on the opinion of the report’s author but is not referenced as such.

The deployment of satellite collars on migrating caribou in the Project’s regional study area in the spring of 2018 was part of the GN’s on-going caribou monitoring program, supported in part by financial contributions from the Proponent. One of the objectives of this program is to understand potential effects of the Project on caribou movements and to provide real-time information on movements to support implementation of the Proponent’s caribou protection measures (CPM). The deployment of collars in 2018 occurred over a period of 3 days in the spring. A total of 34 collars were deployed (M. Campbell *pers comm.*)

Currently, there are no analyses suggesting that a 3-day deployment of collars had any detectable effect on the migratory movements of regional caribou herds in the spring of 2018.

RECOMMENDATION(S)

The GN offers the following recommendations to the Board with respect to this issue:

1. That the Proponent clarify where, in the 2019 Wildlife Monitoring Summary report, those data, analyses and information supporting the Proponent’s assertion that the collaring program affected caribou movements can be found.
2. That, if such data, analyses and information are not currently presented in the report, they be provided by the Proponent in a revised version of the report for review and comment by the NIRB, GN and other parties.
3. That if such data, analyses and information cannot be provided by the Proponent, section 17 of the 2019 Wildlife Monitoring Summary Report be revised to remove statements about effects of caribou collaring on caribou movements.

GN-03: Blasting Measurements	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Blasting Measurements
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2020). Appendix 53 - Whale Tail Blast Measurements
IDENTIFICATION OF ISSUE	
<p>The Project's TEMP includes a program to collected data on noise and vibration levels generated by blasting in-order to assess the extent to which this activity may disturb wildlife (AEM 2019 – Section 3.4.2.4). The 2019 Annual Report provides an update on this blast measurement study (AEM 2020). Review of this report raises some questions regarding the methodology employed in this study. Clarification is sought on this topic.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Figure 1 in Appendix 53 of the Report identifies the locations of blast monitoring equipment in the vicinity of the Whale Tail pit. It is noted that the topography around the pit is undulating and that at least one monitoring location (R4) appears to be on the other side of a relatively large hill from the pit. It is unclear how topography such as this will affect Peak Pressure Level (PPL) and Peak Particle Velocity (PPV) measurements. How will the measurement program account for topography in-order to make the results more robust and applicable to differing conditions around the Whale Tail pit?</p> <p>The study is recording two metrics, noise and vibration (PPL and PPV) that may affect caribou. A third source of potential disturbance associated with blasting activities is dust; either by the visual or olfactory stimulus of a dust cloud. This source of disturbance is not being measured.</p>	
RECOMMENDATION(S)	
<p>The GN offers the following recommendations with respect to this issue:</p> <ol style="list-style-type: none"> 1. That the Proponent clarify how the effect of topography on the measurement of blasting related PPV and PPL is accounted for in the study. 	

2. That the Proponent consider the addition of more monitoring sites, varying in terms of topography between the Whale Pit and measurement location.

GN-04: Traffic Rates	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Traffic Rates
Terms and Conditions	28, 31
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report.
IDENTIFICATION OF ISSUE	
<p>In accordance with term and conditions 28 and 31, the 2019 Wildlife Monitoring Summary Report (AEM 2020) provides a summary of traffic data for the Project's roads that can be compared to traffic predictions made in the Project's Final Environmental Impact Statement (FEIS) and FEIS Addendum. There is some uncertainty about the traffic parameters reported. Clarification is sought on this matter in-order to determine whether traffic levels in 2019 were above or below predicted level of Project roads.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>The traffic data reported in Table 3.7 and Figure 3.6 of Appendix 52 are expressed as "monthly traffic data" and "number of vehicle trips", respectively. It may be assumed, by the reviewer, that each of these metrics represents the number of one-way transits made by vehicles along roads rather than round trips. However, this assumption should be verified since it affects whether traffic levels are above or below FEIS predictions which in turn determines whether the adaptive management provisions of term and condition 31 are applicable.</p>	
RECOMMENDATION(S)	
<p>The GN offers the following recommendations to the Board with respect to this issue:</p> <ol style="list-style-type: none"> 1. That AEM provide an explanation of the reported traffic metrics clarifying whether they represent one-way transits or round trips. 	

GN-05: Non-native Plant Study	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Non-native Plant Study
Terms and Conditions	25, 26
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Government of Nunavut (GN). (2003). Wildlife Act, SNu 2003, c 26, <http://canlii.ca/t/51x1n> retrieved on 2020-06-02
IDENTIFICATION OF ISSUE	
<p>In 2019, the Proponent initiated a non-native plant monitoring study to assess and monitor the potential introduction of non-native plant species (AEM 2020, Appendix N). A total of 107 sites in disturbed areas around the Meadowbank-Whale Tail complex were surveyed for plant species. Two species of plants that are non-endemic to the Arctic were discovered during these surveys. A single plant of the species known as Scentless Chamomile (<i>Matricaria perforata</i>) was found and pulled from the ground for disposal. Of greater significance, Flixweed (<i>Descurainia sophia</i>) was found growing at 28 (26%) of these sites in well-established populations, ranging from less than 10 plants to greater than 1000 plants (Figure 1). Seventeen of the 28 Flixweed populations consisted of greater than 100 plants and covered areas of up to 10,000 m². These findings suggest that Flixweed is well established in disturbed areas around the Meadowbank-Whale Tail complex.</p> <p>The report concludes that:</p> <p style="padding-left: 40px;">"Observed Flixweed populations have not encroached onto the tundra and all observations were limited to disturbed areas"; and</p> <p style="padding-left: 40px;">"Flixweed has not migrated from the Meadowbank Mine site through the haul road or to the Whale Tail Mine site." (AEM 2020, Appendix N, Section 4.0)</p> <p>The report recommends that:</p> <p style="padding-left: 40px;">"Although Flixweed has not migrated from disturbed areas, it should be controlled to contain the infestation and prevent spread north to new locations.";</p> <p style="padding-left: 40px;">"A management plan for non-native plant species employing adaptive management may be implemented if the nonendemic and other non-native plant species continue to be observed and/or are observed to spread further within the Meadowbank Complex area."</p>	

(AEM 2020, Appendix 52 (N), Section 4.0)

Several concerns are noted with respect to the report's findings, as follows:

1. Based on the survey results, Flixweed appears to be well established at the Meadowbank-Whale Tail complex. This species is not native to Nunavut and its presence poses potential, albeit unknown, risks to wildlife and wildlife habitat.
2. Cleaning and control programs currently being implemented by AEM, pursuant to term and condition 25, appear to be ineffective in preventing the introduction of non-native species. This raises concerns about the potential for introduction of additional, possibly invasive, species.
3. The extensive distribution of this plant species suggests that it has been present for some time at the Meadowbank-Whale Tail Complex, raising concerns about the effectiveness of monitoring and reporting programs and suggesting that introductions of "non-indigenous plant species" are not being promptly reported to the Government of Nunavut Department of Environment, as required under terms and condition 25 .
4. The report's conclusion that the species "has not migrated from the Meadowbank Mine site through the haul road or to the Whale Tail Mine site" is inconsistent with the data presented in the report. Populations of Flixweed were found at survey sites at the Whale Tail mine and along the All-Weather-Access-Road suggesting that the species has already spread beyond the Meadowbank site (AEM 2020, Appendix 52 (N), Table A-1, Plots MB19DMW026, MB19DMW053).
5. The report's conclusion that the species is currently only occupying disturbed areas and is not colonizing undisturbed habitats is tenuous. All survey sites in 2019 were on disturbed sites only. There was no apparent effort to survey undisturbed, natural habitats for the presence of this species. The potential for this species to colonize undisturbed habitats must be assessed in a comprehensive manner.
6. The report does not provide a definitive plan for eradicating or controlling this non-endemic species. Several possible control measures are discussed but specific actions, objectives and timelines are not detailed (AEM 2020, Section 16.6).
7. Flixweed is toxic to a wide range of animals, including ungulates of which caribou are a member if plants at certain stages of development are eaten in sufficient quantities. Signs of toxicity include blindness, staggering and the inability to swallow (e.g. <http://www.agric.gov.ab.ca/app107/loadPest?action=display&id=110>)

The presence of this non-endemic species in Nunavut falls under Section 91 of the *Nunavut Wildlife Act* and requires further action by the GN, AEM and the NIRB.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Flixweed is non-endemic to the Arctic, including Nunavut. The report indicates that populations of this species are most concentrated “along the perimeter of the airstrip (e.g., southwest border; exceeding 1,000 individuals), and the southwest edge of the Meadowbank Mine site around the workshop and shipping container storage areas” (AEM 2020, Section 16.5). This suggests the species was introduced via equipment and materials transported to the Meadowbank-Whale Tail complex from outside Nunavut.

The finding that populations have established along the All-Weather-Access-Road (AWAR) and at the Whale Tail mine site suggests that without implementing new eradication or control measures the potential for future expansion of the species’ range within the complex is moderate to high. Based on the information provided in the report the potential for colonization of natural habitats beyond the disturbed sites of the complex is unknown, at present. The presence of this species and its potential for range expansion in Nunavut presents an unknown risk to wildlife and wildlife habitat. In parts of North America where this species is endemic it occupies disturbed areas such as roadsides, industrial sites and agricultural land, including rangeland grazed by cattle. Whether this plant will colonise a tundra environment, grazed by wildlife, is unknown. Whether wildlife such as caribou will consume this plant and experience toxicological effects is unknown.

Section 91 Subsection 2 of the Nunavut Wildlife Act states:

“(2) No person shall release a member of a species into a habitat in which that species does not belong or never naturally occurred.

(3) Any person who contravenes subsection (1) or (2) shall make every effort to recover the animal or member of the species.

(4) Any person who contravenes subsection (1) or (2) is not entitled to any compensation if the animal or member of the species is harmed or destroyed and is liable to the Government of Nunavut for

(a) any loss or damage to wildlife or habitat caused by the release; and

(b) all costs incurred in pursuing, recovering, holding or destroying the animal or member of the species.”

Section 91 of the Nunavut Wildlife Act is applicable in the case of the report’s findings regarding Flixweed at the Meadowbank-Whale Tail complex. The phrase “member of a species” includes plant species. The available evidence suggests that this species that “does not belong or never naturally occurred” (GN 2003, Section 91) in Nunavut and has been released as a result of operations at the Meadowbank-Whale Tail complex. In accordance with the Act, efforts to eradicate, or at least control, this species are required.

The report does not present a species-specific management plan for control or eradication of Flixweed. Possible control measures such as mowing, hand pulling of plants and herbicide use are discussed but a commitment to specific actions or a schedule is not apparent in the report (AEM 2020, Appendix N, Section 4). The report does not discuss plans for assessing the risk posed by the species nor study designs necessary to track its distribution or abundance. The report does not present future monitoring study designs necessary to determine, with statistical

confidence, whether this species has/will colonize undisturbed tundra habitats. Finally, the report does not provide any recommendations to improve the cleaning, protection and monitoring protocols that have allowed this species to become well established. These protocols appear to be ineffective in preventing introduction of non-endemic species and should be reviewed and revised. The failure to promptly report the presence of this species indicates poor compliance with term and condition 25 of the Project Certificate.

Figure 1. Flowering Flixweed (*Descurainia Sophia*). (Source: invasive.org)



Flixweed (*Descurainia Sophia*) is similar in appearance to Northern Tansy Mustard (*Descurainia pinnata*) which is endemic to the Arctic. Care should be taken to ensure that mis-identification does not occur.

Figure 2. Flowering Northern Tansy Mustard (*Descurainia pinnata*)



RECOMMENDATION(S)

The GN offers the following recommendations to the Board with respect to this issue:

1. The Proponent should enlist a botanist to confirm that the species identified on site is in fact flixweed and not northern tansy mustard. Should the identification of flixweed be confirmed then the Proponent should undertake the following recommendations pertaining to tracking and containment.

2. That the Proponent thoroughly survey and create a map showing the current distribution of Flixweed (*Descurainia sophia*) at the Meadowbank-Whale Tail complex. This map should be provided to the NIRB for placement on the public registry, along with being provide to all members of the Terrestrial Advisory Group.
3. Produce a risk assessment examining:
 - The potential for the species to colonise undisturbed habitats beyond the disturbed areas of the Meadowbank-Whale Tail complex;
 - The impact of this species on efforts to revegetate disturbed areas of the complex with species and plant communities endemic to Nunavut, as required under term and condition 26; and
 - The risk of this species to wildlife such as caribou.
4. Develop a monitoring program with study designs and demonstrated statistical power to:
 - Determine the full extent of this species' current abundance and distribution at the Meadowbank-Whale Tail complex;
 - Monitor changes in abundance and distribution;
 - Measure the effectiveness of eradication/control programs;
 - Detect the colonization of undisturbed tundra habitats by this species.
5. The Proponent should conduct a review of cleaning and control measures employed at the Meadowbank-Whale Tail complex to prevent non-native species introductions. This review should be conducted in collaboration with subject matter expert(s) in the field of invasive species introduction. The results of this review should be provided to both NIRB and Terrestrial Advisory Group.

GN-06: Monitoring and Mitigation/Adaptive Management	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Links Between Monitoring and Mitigation/Adaptive Management
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019a). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2019b). Commitment list from NIRB technical meetings on the Whale Tail Expansion proposal, Baker Lake, June 11-13, 2019. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Government of Nunavut (GN). (2019). Comments on Agnico Eagle Mines Ltd.'s Meadowbank Gold Mine Project 2018 Annual Monitoring Report.
IDENTIFICATION OF ISSUE	
<p>The 2019 Wildlife Monitoring Summary Report concludes that Project effects on the movements of caribou were successfully mitigated because the caribou protection decision trees within the TEMP were applied when caribou were seen near Project facilities (AEM 2020, Section 17, Table 17.1). These decision trees specify changes in monitoring or mitigation activities, designed to manage disturbance of caribou, that are automatically triggered when caribou in numbers above Group Size Thresholds (GST) and within specified distances of the Project are observed (AEM 2019a, Figures 6 to 9).</p> <p>The format of the report makes it hard determine whether the decision trees were properly implemented in 2019. A previous commitment by the Proponent to revise the format for reporting caribou observations and the mitigation/adaptive management actions taken in response to those observations has not been fulfilled. Based on the content of the 2019 Wildlife Monitoring Summary Report, the GN cannot ascertain whether the Proponent's conclusion, that the caribou decision trees were properly implemented, is accurate.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>Observations of caribou, some of which should have triggered monitoring and mitigation actions, in accordance with decision trees, are provided in large appendices in the form of handwritten field data sheets (AEM 2020, Appendices A and B) or tables (AEM 2020, Appendix E). Monitoring and mitigation actions taken in response to caribou near the Project, such as road closures are summarized in separate tables within the main body of the report (e.g. AEM 2020,</p>	

Tables 3.9 to 3.11). There is no direct linkage between these two data sets (observations and actions). This prevents the reviewer from linking observations of caribou to subsequent actions. Therefore, the Proponent's claim that the Project's Caribou Protection Measures (CPM), as specified in the decision trees, were implemented in 2019 cannot be assessed without conducting a detailed audit of these two datasets. This requires considerable resources that some reviewing parties may lack.

The GN has previously raised concerns about the Proponent's reporting on the implementation of caribou decisions trees (GN 2019, GN-10). During the NIRB's review of the Whale Tail Project expansion proposal, the Proponent committed to the following:

"All observations of caribou will be reported in future Meadowbank and Whale Tail Wildlife Monitoring Summary Reports using the format presented in Table GN-TRC- #4-1 of AEM's response to technical comments on the Expansion Project." (AEM 2019b, Commitment 11)

This commitment was intended to satisfy the GN's on-going concern about the inability to verify the Proponent's compliance with the CPMs in the TEMP. This table has not been provided in the 2019 Wildlife Monitoring Summary Report.

RECOMMENDATION(S)

The GN offers the following recommendations to the Board with respect to this issue:

1. That the Proponent provide all 2019 observational data for caribou, alongside the corresponding monitoring and mitigation responses that were implemented, in the table format previously committed to by the Proponent during the NIRBs review of the Whale Tail Project expansion proposal, and that this table be provided to parties for review.

GN-07: CPM Compliance	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Compliance with Caribou Protection Measures
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019a). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2019b). Commitment list from NIRB technical meetings on the Whale Tail Expansion proposal, Baker Lake, June 11-13, 2019. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Government of Nunavut (GN). (2019). Comments on Agnico Eagle Mines Ltd.'s Meadowbank Gold Mine Project 2018 Annual Monitoring Report.
IDENTIFICATION OF ISSUE	
<p>The 2019 Wildlife Monitoring Summary Report concludes that Project effects on the movements of caribou were successfully mitigated because the caribou protection decision trees within the TEMP were applied when caribou were seen near Project facilities (AEM 2020, Section 17, Table 17.1). These decision trees specify changes in monitoring or mitigation activities, designed to manage disturbance of caribou, that are automatically triggered when numbers of caribou above Group Size Thresholds (GST) and within specified distances of the Project are observed (AEM 2019a, Figure 6 to 9).</p> <p>The format of the report makes it hard to determine whether the decision trees were properly implemented in 2019. However, a detailed review of the report's appendices, conducted by the GN, indicates there were numerous occasions in 2019 when caribou groups, above the Group Size Thresholds (GST) and within the Distance Thresholds (DT) specified in the TEMP, were observed near Project roads but automatic mitigation actions (such as road closures) were not implemented, as required by the decision trees. Contrary to the Proponent's conclusion, these findings suggest that the decision trees were not fully implemented in 2019, in accordance with the TEMP. It appears that what are supposed to be automatic actions in response to observed caribou are instead being implemented as discretionary measures.</p> <p>This is the second year since the initiation of the Whale Tail Project that implementation of the CPMs specified in the Project's TEMP has been incomplete (GN 2019 – GN comment #10). During the NIRB's review of the Whale Tail Project and Whale Tail Expansion Project, the assumption that these CPMs would be fully implemented by the Proponent was viewed by the</p>	

GN as one of the key factors reducing the substantial uncertainty and risks associated with the Project. The GN remains concerned that these CPMs are not effective when they are being applied incompletely. The GN maintains that the Proponent has not fulfilled the requirements of term and condition 28.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Road Closures in Response to Caribou

The Project's TEMP contains a series of caribou protection decision trees that are intended to reduce effects of the Project on the movements and distribution of caribou (AEM 2019a, Figures 6 to 9). In particular, during defined caribou migration seasons in the spring and fall, these decision trees specify changes in monitoring or mitigation activities, including road closures, that are supposed to be automatically triggered when caribou in numbers above Group Size Thresholds (GST) and within specified distances of the Project are observed.

Section 3.6.6 of the 2019 Wildlife Summary Monitoring Report (AEM 2020) discusses road-related mitigation that occurred in 2019 in response to caribou near the Project. Tables 3.9 and 3.11 present data showing the dates when the Meadowbank Awar and the Whale Tail Haul Road were closed to traffic in response to caribou. From these tables it is not possible to determine which caribou observations triggered these road closures and subsequently triggered reopening to traffic. Observations of caribou during road surveys and incidental observations by Project personnel, some of which should have triggered automatic monitoring and mitigation actions in accordance with the decision trees, are provided within the report as large appendices (AEM 2020, Appendices A, B, E). The report does not directly link these two data sets (observations and actions). This prevents the reviewer from understanding whether the caribou decisions trees are being properly implemented. Therefore, the Proponent's claim that the Project's CPMs, as specified in the decision trees, were implemented in 2019 cannot be assessed without conducting a detailed audit of these two datasets.

A detailed review and comparison of Appendices A, B, and E with the road closures listed in Tables 3.9 and 3.11 shows that there were numerous days in 2019 when caribou groups, above the GST and within the Distance Thresholds (DT) specified in the TEMP, were observed near Project roads, but the automatic road closure specified in the decision trees was not implemented (See Table 1 below). These observations were made incidentally and during official road surveys along both the Awar and Whale Tail Haul Road. On most days, multiple observations above road closure trigger thresholds were made.

The report does not explain why Project roads were not closed in response to these observations. These findings suggest the link between caribou monitoring and mitigation actions is weak or ineffective, and that mitigation actions, specifically identified in the TEMP as automatic responses to caribou observations, are not being applied or are being applied in a discretionary rather than automatic manner. This raises concerns about the efficacy of the Project's CPMs and indicates non-compliance with the TEMP and therefore with term and condition 28 of the Project certificate. This is the second year since the Whale Tail Project began that the GN has voiced the opinion that the implementation of the CPMs has been incomplete (GN 2019 – GN Comment #10).

Table 1. Observations of caribou above GSTs and within Distance Thresholds, that should have triggered road closures in 2019, for which no mitigation or adaptive management response is recorded.

Migration Season	Road	Month	Day	Number of Observations of Caribou Above Group Size Thresholds	
				Road Surveys ¹	Incidental Reports ²
Spring (April 1 – May 25)	AWAR	April	2	2	2
			3		1
			4		2
			5	5	11
			6		1
		May	1	5	9
			2	11	
			3	7	
			14	3	
			17	2	4
			18		1
			19		2
			20		4
			21	1	2
			22		2
			24	2	2
	Whale Tail	April	1		1
			3	1	
			4	2	2
			5	4	
			6	1	
			7	1	
		May	7	10	9
			8	3	7
			15	2	3
			17	2	
Fall (Sept 22 – Dec 15)	AWAR	Oct	19	4	
			20	1	
			22	3	
			23	1	
			24	2	
			25	2	1
		Nov	7		2
			17	3	3
			22	4	
	Whale Tail	Oct	19	3	1
			20	1	

		22	1	1
	Dec	18	1	

1- Source: Meadowbank Goldmine Project 2019 Wildlife Monitoring Summary Report, Appendix A 2019 Road Survey Forms – Meadowbank AWAR and Vault Haul Road; and Appendix B 2019 Road Survey Forms – Whale Tail Haul Road

2 - Source: Meadowbank Goldmine Project 2019 Wildlife Monitoring Summary Report, Appendix E 2019 Wildlife Observation Records

Essential Vehicles

The Project's TEMP specifies, during periods when the roads are closed due to the presence of caribou that only essential vehicles will be allowed on the closed roads. Roads will be closed to all non-essential vehicles. The TEMP defines essential and non-essential vehicles as:

“Essential vehicles include vehicles operated for the purpose of maintaining the safety of personnel, Emergency Response Team (ERT), security and wildlife monitoring.”; and

“Non-essential vehicles and heavy equipment - all vehicles or heavy equipment except those operated for the purpose of maintaining the safety of personnel. For clarity, nonessential vehicles shall include vehicles and equipment used to continue mining operations or hauling of ore.” (AEM 2019a, Figures 7 and 8)

In 2019, during periods when Project roads were closed due to the presence of caribou (AEM 2020, Tables 3.9 to 3.11), some traffic was still permitted to use the closed roads. The comments column of Tables 3.9 to 3.11 notes that convoys for “daily ride” and other traffic used the closed roads. However, the amount of traffic and whether this traffic was consistent with the definition of “essential vehicles” is unclear based on the information provided in the report.

RECOMMENDATION(S)

The GN offers the following recommendations with respect to this issue:

1. That the Proponent explain why Project roads were not closed in response to caribou observations made on the days listed in Table 1 of this comment.
2. That the Board direct the Proponent to implement the CPMs fully and consistently in the TEMP in accordance with the Group Size and Distance Thresholds specified in the decision trees (AEM 2019 a, Figures 6 to 9).
3. That the Board direct the Proponent to report all observational data for caribou, alongside the corresponding monitoring and mitigation responses that were implemented, in the table format previously committed to by the Proponent during the NIRBs review of the Whale Tail Project expansion proposal. That this table be provided to parties for review in each Annual Report.
4. That for each of the road closures listed in Tables 3.9 and 3.11 of the 2019 Wildlife Summary Monitoring Report, the Proponent explain what criteria and monitoring data were used to make the decision to reopen the road. That the Proponent also provide, summarized in table

format, the monitoring data used to support each reopening, for review by the GN and other parties.

5. That for the road closures listed in Tables 3.9 and 3.11 of the 2019 Wildlife Summary Monitoring Report, the Proponent provide information on the number of convoys that occurred on each day and how many vehicles were in each convoy. That the Proponent also explain how the different types of vehicles in these convoys fit the definition of “essential vehicles” as specified in the TEMP.

GN-08: Caribou Collar Data	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Caribou Collar Data
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019a). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2019b). Commitment list from NIRB technical meetings on the Whale Tail Expansion proposal, Baker Lake, June 11-13, 2019. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Government of Nunavut (GN). (2019). Comments on Agnico Eagle Mines Ltd.'s Meadowbank Gold Mine Project 2018 Annual Monitoring Report.
IDENTIFICATION OF ISSUE	
<p>The 2019 Wildlife Monitoring Summary report highlights the importance of caribou collar data in monitoring and mitigating effects of the Project on caribou. However, the report does not make recommendations or provide specific plans for future acquisition of collar data that will be necessary to support the Project.</p> <p>Given the importance of this source of data, the Proponent should specify how many collars, and on which herds, will be needed in future. Without such a plan, it is unclear whether sufficient collar data will be available in future. This in turn leads to uncertainty regarding the Proponent's ability to mitigate Project effects on caribou.</p>	
IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE	
<p>As discussed in the 2019 Wildlife Monitoring Summary Report, caribou collar data are relied upon heavily for both day-to-day Project management (e.g. road mitigation measures) as well as effects monitoring. For example:</p> <p>"Collar location maps were instrumental in assessing the need for increased road monitoring." (AEM 2020, section 3.6.6); and</p> <p>"Another key objective of the program is to provide timely information for the Caribou management and monitoring strategy at the Meadowbank and Whale Tail sites (i.e., Decision Tree approach; see 2019 TEMP [Agnico Eagle, 2019])." (AEM 2020, Section 6.2)</p>	

Given the importance of caribou collar data, it is concerning that the section of the report discussing the collaring program does not make recommendations or specify plans for the continued acquisition of this data (AEM 2020, Section 6.9). It appears that the Proponent's plan for the acquisition and use of collar data will be *ad hoc* and reliant on what ever data are available from the GN. While it is understood that the collaring program is a GN-led initiative, the Proponent should be able to provide a plan specifying the Project's specific collar data needs in terms of the number of collars, and on which herds, required to support effective day-to-day mitigation (i.e. implementation of the caribou decision trees) and effects monitoring. In absence of this plan, there is significant uncertainty about the Proponent's capacity to mitigate Project effects on caribou.

Since the Project Certificate was issued in March 15, 2018, there has been no new investment by the Proponent in collection of collar data for the Whale Tail and Meadowbank Projects yet term and condition 29 of the Project Certificate specifies the need to collect such data. During this period, the Project has gone through several significant phases of development including construction and widening of the haul road and the start of ore hauling. The lack of a plan for acquisition of collar data represents a large gap in the Project's monitoring scheme that must be addressed by the Proponent. It is inappropriate to rely heavily on a type of data and not provide a plan for its acquisition.

RECOMMENDATION(S)

The GN offers the following recommendations to the Board with respect to this issue:

1. That the Board direct the Proponent to provide a plan for acquisition of caribou collar data specifying the number of collars required on each of the herds interacting with the Project that are required by the Proponent for Project effects monitoring and day-to-day implementation of CPMs. This plan should include information on sample size considerations, schedule and level of investment to be provided by the Proponent to acquire these data. It is acknowledged that caribou collaring in the Kivalliq region is GN-led. However, this does not prevent the Proponent from expressing the Project's data needs in the form of a plan. This plan should be provided to the TAG for review. Progress in implementing the plan should be reported in future Annual Wildlife Summary Monitoring Reports.

GN-09: Caribou Road Surveys	
Department	Environment
Organization	Government of Nunavut
Subject/Topic	Road Surveys for Caribou
Terms and Conditions	28
References	<ul style="list-style-type: none"> • Agnico Eagle Mines (AEM) Ltd. (2019a). Meadowbank Division Terrestrial Ecosystem Management Plan, Version 7. • Agnico Eagle Mines (AEM) Ltd. (2019b). Commitment list from NIRB technical meetings on the Whale Tail Expansion proposal, Baker Lake, June 11-13, 2019. • Agnico Eagle Mines (AEM) Ltd. (2020). Meadowbank Mine 2019 Wildlife Monitoring Summary Report. Final. Appendix 52 of the Meadowbank Mine Annual Report. • Government of Nunavut (GN). (2019). Comments on Agnico Eagle Mines Ltd.'s Meadowbank Gold Mine Project 2018 Annual Monitoring Report. • Nunavut Impact Review Board (NIRB). (2017) Final hearing report, Agnico Eagle Mines Ltd. Whale Tail project. NIRB File No. 16MN056.
IDENTIFICATION OF ISSUE	
<p>The 2019 Wildlife Monitoring Summary Report concludes that Project effects on the movements of caribou were successfully mitigated because the caribou protection decision trees within the TEMP were applied when caribou were seen near Project facilities (AEM 2020, Section 17, Table 17.1). These decision trees specify changes in monitoring or mitigation activities, designed to manage disturbance of caribou, that are automatically triggered when caribou numbers above Group Size Thresholds (GST) and within specified distances of the Project are observed (AEM 2019a, Figures 6 to 9). In reaching this conclusion, the report assumes that these decision trees are being fully implement and that they are effective in reducing disturbance. However, neither the extent to which they were implemented, nor their effectiveness, is evaluated in the report. Consequently, the GN considers the report's conclusion to be tenuous and of low confidence.</p> <p>During the NIRB's review of the Whale Tail Project, the Proponent committed to conduct a statistically robust evaluation of the Project's CPMs (NIRB 2017, Appendix B, Commitment 1). Despite the availability of data in 2019 to perform some of parts of this evaluation, the Proponent has not attempted to critically evaluate the CPMs. For example, road surveys to detect groups of caribou near the Project are a key monitoring tool for triggering adaptive management/mitigation measures such as road closures in-order to facilitate the migration of caribou without sensory disturbance by Project activities such as road traffic (AEM 2020, Section 3.2). The GN has identified several concerns with the road survey data within the 2019 Wildlife Monitoring Summary Report (AEM 2020, Appendices A and B), they are as follows:</p>	

- The range over which these surveys are capable of detecting caribou is very limited and well below the distance thresholds that are employed within the TEMP's CPMs for triggering enhanced monitoring and mitigation actions, including road closures. These findings suggest that the Proponent currently lacks the capacity to detect caribou approaching the Project in time to enact mitigation measures designed to reduce disturbance of migratory movements. The inadequacy of this survey method indicates that the CPMs lack an effective/sensitive monitoring trigger and are thus unlikely to be effective unless road closures are maintained for prolonged periods during migration seasons.
- Road survey results show that the vast majority of caribou observations are concentrated near Project roads on the road-side facing the on-coming migration. This finding is consistent with the hypothesis that caribou are being significantly obstructed by Project roads; a finding that is consistent with analyses of caribou collar being conducted by the GN and soon to be published.

IMPORTANCE TO REVIEW AND SUPPORTING RATIONALE

Road surveys to detect caribou and other wildlife are a main feature of the Project's TEMP for monitoring Project effects and triggering adaptive management measures such as road closures in-order to reduce disturbance of migrating caribou. The methodology for these surveys is described in the 2019 Wildlife Monitoring Summary Report as follows:

"The terrain on both sides of the road (to a maximum horizontal distance of approximately 1 km perpendicular from the road edge) is surveyed as the vehicle progresses at a maximum speed of 30 km per hour." (AEM 2020, Section 3.4)

Given the importance of these surveys for triggering mitigation and adaptive management, careful scrutiny of the data produced by these surveys is warranted. Section 3.4.2.3 of the TEMP states that:

"It is recognized that this type of survey data is limited to the sightability and detection of caribou from the survey locations. Consequently, the determination of sightability and detection functions will be attempted for the various monitoring methods (AWAR/Haul Road scan surveys, Roadside surveys and HOL surveys)." (AEM 2019a)

Despite the availability of a sizeable data set derived from 2019 and other observations, these detection functions for road surveys have not been presented in the 2019 Wildlife Monitoring Summary report. The effectiveness of road surveys in detecting caribou approaching the project could be evaluated using the available data and should be evaluated as per the TEMP. This is a critical step in evaluating the Project's CPMs as committed to by the Proponent during review of the Whale Tail Project (NIRB 2017, Appendix B, Commitment 1).

As an initial step in this evaluation, the GN has compiled and reviewed the 2019 road survey data. Based on this review the GN has identified the following areas of interest:

- If caribou were unobstructed by Project roads, the distribution of observations should be approximately equal on either side of the road. However, despite observers surveying

both sides of Project roads, during both the spring and fall migration, the vast majority (91%) of caribou observations along the All-Weather-Access-Road (AWAR) and the Whale Tail Haul Road in 2019 were concentrated on the road-side facing the on-coming migration (figures 1 a to d). This finding is consistent with the hypothesis that caribou are being obstructed by Project roads and are aggregating into high densities as they approach the road and attempt to cross; a finding that is also consistent with analyses of caribou collar being conducted by the GN and soon to be published.

- As illustrated in Figures 1 a to d, most of the observations of caribou made by road survey observers were within 500m of the roads. For example, during the two periods when caribou observations were highest, spring time along the Whale Tail Haul Road (n = 615) and fall time along the AWAR (n = 183), 77% and 92% of the caribou groups observed were within 500m of the roads, respectively. These statistics demonstrate that road surveys have a range of detection considerably less than the 4 km and 1.5 km distance thresholds that are specified in the TEMP for triggering increased monitoring and road closures, respectively (AEM 2019a, Figures 6 to 9). This finding suggests that road surveys are not an effective trigger for CPMs that are designed to reduce disturbance of migrating caribou. These surveys cannot detect caribou before they are subject to disturbance by Project activities such as ore hauling traffic.
- Looking at the road survey data for the Whale Tail Haul Road during the spring-time migration, when most caribou observations were made in 2019 (n = 615 groups), group sizes of caribou observed within 250 metres of the road were significantly larger than groups observed within 251-500m of the road (Mann Whitney U-Test, p = 0.03). This suggests that caribou may be coalescing into larger groups as they approach the Project's roads, in response to disturbance.

The GN notes that these are exploratory analyses, only, and do not provide definitive results. Nevertheless, they highlight the need to conduct more detail analyses of the road survey data using multiple covariates, such as distance from road and road status (i.e. open vs closed). Such analyses are particularly important when considering revision of caribou GSTs in the TEMP that are used for triggering road closures, for developing new strategies for road management in response to caribou movements and for developing new methods of detecting caribou approaching the Project.

Figure 1. Frequency of caribou observations, made during road surveys, on the east and west sides of the Whale Tail haul road (1a) and All-Weather-Access-Road (1b) during the spring migration. Similar data presented for the Whale Tail haul road (1c) and AWAR (1d) for the fall migration. (Data derived from AEM 2020, Appendices A and B)

Figure 1 a.

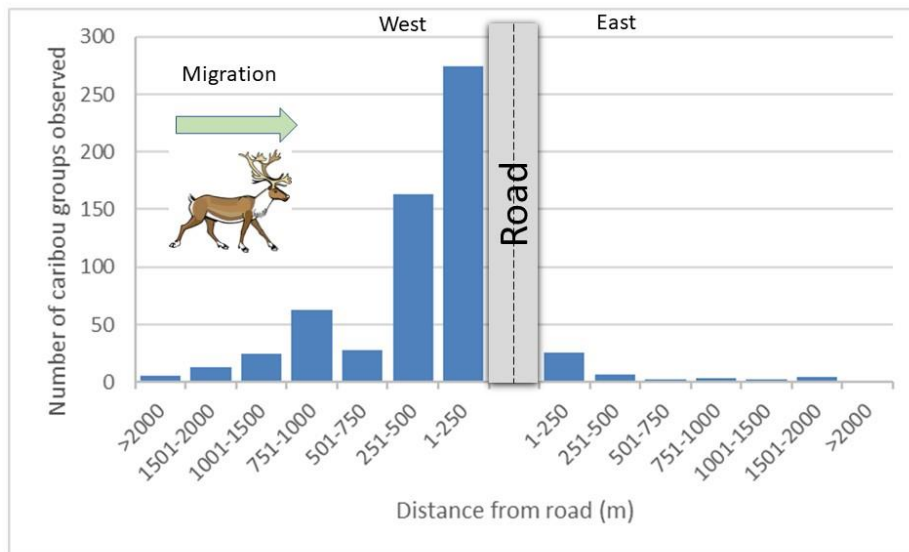


Figure 1b.

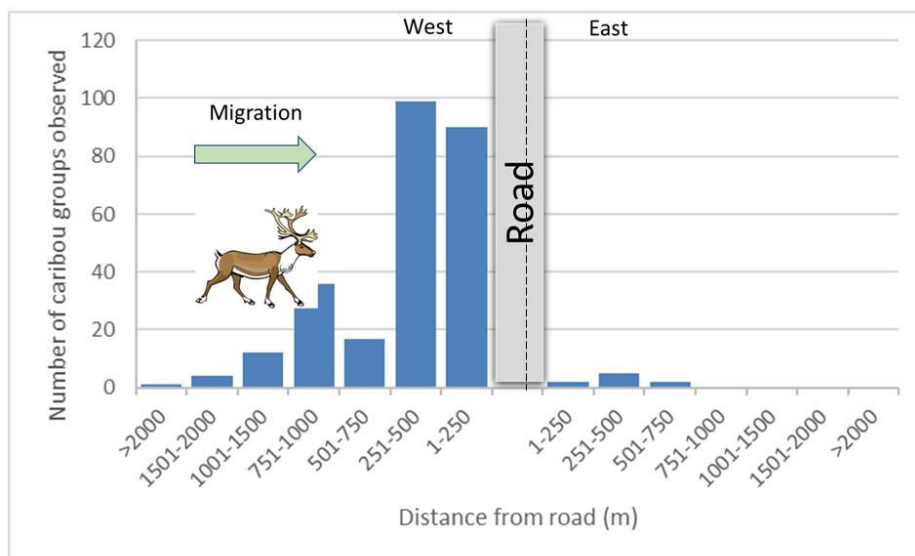


Figure 1c.

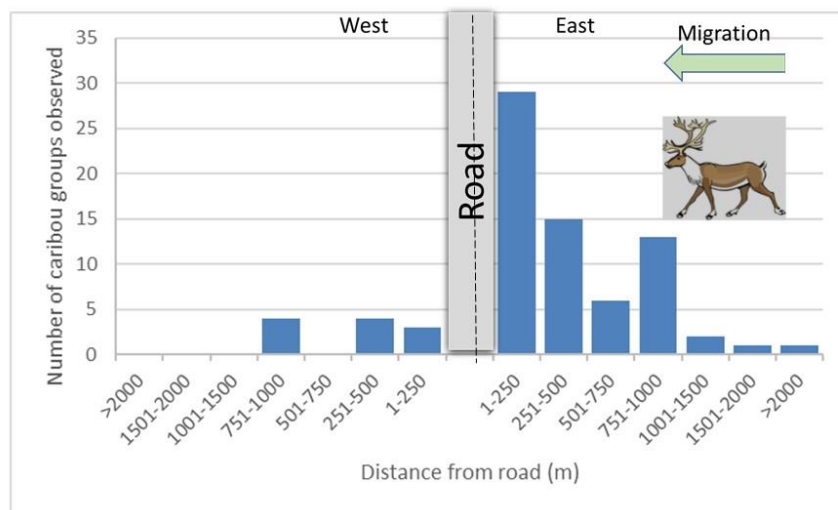
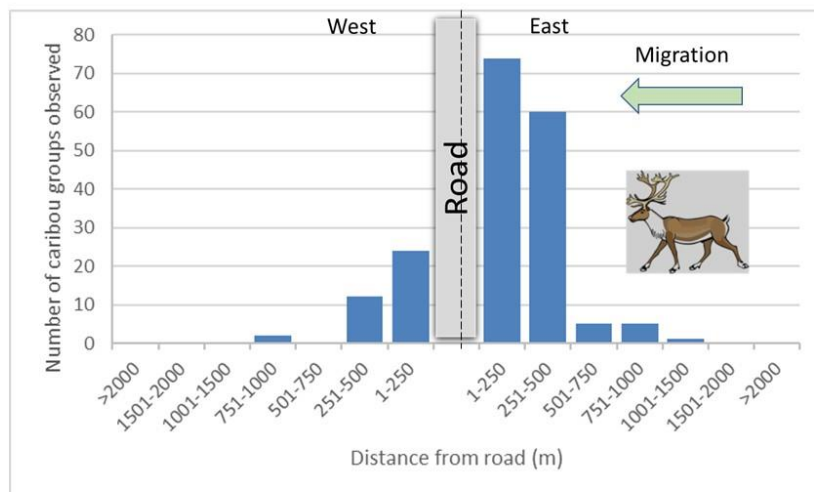


Figure 1d.



RECOMMENDATION(S)

The GN offers the following recommendations with respect to this issue:

1. That, the Board direct the Proponent to conduct a comprehensive analysis of the available caribou observation data (for 2019 and earlier years) including road surveys and incidental observations; the GN believes that completion of this analysis within 6 months of receipt of this recommendation is reasonable. These analyses should be based on guidance provided by the TAG (as per its terms of reference). The results of these analyses should be used to assess the effectiveness of caribou detection methods and to make appropriate revisions to GSTs used in the TEMP to trigger automatic road closures. A report on the findings and recommendations from these analyses should be provided to the Board, GN and other parties for review.
2. Noting that road surveys alone are inadequate for detecting and responding to the presence of caribou near the Project, that Board direct the Proponent to invest in the long-range detection of migrating caribou.