GNWT Response to:
GoC ECCC IR#5 (ID7)

Topic
Boreal Caribou – Undisturbed Habitat Estimates Within NT1

Comment
Disturbance estimates for Boreal Caribou critical habitat have been provided by the Proponent in the Adequacy Statement Response (Base and Application cases: 66.8%; Reasonable Foreseeable Developments: 66.6%). These disturbance estimates differ from recent estimates within NT1 range provided during other reviews (e.g., preliminary screening for the Project [65.76%] and Government of the Northwest Territories Technical Report for CanZinc Prairie Creek All Season Road EA1415-01 [66%]). Disturbance estimates are expected to vary over time; however, ECCC is unable to account for these discrepancies among recent projects. All estimates appear to account for the same reasonable foreseeable developments in their calculations, so it is unclear why there is a difference in estimates.

Recommendation
ECCC requests that the Proponent provide clarification on the differences among the undisturbed habitat estimates for Boreal caribou critical habitat within NT1 provided during the Project Screening (May 2016), CanZinc Prairie Creek All Season Road Technical Report (March 2017) and the Project Adequacy Statement Response (April 2017).

GNWT Response
The slight differences in future cumulative development disturbance estimates (i.e., 66.6% versus 65.76%) noted for boreal caribou critical habitat relative to the various reports are the result of differences in the spatial data files and coordinate system projections applied in a Geographic Information System (GIS) platform. For example, the Project Description Report (PDR) used Canada Albers Equal Area Conic projection with Landsat imagery that has a 30 metre resolution. The Adequacy Statement Response (ASR, PR#110) used the SPOT 4/5 land cover data with a 20 metre resolution for all wildlife Valued Component habitat mapping, which required LCC E008 (Lambert Conformal Conic) projection. Projection of the ASR's disturbance data using Canada Albers Equal Area Conic results in 3,924,820 ha of disturbance in the NT1 range. Projection of the same disturbance data using LCC E008 projection results in 3,697,667 ha of disturbance in the NT1 range. The development disturbance data used in the Base Case also included the entire length of the existing old airport winter road, whereas the PDR only included parts that were visible on Landsat imagery in ECCC disturbance data. Reconnaissance information (PR#7; PR#54) on the existing route shows that the entire route is

disturbed even though some disturbance is not visible in Landsat imagery. Additionally, the Reasonably Foreseeable Development (RFD) Case in the ASR included the NICO and Mackenzie Valley Highway projects, which were not included in the PDR or preliminary screening calculations. The contribution of these data to the observed differences are expected to be small because they intersect existing development and fire disturbance already present in the Base Case. The RFD Case in the ASR reduced undisturbed habitat in the NT1 range by 0.2%, so these two future projects would represent only a fraction of this amount. Even if these two RFDs had been included in the PDR and preliminary screening calculations, the results would still indicate greater than 65% undisturbed habitat for the NT1 range.

The small difference of 0.84% between the reported undisturbed habitat values through future cumulative effects does not change the overall status of boreal caribou critical habitat condition in the NT1, which exceeds the 65% minimum threshold for undisturbed habitat identified by ECCC as necessary to support a self-sustaining boreal caribou population with a low to moderate risk (EC 2012). The methods used to calculate disturbance estimates were appropriate for the Terms of Reference (PR#69), and the degree of difference between calculations does not change how the assessment for boreal caribou was completed, nor does it influence the results or alter the conclusions of the assessment.

Using any of the different calculations for disturbance in the NT1 range, existing disturbance levels are close to the 65% minimum threshold for undisturbed habitat identified by ECCC as necessary to support self-sustaining boreal caribou population with a low to moderate risk (EC 2012). Disturbance in the NT1 range is primarily from fire (e.g., calculations presented in the Adequacy Statement Response indicate 73% of disturbance is due to fire and 27% is due to buffered development). The addition of the Project increases the amount of disturbance in the NT1 range by <0.1%. The addition of the Project and reasonably foreseeable developments increases the amount of disturbance in the NT1 range by about 0.2%. Using any of the different calculations, disturbance in the NT1 range remains above the 65% minimum threshold in both assessment cases. Consequently, as concluded in the ASR, habitat disturbance for boreal caribou is approaching the limits identified by ECCC for maintaining self-sustaining caribou population, but the limits have not been exceeded.

References

Environment Canada. 2012. Recovery strategy for the woodland caribou (Rangifer tarandus caribou), boreal population, in Canada. Species at Risk Act Recovery Strategy Series. Environment Canada, Ottawa. xi + 138 pp.

GNWT Response to:
GoC ECCC IR#10 (ID12)

Topic
Assessment Methods: Primary Pathways – Strength of Interactions

Comment
The Proponent uses the expected strength of the interactions between primary pathways and each VC. This is determined from the Base Case results, potential to be influenced by reasonably foreseeable developments and literature on the responses of each VC to the effects from the road construction and operations. A formal classification of residual effects and determination of significance was completed only for those VCs that are expected to have "strong" interactions with Project pathways. Avian species at risk, as well as Little Brown Myotis and Bumble Bees, were expected to have "weak" interactions with Project primary pathways. The rationale for the exclusion of VCs with "weak" interactions was not provided. All interactions between the Project and listed wildlife species are important to understand and mitigate as these species are already at risk.

Recommendation
ECCC requests a formal classification of residual effects and determination of significance of all species at risk.

GNWT Response
The pathway analysis undertaken for the Adequacy Statement Response (ASR, PR#110) involves screening the potential effects from the Project to determine whether, after incorporating mitigation, there is still potential for the change in the environment capable of causing or contributing to significant residual effects. Each potential pathway was assessed and described using scientific knowledge, Traditional Knowledge (where available), logic, and experience with similar developments, as well as the effectiveness of environmental design features and mitigation.

Primary pathways identify potential effects of the Project on wildlife in general, and the potential for each valued component (VC) to be affected by each primary pathway varies. For example, some wildlife species are highly susceptible to sensory disturbance, whereas others are unaffected by it, or habituate easily. A weak linkage may describe an interaction where the VC is less sensitive or is likely to adapt and the pathway is therefore not likely to contribute to residual adverse effects for that VC. A weak linkage may also describe an interaction where the effect, although not able to be avoided or minimized, is not expected to impact the self-sustaining or ecologically effective status of a VC. By focusing the assessment on strong

interactions, the effects that matter most are highlighted and effects that are *a priori* confirmed to have no potential to contribute to a significant adverse effect are not carried forward for further assessment.

We strongly agree that all potential interactions between the Project and listed wildlife are important to understand and mitigate. Mitigation for each potential effect pathway is provided in Section 4.3.2 of the ASR. In many cases, the mitigation presented in Section 4.3.2 results in the conclusion that a weak linkage is present for a VC, including species at risk. For example, avoiding disturbance of bat roosts or hibernacula by conducting pre-clearance surveys, or avoiding disturbance to migratory birds by clearing outside the bird nesting and fledging season. The rationale for excluding weak linkages for VCs (including species at risk) was provided in Sections 4.3.3 to 4.3.12 (i.e., demonstration of small potential for the Project to affect populations).

To address ECCC'S request, an effects classification and significance determination was completed based on the results presented in Sections 4.3.3 to 4.3.12 of the ASR. The effects classifications are presented below in Tables 1 through 10. The results of effects classification do not change the conclusions of the assessment.

Table 1: Summary of Residual Effects Classification and Predicted Significance for Bison in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 2,546 ha (0.2%) of undisturbed habitat in the Regional Study Area (RSA) from Base Case to Application Case. Much of this habitat is unoccupied by bison in the Base Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/ Reversibility	■ Permanent (direct loss of habitat) ■ Long-term (sensory disturbance)	
	Frequency/ Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss and much of the habitat is unoccupied)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches	
	Geographic Extent	■ Local	
	Duration/ Reversibility	■ Long-term (direct loss of habitat and sensory disturbance) ■ Permanent (alterations from all-season roads)	
	Frequency/ Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/ Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/ Timing	■ Continuous	
	Likelihood	■ Possible	

Table 2: Summary of Residual Effects Classification and Predicted Significance for Olive-sided Flycatcher in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 2,754 ha (6.4%) of habitat in the RSA from Base Case to Application Case. ■ Roadside habitat established following construction may replace some of the initial habitat loss. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (precautionary assessment and amount of habitat loss and direction of change uncertain; edge effect may improve habitat) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility and ability to occupy fragmented landscapes	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 3: Summary of Residual Effects Classification and Predicted Significance for Peregrine Falcon in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 9 ha (1.8%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 4: Summary of Residual Effects Classification and Predicted Significance for Bank Swallow and Barn Swallow in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 44 ha (1.0%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitats) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA (northern edge of both species distribution)	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 5: Summary of Residual Effects Classification and Predicted Significance for Common Nighthawk in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 1,866 ha (7.0%) of habitat in the RSA from Base Case to Application Case. ■ Roadside habitat established following construction may replace some of the initial habitat loss. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss; clearings may improve habitat) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss; clearings may improve habitat) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 6: Summary of Residual Effects Classification and Predicted Significance for Bumble Bees in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 886 ha (5.3%) of habitat in the RSA from Base Case to Application Case. ■ Roadside habitat established following construction may replace some of the initial habitat loss. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Medium-term (direct loss of habitat along roadside) ■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss; clearings may improve habitat) ■ Possible (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long-term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (small amount of habitat loss; clearings may improve habitat) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long-term (vehicle strikes and sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 7: Summary of Residual Effects Classification and Predicted Significance for Horned Grebe, Yellow Rail, and Red-necked Phalarope in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 24 ha (0.6%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 8: Summary of Residual Effects Classification and Predicted Significance for Rusty Blackbird in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 24 ha (0.6%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss – less than one breeding territory) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss – less than one breeding territory) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 9: Summary of Residual Effects Classification and Predicted Significance for Short-eared Owl in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 27 ha (2.8%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss – less than one breeding territory) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitat) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible (minimal amount of habitat loss – less than one breeding territory) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	

Table 10: Summary of Residual Effects Classification and Predicted Significance for Little Brown Myotis in the Application Case

Indicator	Characteristic	Rating/Effect Size	Significance Determination
Habitat availability	Direction	■ Negative	Not significant
	Magnitude	■ Direct and indirect loss of 521 ha (4.9%) of habitat in the RSA from Base Case to Application Case. ■ Reduced habitat quality and possible avoidance in the RSA from sensory disturbance from construction and operation.	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (sensory disturbance) ■ Permanent (direct loss of habitat)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Certain (direct loss) ■ Probable (sensory disturbance)	
Habitat distribution	Direction	■ Negative	
	Magnitude	■ Small reduction in movements among habitat patches due to high mobility and ability to occupy fragmented landscapes	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Permanent (direct loss of habitats) ■ Long term (sensory disturbance)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Certain (direct loss of habitats) ■ Possible (sensory disturbance)	
Survival and reproduction	Direction	■ Negative	
	Magnitude	■ Direct loss from collisions with vehicles (rare) ■ No change predicted in population size within the RSA	
	Geographic Extent	■ Local	
	Duration/Reversibility	■ Long-term (vehicle strikes and sensory disturbance) ■ Permanent (direct loss of habitats)	
	Frequency/Timing	■ Continuous	
	Likelihood	■ Possible	