R2-CanNor-01

Topic: Health Canada (HC) HC-01 - Monitoring and the proposed Adaptive Air Quality Management Plan (AAQMP)

Preamble from Canadian Northern Economic Development Agency (CanNor):

References: Developer's Assessment Report (DAR), Volume 3, Section 12.0; Round 1 Information Requests: HC-02; DAR Public Review: HC-07.

Health Canada (HC) acknowledges the rationale provided in response to Round 1 Information Request (IR) HC-02 and during the Technical Sessions for the exclusion of air dispersion modelling. However, HC maintains that the approach used by the Developer (Government of the Northwest Territories Department of Infrastructure; GNWT-INF) would not allow adequate assessment of potential impacts on human health from changes to air quality resulting from the Mackenzie Valley Highway Project (Project).

In the absence of dispersion modelling, the Developer has developed an Adaptive Air Quality Management Plan (AAQMP). To ensure that the AAQMP is protective of health and that the principles of keeping clean areas clean and continuous improvement are maintained, proposed mitigation measures should be targeted towards reducing population exposure to fine particulate matter (PM2.5) and nitrogen dioxide (NO2) associated with the proposed Project.

HC recommends that the AAQMP be described in further detail to confirm whether the proposed plan is sufficient to adequately mitigate the potential air quality impacts on human health. For instance, the AAQMP mentions that temporary aerosol monitors (e.g., DustTrak monitors) may be installed at some residences when Project activities are occurring within 1 km. As noted in HC-02, dust particles may settle within a 1-km buffer but PM2.5and precursor pollutants can travel large distances in the atmosphere and affect receptors within and beyond this buffer distance. The AAQMP should be updated to describe how such pollutants will be managed. Additionally, it is not clear from the current DAR what criteria will be used to determine if, and where, temporary aerosol monitors are installed.

Request from CanNor:

1. HC recommends adding additional details to the AAQMP including, but not limited, to:

   a) The criteria that will be used to determine if, and where, temporary aerosol monitors (e.g., DustTrak) are installed.

   b) Details about the frequency of sampling and/or data points for continuous monitoring, locations of sampling sites, and quality assurance/quality control (QA/QC) plans to ensure accuracy of the data (e.g., maintenance of monitoring equipment, sample collection techniques, etc.).

   c) Evidence-based trigger levels for corrective action (i.e., implementation of additional mitigation measures to prevent deterioration of air quality) for managing observed increases in contaminants of potential concern. These trigger levels should be informed by pre-Project baseline levels and other considerations such as reference guidance values, public

complaints, wind speed and direction, and visual observations.

d) Identifying who is responsible for reviewing monitoring data to determine whether applicable criteria are being met and identifying any trends in the data.

e) Identifying how monitoring data will be made available to the public and plans for reporting.

f) Clarifying the components of the dust control plan mentioned in Section 12.4.2.2 of the DAR and in response to HC-02.

g) Listing regular maintenance schedules for vehicles and equipment.

h) Identifying approaches for discouraging or limiting equipment idling.

Response from the Government of the Northwest Territories (GNWT):

To re-iterate the GNWT's previous responses to the request for air dispersion modeling, the GNWT maintains that it is not appropriate for this Project. It is acknowledged that, generally speaking, criteria air contaminants (CACs) like particulate matters $(PM)_{2.5}$ from large stationary sources, such as municipal or industrial diesel power plants, can travel large distances in the atmosphere and beyond the 1-kilometre (km) buffer used in the assessment of potential effects on air quality. However, the Project construction sources of CACs are mostly mobile, intermittent, and the emissions intensity is relatively low compared to large stationary sources. The 1-km buffer estimate for the Project construction sources of CACs is conservative and supported by previous air quality assessments done for road construction projects as per the following example:

- Prairie Creek All Season Road Project: The air quality effects from TSP, PM_{10}, $PM_{2.5}$, is expected to be similar to those from the Prairie Creek mine construction which was assessed using dispersion modelling. The results showed that the maximum concentrations during the construction and operation phase were expected to be lower than the respective air quality standards beyond a buffer of 200 metres from the surface lease boundary (Canadian Zinc, 2015).

The information provided in the Developer's Assessment Report (DAR) about the Adaptive Air Quality Management Plan (AAQMP) is at this stage conceptual and high-level. Details will be added during the development of the AAQMP by the GNWT prior to construction. While there is no regulatory requirement for such a plan, the consolidation of the GNWT's proposed monitoring and response into the AAQMP demonstrates the GNWT's commitment to verifying the effects predictions of the DAR.

It is important to note that, as described in the response to ORS CanNor-16, air quality monitoring, and thus the AAQMP, is expected to last for only a brief time (7 days) while the construction site is within 1 km of the monitoring station in Wrigley and moving northward along the highway alignment. Given this short monitoring period, the AAQMP should be designed to be straightforward and practical. Information such as the maintenance schedule for vehicles and equipment may not be suitable for a short-term monitoring plan. The GNWT does not plan to require the construction contractor to provide maintenance logs for equipment. Equipment maintenance should be done in accordance with manufacturer's specifications.

Some general information that will be included and developed in the AAQMP is outlined below.

- One temporary aerosol monitor, such as DustTrak, will be installed. It should ideally be installed at the nearest residence within the 1-km buffer, or another location acceptable to the community to represent the most affected receptor location.

- The station will monitor for PM including $PM_{2.5}$. The data will be displayed as 1-hour average. It will be shared to a cloud-based website, which will be updated in real-time and available for everyone in the community to check on their phones and computers. This data will help the community and the Project developer make corrective actions. 24-hour average data will also be displayed to compare against trigger levels.

- The trigger levels for corrective action will be informed by the Northwest Territories Ambient Air Quality Standards and other federal and provincial regulatory objectives such as the Canadian Ambient Air Quality Standards. Safety factors may be applied for the purpose of being proactive and conservative. Notification alerts by email will be sent to the GNWT Department of Infrastructure (GNWT-INF) when the 24-hour averaged data exceeds the trigger levels.

- As the Project construction site may not be the only source of PM measured by the monitoring station (e.g. regional forest fire smoke, power generation, home heating, aircraft landings, and other anthropogenic activities in Wrigley), best judgement will be applied to determine if and when corrective actions should be performed. This may include looking at PM levels measured outside of the construction work hours, checking for other sources of PM and dust plumes in the area, and looking at general trends from other monitoring stations in the region (a reference baseline).

- As committed to in the Developer's Assessment Report, equipment idling will be discouraged or limited. Discretion must be allowed in consideration of operating diesel-powered engines in extreme cold temperatures.

- The possible corrective actions are listed below. These are in addition to the pre-emptive mitigation measures listed in the DAR Table 12.7 and Section 12.4.2.2. These corrective actions apply only during the air quality monitoring period, which occurs during the Project construction phase, while the construction site is within 1 km of the monitoring station in Wrigley.
    - Increase the frequency or location of dust suppression (i.e. water) as necessary to reduce dust.
    - Avoid or reduce dust generating activities when wind speeds and wind direction will cause a safety concern due to reduced visibility.
    - Surfaces of granular material stockpiles may be stabilized during extended periods between usage, by means of covering the exposed surfaces, as feasible.
    - Reduce vehicle speed when travelling within 1 km of receptors.

References

Canadian Zinc (Canadian Zinc Corporation). 2015. Developer's Assessment Report All Season Road Project Prairie Creek Mine. Environmental Assessment of Prairie Creek Mine EA 1415-01. April 2015. Available at: https://reviewboard.ca/upload/project_document/EA1415-01_EA1415-01_Developer_s_Assessment_Report.PDF

R2-CanNor-02

Topic: Fisheries and Oceans Canada (DFO) DFO-01 - Aquatic invasive species: lack of consideration for aquatic invasive species

Preamble from Canadian Northern Economic Development Agency (CanNor):

Reference: DAR Sections 11, 17, and 18.

Aquatic Invasive Species (AIS) are not specifically addressed in GNWT-INF's DAR. Section 17, Table 17.8 notes that "machinery will arrive on-site and will be maintained in a clean condition and free of invasive species and noxious weeds". Aquatic invasive species and whirling disease can be introduced and spread through transporting water, sands, and sediments and using contaminated construction equipment – this could occur during construction but also during the operation of the MVH.

The Canadian Aquatic Invasive Species Regulations under the Fisheries Act prohibits:

- The importation, possession, transportation or release of aquatic invasive species.
- The introduction of aquatic species into regions or bodies of water frequented by fish where they are not indigenous.

In addition, whirling disease, a disease of finfish, caused by infection with a microscopic parasite called Myxobolus cerebralis, has been identified in Alberta. Whirling disease can cause death in the younger life stages of susceptible freshwater finfish. Affected finfish may exhibit any of the following signs:

- whirling swimming pattern.
- skeletal deformities of the body or head (i.e., shortening of the mandible and indentations on the top of the head).
- tail may appear dark or even black.

Request from CanNor:

1. Please provide information on:
   a) Which mitigation measures will be put in place to prevent the introduction of Aquatic Invasive Species and whirling disease during Project construction and during road operation (i.e., use by the public).
   b) Whether monitoring will be conducted to detect a potential introduction of Aquatic Invasive Species and whirling disease.

DFO recommends a section Aquatic Invasive Species and whirling disease mitigation and monitoring be developed as part of the Fish and Fish Habitat Protection Plan.

2. To prevent the introduction and spread of Aquatic Invasive Species and whirling disease, DFO recommends the Developer:
   a) Ensure all equipment arrives on site clean and free of invasive species.
   b) Clean, drain, and dry any equipment used in the water.
   c) Never move organisms or water from one body of water to another. Follow and encourage the public to follow best practices found on the Alberta Environment website (https://www.alberta.ca/stop-whirling-disease.aspx).

d) Place signage along the road to inform the public on risks and mitigation measures.

DFO also recommends that monitors working on site during construction and monitoring of the MVH be familiar with Aquatic Invasive Species and signs of whirling disease in aquatic species so that evidence of introduction can be reported.

Response from the Government of the Northwest Territories (GNWT):

The GNWT will include mitigation measures to prevent the spread of Aquatic Invasive Species, including whirling disease, in the Fish and Fish Habitat Protection Plan. The Contractor will adhere to the Fish and Fish Habitat Protection Plan and implement the mitigation measures described therein. Mitigation measures will be followed from the Government of Alberta's (GOA) *Decontamination Protocol for Work in or Near Water* (2017); however, if these are updated at the time of construction, the most current measures will be incorporated and followed.

Equipment working in streams will be clean when it arrives to the worksite (i.e., clean of mud/sediment, no vegetation or organisms) and, if moving into or between the watershed sub-basins intersecting the Project (Central Mackenzie – Blackwater Lake and Central Mackenzie – The Ramparts), will follow the decontamination protocol in the GOA's (2017) protocol before equipment is mobilized to site. This protocol will also be applied to personal equipment (e.g., waders, work boots) and to sampling equipment (e.g., fish salvage equipment, nets, sampling probes) used in-stream. Decontamination records will be required to be retained for at least five years by the contractor so that they can be provided to the GNWT or regulatory authorities.

Whirling disease in fish (particularly young salmonids including salmon, trout, char, and some whitefish) is often observed based on body deformities, a blackened tail, or swimming in a characteristic whirling pattern. Detection of whirling disease can be challenging because while infected individuals may exhibit symptoms, these symptoms are not unique to whirling disease and may be a result of a different illness, parasite, or pathogen. In addition, not all infected individuals exhibit symptoms. Whirling disease must therefore be confirmed by laboratory testing of fish, aquatic worms, water, or sediment. Canada has established a whirling disease detection program supported by Parks Canada, DFO, and the Canadian Food Inspection Agency (CFIA) along with provincial and territorial counterparts. Positive detections of whirling disease have been found in British Columbia and Alberta and confirmed detections are listed on the CFIA (2024) website. If fish exhibiting possible symptoms of whirling disease are encountered during fish rescue activities (part of instream construction works) by qualified persons, the GNWT will notify relevant Sahtu and Dehcho organizations and the appropriate authorities to undertake testing to confirm the presence of whirling disease.

The GNWT will consider installing permanent signage at the start of the highway, and at major watercourse crossings with information to clean, drain, and dry boats and equipment before and after entering water to prevent the spread of aquatic invasive species, though the GNWT will, through design, discourage access from the highway to these watercourses, particularly for watercraft.

References

Government of Alberta. 2017. Decontamination Protocol for Work In or Near Water. Last updated July 2020. Available at: https://open.alberta.ca/dataset/9b126cfd-b637-4dd2-838e-b43d12c8993a/resource/d89b106e-af61-4858-a991-12caadd0869d/download/aep-decontamination-protocol-for-work-in-or-near-water.pdf

Canadian Food Inspection Agency. Whirling disease. Last updated May 6, 2024. Available at: https://inspection.canada.ca/en/animal-health/aquatic-animals/diseases/reportable-diseases/whirling-disease#con

R2-CanNor-03

Topic: Environment and Climate Change Canada (ECCC) ECCC-01 Caribou Assessment Area

Preamble from Canadian Northern Economic Development Agency:

References: Responses to IRs: ECCC-01, ECCC-02, ECCC-03, MVEIRB #44, MVEIRB #51, MVEIRB #52; Technical Meeting Transcript; Federal Recovery Strategy (ECCC 2020)

In IR ECCC-01, ECCC requested the Developer provide further rationale for the selection of the Local Assessment Area (LAA) 15 km buffer as the relevant scale for the cumulative effects assessment area for boreal caribou. In IR ECCC-02, ECCC requested the Developer provide the rationale to exclude a Regional Assessment Area (RAA) from the assessment for boreal caribou and to have the LAA serve as the RAA. In IR ECCC-03, ECCC requested the Developer include Imperial Oil activities in the Norman Wells area in the cumulative effects assessment. The geographic scope of the Caribou LAA is not appropriate for the characteristics of the caribou component (ie. population), therefore the LAA is not an appropriate scale for a cumulative effects assessment and should not be a supplement for the RAA.

The Developer's arguments in the IR response to MVEIRB #44 were that the Caribou LAA does not (and is not meant to) evaluate boreal caribou at the level of designated population units, and that regional environmental conditions beyond the Caribou LAA are too different in terms of habitat and disturbance levels to compare with conditions proximal to the Project.

Project level effects can be assessed at the Caribou LAA, however, for an understanding of the cumulative effects of the Project, they must be put into context of the differing environments in the broader area used by the population or sub-population that could interact with the Project. The valued component is the population, not just individuals affected by the Project.

Additionally, the Developer does not estimate the total % disturbance of the NT1 range or regional planning areas resulting from all reasonably foreseeable future developments.

Section 7.2.3 in the Federal Recovery Strategy (ECCC 2020) states:

"The cumulative effects assessment will:

- Assess the impact of all disturbances (anthropogenic and natural) at the range-scale;
- Monitor habitat conditions, including the amount of current disturbed and undisturbed habitat (see Section 4.2.1), and amount of habitat being restored;
- Account for planned disturbances; and
- Assess the distribution of disturbance in large ranges for risk of range retraction in parts of the range."

The list of all reasonably foreseeable developments should then be expanded to match the cumulative effects study area. This is particularly relevant as the Imperial Oil Operations in Norman Wells are currently pending an Environmental Impact Assessment.

A key concern for the cumulative effects assessment is the risk of exceeding the disturbance threshold in this range in the near term.

Request from Canadian Northern Economic Development Agency:

1. ECCC requests the Developer provide, prior to interventions:

   a) A cumulative effects re-assessment at a geographic scale (RAA) which is appropriate for the characteristics of the caribou component; and

   b) Given that there are no distinct herds in the NT1 range, an outline of how the Developer plans to capture the effects of the Project, and all reasonably foreseeable developments and their cumulative impacts, at the population or sub-population level.

Response from the Government of the Northwest Territories (GNWT):

1a. The cumulative effects assessment (CEA) of disturbance to boreal caribou Critical Habitat was completed for the Caribou and Moose local assessment area (LAA) (primary assessment boundary; Developer's Assessment Report [DAR] Section 10.1.4), which also considered existing disturbances within the NT1 boreal caribou range and the administrative Sahtu and Southern NWT Range Planning Regions defined in *A Framework for Boreal Caribou Range Planning GNWT* (2019). The assessment only included reasonably foreseeable projects within the Caribou and Moose LAA, as defined in Section 4.6 of the DAR, in accordance with the methodology for the CEA. Specifically, "*the cumulative effects assessment has considered residual effects of the Project in combination with detectable residual effects from other physical activities (projects) that overlap in time and space*" (pg. 84, DAR). The CEA is, thus, still a Project-centric approach to assessing effects on valued components like boreal caribou. Environment and Climate Change Canada (ECCC)'s reference to CEAs in the Federal Recovery Strategy is not consistent with, and does not apply to, Project-specific CEAs.

Regardless, to address ECCC's request, the GNWT has identified *additional* proposed projects within the Sahtu and Southern NWT Range Planning Regions, and the NT1 as a whole that will result in land disturbance. Consistent with its previous response to ECCC regarding assessment areas (R1 CanNor IR#22 and R1 CanNor IR#23), the GNWT maintains that these range planning regions are likely to be larger than the areas needed to assess the significance of the Project's cumulative effects on caribou.

Proposed projects may represent ~44,019 hectares (ha) of disturbance (0.10%) in the NT1 range, ~497 ha of disturbance (0.003%) in the Sahtu Range Planning Region, and ~41,657 ha of disturbance (0.26%) in the Southern NWT Planning Region. These values are approximate because:

- They rely on publicly available information (applications to regulators) about proposed or anticipated land disturbances which may be based on delineated areas of interest, where footprints are not defined in the application. Disturbance may be under- or over-estimated
- They do not account for existing human disturbances and burns that may overlap these projects; this includes components of proposed projects that may be underway (disturbance is likely over-estimated)
- Projects may not proceed (disturbance may be over-estimated)
- Remediation and reclamation projects are assumed to have 0 ha of new disturbance.
- They do not include a 500 metre disturbance buffer used for other disturbance calculations.

Table Round 2-CanNor-03-01 summarizes the approximate contribution of different proposed disturbance types to the disturbance of boreal caribou Critical Habitat in the NT1 range and Range Planning Regions (outside of the Caribou and Moose LAA). Additional disturbance areas for boreal caribou Critical Habitat, from these additional projects, are provided in the Round 2 CanNor IR#04 response.

Table Round 2-CanNor-03-01. Proposed Future Disturbances to Boreal Caribou Critical Habitat in the NT1 Boreal Caribou Range and Range Planning Regions, by Disturbance Type.

Future Disturbance Type	Approximate Disturbance (ha)		
	NT1 Range	Sahtu Region	Southern NWT Region
Geotechnical	1	1	0
Infrastructure	30	30	0
Mining and Mining Exploration	17,801	462	15,479
Oil & Gas	4	4	0
Municipal	0	0	0
Quarrying	30	0	24
Remediation & Reclamation	0	0	0
Forestry	26,154	0	26,154
Total	44,019	497	41,657

Sources: Mackenzie Land and Water Board public registry, Mackenzie Land and Water Board Online Review System, Mackenzie Valley Environmental Impact Review Board Public Registry.

b. The GNWT refers ECCC to the response above and the response to Round 2 CanNor IR#04. These responses address Project-related and cumulative disturbances in the Caribou and Moose LAA, Sahtu and Southern NWT Range Planning Regions, and the broader NT1 boreal caribou range. The GNWT believes these responses to be sufficient to address ECCC concerns regarding effects to boreal caribou at a population and sub-population level.

R2-CanNor-06

Topic: ECCC-04 Caribou Habitat Disturbance

Preamble from Canadian Northern Economic Development Agency:

References: Responses to IRs: ECCC-06, ECCC-07, MVEIRB #47, MVEIRB #52, MVEIRB #56; Technical Meeting Transcript; Federal Recovery Strategy (ECCC 2020)

In IR ECCC-06, ECCC requested the Developer calculate habitat area loss using the standardized equations as derived from the Federal Recovery Strategy. In IR ECCC-07, ECCC requested the Developer provide justification for the adequacy of existing habitat information in the absence of Project-specific baseline data for caribou.

The Developer has calculated habitat area loss, but the calculations are based on an unsuitable buffer size for indirect habitat loss, and use of selected habitat only for direct habitat loss. All areas disturbed by the Project in the Project Development Area (PDA) in the caribou range should be considered direct habitat loss. Further, while a sensitivity analysis was done, the Developer hasn't followed it through the assessment of effects and significance.

To assess indirect habitat loss, the Developer applied a 500 m buffer to the PDA and calculated the full area of habitat types boreal caribou select, according to a Resource Selection Function (RSF) model used to identify habitat selection by collared animals. The 500 m buffer discussed in the Federal Recovery Strategy (ECCC 2020), which should be used for calculating total direct habitat disturbance for a range, is based on model results specific to a range-level analysis of disturbance impacts on boreal caribou at the National scale and is therefore not appropriate for assessing Project-specific impacts on boreal caribou. Instead, indirect habitat loss calculations should be made within an area around the PDA which is justified by literature identifying the zones of influence for effects from the Project.

The Developer responded during the Technical Meeting (November 19 to 21, 2024) that they did use a range of buffer sizes as outlined in the response to MVEIRB #47. Response to MVEIRB #47 is a sensitivity analysis on selected boreal caribou habitat using variable buffer widths. The response to MVEIRB #52 is an analysis update on total area disturbance calculations using a 500 m buffer.

Calculating the indirect habitat loss using the different buffers is a good start. It is clear from this exercise that the 5 km buffer shows a much larger impact. However, the Developer is still using the RSF habitat model RSF >/= 0.6. That is useful in terms of understanding the importance of the habitat types impacted, but the total amounts should be considered in the indirect habitat loss. This exercise does not address the incorrect usage of the 500 m buffer in the indirect habitat loss analysis.

To assess direct habitat loss in the DAR, the Developer calculated caribou "selected habitat" according to an RSF model. In the response to IR MVEIRB #52, the Developer re-calculated direct habitat loss using ECCC recommended definitions of disturbed habitat and the Federal Recovery Strategy formulas (ECCC 2020). However, the data used to develop conclusions on the effects to boreal caribou individuals and critical habitat is still partly based on "selected habitat" according to the RSF habitat model. While caribou may select types of habitats at the scale of the PDA, caribou is a landscape scale species that requires continuous tracts of undisturbed habitat. They occur in low densities throughout their distribution to reduce the risk of predation (Section 3.3.1 ECCC 2020). Connectivity within and between ranges is essential for boreal caribou persistence on the landscape (Section 3.3.2 ECCC 2020). While caribou may select (i.e., use more than available) specific types of habitats (represented in the DAR by

landcover data), at the scale of the PDA, all areas directly disturbed should be considered habitat loss, not only those land cover types used preferentially.

The relative amounts of the selected/avoided habitat within the PDA area are informative (e.g., risks of impacts are higher if the habitat disturbed is all preferred) however caribou may move through any of the habitat types present within their range, and thus, the loss of those areas, particularly as small patches interspersed with selected habitat types, can be expected to impact caribou. Details on the amount of direct habitat loss that is selected, avoided, and used equal to availability provides more context for the scale of possible impacts, and so ECCC recommends that all disturbed areas in the PDA caribou range be considered direct habitat loss, unrelated to RSF value.

Request from Canadian Northern Economic Development Agency:

1. ECCC requests the Developer commit to a reassessment of indirect habitat loss with a more appropriate buffer size:

    a) Carry the resulting buffer through the assessment and provide the updated assessment prior to interventions;

    b) Confirm whether the 5 km buffer will be used for a final assessment on significance of impacts to caribou from indirect habitat disturbance; and

    c) Outline the plan to reconcile the calculations for direct habitat loss with the Project effects assessment; adjust the conclusions on the effects to boreal caribou individuals and critical habitat and discontinue reliance on the RSF model.

ECCC requests that indirect habitat loss calculations be made within an area around the PDA which is justified by literature identifying the zones of influence for effects from the Project instead of the 500 m buffer discussed in the Federal Recovery Strategy. The Developer should clearly identify the buffer size which will apply to the assessment of the Project's potential effects and significance that will be carried throughout the assessment.

Response from the Government of the Northwest Territories (GNWT):

The GNWT would like to correct a few points in Environment and Climate Change Canada (ECCC)'s preamble:

The GNWT's assessment of Project-level effects focused on 'selected' boreal caribou habitat, or biophysical attributes. Comparatively, all areas in boreal caribou critical habitat (NT1 range) were considered when assessing cumulative effects at the landscape-level. Environment and Climate Change Canada (2020) specifically states that critical habitat for boreal caribou considers: (a) "*the area within the boundary of each boreal caribou range that provides an overall ecological condition that will allow for an ongoing recruitment and retirement cycle of habitat, which maintains a perpetual state of a minimum of 65% of the area as undisturbed habitat*"; and (b) "*biophysical attributes required by boreal caribou to carry out life processes*" (pg. 34). The Developer's Assessment Report (DAR) considers both definitions of habitat when characterizing boreal caribou habitat loss. Furthermore, all direct and indirect effects are characterized conservatively by assuming the Project creates a footprint and sensory disturbance on undisturbed areas, even though most of the Project alignment overlaps the existing Mackenzie Valley Winter Road.

1. The following are responses to ECCC's requests:

a) The project will not be impacting undisturbed habitat. See response to parts b) and c).

b) Indirect habitat loss using different buffers (500 metre (m), 1 kilometre (km), 2.5 km, and 5 km) was presented in response to R1 MVEIRB IR#47. However, the GNWT disagrees with using an arbitrary buffer to define indirect habitat loss by applying a zone of influence (ZOI). Varied ZOI distances are estimated and presented in the caribou literature, ranging from attraction to extreme avoidance (>15 km), that differ by ecological context between populations and by season/year within populations (Weir et al. 2007, Polfus et al. 2011, Johnson and Russell 2014, Plante et al. 2018, Johnson et al. 2020, Prichard et al. 2020, 2022, Boulanger et al. 2021, 2024). These studies rely on statistical estimates of spatial distribution to infer avoidance and have no link to meaningful changes in caribou physiology (e.g., reduced foraging and body condition) or population parameters like recruitment, survival, and population growth. Instead of relying on ZOI estimates in the literature, the GNWT focuses on disturbance buffers that have a clear link to caribou demography. The 500 m buffer around anthropogenic disturbances proposed in Environment Canada (2011) provides such a link, and therefore is appropriate to use in the assessment.

c) In response to ECCC's preamble, the DAR includes assessments using both (1) selected habitat and (2) total area within the NT1 range. Assessing effects on caribou biophysical attributes, effectively delineated using 'selected' habitat, is important in addressing changes to boreal caribou Critical Habitat.

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